63. Soil erosion can be avoided by
- a. Maintaining a protective cover on the soil
- b. Creating a barrier to the erosive agent
- c. Modifying the landscape to control runoff amounts and rates
- d. All the above

64. Specific practices to avoid water erosion
- a. Growing forage crops in rotation or as permanent cover
- b. Growing winter cover crops
- c. Inter-seeding
- d. All the above

65. Specific practices to avoid water erosion
- a. Protecting the surface with crop residue
- b. Shortening the length and steepness of slopes
- c. Increasing water infiltration rates
- d. Improving aggregate stability
- e. All the above

66. Specific practices to avoid wind erosion
- a. Maintaining a cover of plants or residue
- b. Planting shelterbelts
- c. Strip cropping
- d. All the above

67. Specific practices to avoid wind erosion
- a. Increase surface roughness
- b. Cultivating on the contour
- c. Maintaining soil aggregates at a size less likely to be carried by wind
- d. All the above

68. One of the functions of a wetland is to recharge groundwater sources (True/False)

69. Class III land contains 2% or less slopes (True/False).

70. Terraces are built and designed around the natural contour of the land (True/False).

71. Soil erosion is one of the leading offenders in point source pollution (True/False).

72. One of the main functions of watersheds is controlling floods (True/False).

73. Leaving adequate ground cover to prevent soil erosion is one of the benefits of maximum tillage (True/False).

74. A 45 foot strip of grass outlining an agricultural crop-producing field is called a grass waterway (True/False).

75. One of the benefits of leaving adequate ground cover is that precipitation is allowed to percolate into the soil instead of running off into surrounding surface waters (True/False).

76. Water quality is affected by the activities within a watershed (True/False).

77. Agricultural producers convert wetlands into productive acres because it is the least expensive way to increase their production acres (True/False).

78. Grass waterways are placed in areas of the field where soil erosion is most prevalent (True/False).

79. Which of the following is most likely to cause desertification of soil?
- a. Overgrazing of pastures
- b. A large accumulation of heavy metals
- c. Improper irrigation
- d. Improper handling of chemicals

Answers												
	63.	d	66.	d	69.	f	72.	f	75.	T	78.	T
	64.	d	67.	d	70.	T	73.	f	76.	T	79.	a
	65.	e	68.	T	71.	f	74.	f	77.	T		

80. Which type of erosion is the most highly visible?
- a. Gully erosion
- b. Wind erosion
- c. Ephemeral gullies
- d. Splash erosion

81. The largest of these soil separates or particles is
- a. Gravel
- b. Sand
- c. Silt
- d. Clay

82. If soil is stabilized it is
- a. Acted on by geological soil erosion and man-made soil erosion
- b. Never moving under any circumstances
- c. Under the influence of construction of a new highway
- d. Acted on only by geological soil erosion

83. Which of these is not a key ingredient of soil?
- a. Organic matter
- b. Hemoglobin
- c. Minerals
- d. Air

84. What percentage of the average soil is organic matter?
- a. 45%
- b. 5%
- c. 25%
- d. 17%

85. An agronomist is primarily concerned with what use of soil?
- a. Construction
- b. Acting as a filter for the hydrologic cycle
- c. Supporting crop growth
- d. Natural beauty

86. Soil erosion is
- a. The transportation of soil particles from one place to another
- b. The result of terraces and diversions
- c. Not a natural phenomenon
- d. Unable to be affected by humans

87. Which of the following is not used to reduce soil erosion?
- a. Mulch
- b. Gravel
- c. Residue from previous crops
- d. Animal waste ad residues

88. What is no-till crop production?
- a. Preparing a good seedbed for crops
- b. Ploughing ground, but not discing
- c. Planting the seeds in the previous year's crop residue
- d. Discing ground prior to planting

89. Diversion terraces are not suitable for slopes more than
- a. 12%
- b. 1%
- c. 5%
- d. 7%

90. When slopes are more than 20% which of the following types of terraces are suitable for
- a. Diversion
- b. Retention
- c. Bench
- d. All the above

91. Which of the following is/are the type of waterways?
- a. Grassed waterways
- b. Diversion channels
- c. Terrace channels
- d. All the above

92. Which of the following is/are (an) example(s) of grass used for grassed waterways?
- a. Anjan
- b. Bermuda
- c. Napier
- d. All the above

93. The threshold velocity for particle movement in surface wind is
- a. 2 km/hr
- b. 3 km/hr
- c. 5 km/hr
- d. 10 km/hr

Answers												
	80.	a	83.	b	86.	a	89.	a	92.	d		
	81.	a	84.	b	87.	d	90.	c	93.	b		
	82.	d	85.	c	88.	c	91.	d				

94. Soils containing more than 1.5 MPa soil moisture tension are
a. Less susceptible for wind erosion
b. More susceptible for wind erosion
c. Both a and b
d. None of the above

95. CSWCRTI was established in which year?
a. 1974 b. 1949
c. 1958 d. 1985

96. First recorded soil conservation research in India started in which year?
a. 1923 b. 1935
c. 1958 d. 1974

97. First soil conservation scheme called Dry farming Scheme started at which place in India?
a. Manjiri near Pune
b. Dehradun
c. Barapani at Shillong
d. None of the above

98. Individual raindrops strike the soil surface at velocities up to
a. 9 m/s b. 5 m/s
c. 2 m/s d. 1 m/s

99. The first relationship on soil loss to slope length was given by
a. Zeng b. Smith
c. Musgrove
d. Wischmeir and Smith

100. Which of the following soil conservation measure is the most popular in India?
a. Bench terracing
b. Contour bunding
c. Contour strip
d. All the above

101. With an increase of R_2O_3 the erodibility of soil
a. Increase b. Decrease
c. Both a and b d. None

102. Which of the following is/are the types of terrace?
a. Diversion b. Retention
c. Bench d. All the above

103. When the rate of water supply to the soil surface exceeds the rate of infiltration, the free water, is called
a. Surface water excess
b. Subsurface water
c. Ponding water
d. None of the above

104. Surface storage capacity is the excess water collected
a. In depressions,
b. Forming puddles
c. Both a and b
d. None of the above

105. Surface runoff of rain water represents the portion of the water supply to the surface that is
a. Not absorbed by the soil
b. Not retained on its surface
c. That runs down slope
d. All the above

106. Overland flow is
a. Thin Sheet like
b. Gully like
c. Both a and b
d. None of the above

107. Reynolds number of which value is used as a criterion for the onset of turbulence
a. 500 b. 200
c. 300 d. 1000

Answers										
	94.	a	97.	a	100.	b	103.	a	106.	a
	95.	a	98.	a	101.	a	104.	c	107.	a
	96.	a	99.	a	102.	d	105.	d		

108. Natural run-off seldom exceeds about what % of annual precipitation
a. 10 b. 20
c. 30 d. 40

109. Runoff can be increased several folds by
a. Stone clearing b. Smoothing
c. Compaction d. All the above

110. The soil surface can be made water repellent or impermeable by the application of mechanical barriers to water movement such as
a. Plastic
b. Aluminum foil
c. Concrete or sheet metal
d. All the above

111. The soil surface can be made water repellent or impermeable by barriers to water movement involving formation of an impervious soil crust with the aid of various materials, such as
a. Sodic salts
b. Sprayable asphalt emulsions
c. Silicone water-repellents
d. All the above

112. Soil erosion is a
a. Three-stage process
b. Two stage process
c. Five stage process
d. None of the above

113. When the runoff water finally comes to rest in a low-lying area, it deposits its suspended load, which is known as
a. Fluvial sediment
b. Sedimentation
c. Both a and b
d. None of the above

114. The uniform removal of thin layers of soil from a more or less smooth slope, carried by the distributed (rather than concentrated) flow of runoff water over the soil surface is called
a. Sheet erosion b. Gully erosion
c. Rill erosion
d. None of the above

115. Splash and sheet erosion are also known as
a. S inter-rill erosion
b. Gully erosion
c. Both a and b
d. None of the above

116. The scouring and transport of soil by a concentrated flow of water is called
a. Rill erosion
b. Sheet erosion
c. Both a and b
d. None of the above

117. Raindrop sizes range from up to about
a. 5 mm in diameter b. 10 mm in dia
c. 15 mm in dia d. 20 mm in dia

118. Raindrops larger than 5 mm because of air turbulence generally tend to
a. Disintegrate
b. Accumulate
c. Both a and b
d. None of the above

119. A soil pulverized by excessive tillage or trampling is
a. More erodible than an untilled and mulch-covered soil.
b. Less erodible than an untilled and mulch-covered soil.
c. Both a and b
d. None of the above

Answers										
	108.	a	111.	d	114.	a	117.	a		
	109.	d	112.	a	115.	a	118.	a		
	110.	d	113.	c	116.	a	119.	a		

120. When air gusts pick up masses of loose particles from the surface it is called
a. Deflation b. Inflation
c. Diffraction d. None of these

121. The proneness of the soil to wind erosion depends on
a. Surface dryness
b. Roughness
c. The sizes of particles (texture)
d. Whether the particles are loose
e. Bound in aggregates
f. All the above

122. The rolling or sweeping motion of relatively large particles that occurs within a few centimeters over the ground surface is called
a. Surface creep b. Saltation
c. Suspension d. All the above

123. Surface creep occurs when particle size is
a. Diameters of 0.5 mm or more
b. Diameter of 10mm or more
c. Diameter of 2mm or more
d. All the above

124. The jerky movement of finer sand particles that follow distinct trajectories is called
a. Surface creep b. Saltation
c. Suspension d. All the above

125. Saltation occurs when particle size is
a. 0.1-0.5 mm b. 0.5-1 mm
c. 2-5 mm d. 10-20 mm

126. Methods of land evaluation includes
a. Qualitative b. Quantitative
c. Both a and b d. None of these

127. Qualitative method of land evaluation includes
a. Land capability classification
b. Land irrigability classification
c. Both a and b
d. None of the above

128. Quantitative method of land evaluation includes which of the following
a. Soil index rating
b. Actual and potential productivity
c. Land suitability classification
d. All the above

129. Causes of climate change can be
a. Periodic tidal pulls exerted by astronomical bodies
b. Variation in amount and quality of solar energy (Sun-spot cycle)
c. El Nino/Southern oscillation (ENSO) phenomenon
d. All the above

130. Positive Effects of climate change can be
a. Increase of rate of photosynthesis in C_3 plants due to high CO_2 conc. and high leaf area
b. High CO_2 conc. reduces transpiration due to reduced stomatal aperture and may result in high water use efficiency
c. Both a and b
d. None of the above

131. Direct Negative Effects of climate change can be
a. Increased LAI may result in self shading and thus reduces net assimilation rate
b. Increased CO_2 conc. results in higher LAI thus more transpiring surface is available which might compensate increased Water Use Efficiency
c. Both a and b
d. None of the above

Answers							
	120. a	123. a	126. c	129. d
	121. f	124. b	127. c	130. c
	122. a	125. a	128. d	131. c

132. Indirect Negative Effects due to increased temperature can be
a. Reduction in maturity duration of crops with every 1 ^{0}C rise in temperature
b. Accelerated leaf senescence, forced maturity in winter cereal crops
c. Increased temperature by 1-2 ^{0}C above mean temperature of 17 ^{0}C during grain filling period reduces yield due to increased rate of senescence of flag leaf and reduction in grain filling period
d. All the above

133. Indirect Negative Effects due to increased temperature can be
a. ET will rise by rise in temperature
b. Reduction in soil moisture due to increased evaporation from soil and transpiration from plants
c. Both a and b
d. None of the above

134. The purposes of modeling are
a. To reduce a complex system to its essential processes, so that system behavior may be simulated under different conditions
b. To reduce time and resources (money, labour, energy)
c. Both a and b
d. None of the above

135. Different types of models includes
a. Mathematical models
b. Statistical models
c. Simulation models
d. All the above

136. Different types of models includes
a. Physical models
b. Computer models (Information system, decision support system expert system)
c. Empirical models
d. All the above

137. If 50% land is covered by canopy than what can be the probable run-off?
a. Heavy run-off
b. Medium run-off
c. Less run-off
d. None of the above

138. If 50-75% land is covered by canopy than what can be the probable run-off?
a. Heavy run-off
b. Medium run-off
c. Less run-off
d. None of the above

139. If more than 75% land is covered by canopy than what can be the probable run-off ?
a. Heavy run-off b. Medium run-off
c. Less run-off d. None of these

140. Of the following, which is the major soil blowing criterion?
a. Soil texture
b. Size of soil aggregates
c. Presence of carbonates
d. Degree of decomposition inorganic soils

141. Which of the following abbreviations are related with soil blowing grouping?
a. WEG b. EI
c. Both a and b d. None of these

142. The vulnerability of a soil to erosion, which depends on texture, structure (size and stability of aggregates), looseness and roughness of the soil surface, is called
a. Erodability b. Susceptibility
c. Vulnerability d. None of these

Answers							
	132. d	135. d	138. b	141. c
	133. c	136. d	139. c	142. a
	134. c	137. a	140. d	

143. The vulnerability of a soil to erosion depends on which of the following properties of soil?
   a. Texture
   b. Structure
   c. Looseness and roughness of the soil surface
   d. Size and stability of aggregates
   e. All the above

144. The erosive power of rainfall, running water, or wind is called
   a. Erosivity
   b. Erodibility
   c. Susceptibility
   d. Run-off

145. The erosive power of rainfall depends upon
   a. Rainfall intensity
   b. Duration
   c. Both
   d. None

146. The erosive power in the case of running water depends on
   a. The velocity
   b. Turbulence
   c. Both a and b
   d. None of the above

147. An equation relating the height of the water-table between drains to depth of the drains and the distance between them, the hydraulic conductivity of the soil, and the rate of recharge by percolating water is called
   a. Hooghoudt equation
   b. Darcy equation
   c. Renould's equation
   d. None of the above

148. The volume of water that runs off the soil surface and flows into streams during episodes of intense rainfall is called
   a. Runoff
   b. Erosion
   c. Splash erosion
   d. Sheet erosion

149. The volume of water that runs off during an irrigation that exceeds the soil's infiltrability is called
   a. Run-off b. Erosion
   c. Splash erosion d. Sheet erosion

150. A section of the land surface that drains its surface-water excess to a specified point along a stream is called
   a. Watershed b. Catchment
   c. Both a and b
   d. None of the above

151. Vegetated windbreaks are also called as
   a. Shelterbelts b. Tree belts
   c. Watershed
   d. None of the above

152. The majority of the land degradation is caused by
   a. Acidification b. Salinization
   c. Erosion
   d. None of the above

153. Wind and water almost contribute what percentage of soil degradation?
   a. 50% b. 60%
   c. 70% d. 80%

154. Canyons are the result of
   a. Geological erosion
   b. Man made erosion
   c. Both a and b
   d. None of the above

Answers								
	143. e	146. c	149. a	152. c
	144. a	147. a	150. c	153. d
	145. c	148. a	151. a	154. a

155. The maximum amount of soil that can be lost by erosion without causing long term soil degradability is called
   a. T value b. A value
   c. E value
   d. None of the above

156. T value of a soil depends upon
   a. Organic matter content
   b. Soil depth
   c. Management factors
   d. All the above

157. T values generally range from
   a. 5-11 Mg/ha b. 1-2 Mg/ha
   c. 0-1 Mg/ha
   d. None of the above

158. Water erosion is a
   a. 2 way process
   b. 1 way process
   c. 3 way process
   d. None of the above

159. The speed at which the friction between the drop and the air balances the force of gravity is called
   a. Terminal velocity
   b. Accelerated velocity
   c. Threshold velocity
   d. None of the above

160. The amount of soil delivered to the stream divided by the amount eroded is called
   a. Delivery ratio
   b. Terminal velocity
   c. Accelerated velocity
   d. Threshold velocity

161. Delivery ratio for watersheds where valleys slopes are very steep may reach up to
   a. 20% b. 30%
   c. 40% d. 60%

162. Delivery ratio for small watersheds will be
   a. Less
   b. More
   c. Both a and b
   d. None of the above

163. Which of the following soil properties influences erodability?
   a. Infiltration capacity
   b. Structural stability
   c. Both a and b
   d. None of the above

164. If the gullies are deep up to 3m and width is not greater than 18m wherein side slopes vary this comes under which class of gully erosion?
   a. Very small b. Small
   c. Medium d. Deep & narrow

165. If the gullies are deep up to 3m and width is greater than 18m wherein side slopes vary between 8-15% this comes under which class of gully erosion?
   a. Very small b. Small
   c. Medium d. Deep & narrow

166. If the gullies are deep up to 3-9m and width is not less than 18m wherein side slopes vary 8-15% this comes under which class of gully erosion?
   a. Very small b. Small
   c. Medium d. Deep & narrow

167. If the gullies are deep >9m and width is variable and slopes mostly steep or even vertical with intricate and active branch gullies, then it is called as
   a. Very small b. Small
   c. Medium d. Deep & narrow

Answers					
	155. a	158. c	161. d	164. a	167. d
	156. d	159. a	162. b	165. b	
	157. a	160. a	163. c	166. c	

168. The development of gully occurs due to which of the following stages?
a. Formation
b. Development
c. Healing
d. Stabilization
e. All the above

169. Agroforestry interventions with adequate soil and moisture conservation methods can reduce the soil loss by
a. 30% b. 40%
c. 50% d. 70%

170. No apparent or slight sheet erosion phase is denoted by which symbol?
a. e1 b. e2
c. e3 d. e4

171. Very severe erosion phase is denoted by which symbol?
a. e1 b. e2
c. e3 d. e4

172. LCC (Land capability class) 1 is denoted by which colour?
a. Light green b. Yellow
c. Red d. Blue

173. LCC (Land capability class) 2 is denoted by which colour?
a. Light green b. Yellow
c. Red d. Blue

174. LCC (Land capability class) 3 is denoted by which colour?
a. Light green b. Yellow
c. Red d. Blue

175. LCC (Land capability class) 4 is denoted by which colour?
a. Light green b. Yellow
c. Red d. Blue

176. LCC (Land capability class) 5 is denoted by which colour?
a. Dark green b. Orange
c. Brown d. Purple

177. LCC (Land capability class) 6 is denoted by which colour?
a. Light green b. Yellow
c. Red d. Blue

178. LCC (Land capability class) 7 is denoted by which colour?
a. Light green b. Yellow
c. Red d. Blue

179. LCC (Land capability class) 8 is denoted by which colour?
a. Light green b. Yellow
c. Red d. Blue

180. If thickness of top soil is 0-15 cm depth the thickness comes under
a. Less thick b. Moderate thick
c. Thick d. Very thick

181. If thickness of top soil is 15-30cm depth, the thickness comes under
a. Less thick b. Moderate thick
c. Thick d. Very thick

182. If thickness of top soil is 30-60cm depth, the thickness of the top soil comes under
a. Less thick b. Moderate thick
c. Thick d. Very thick

183. Hydraulic action of the water will be more pronounced in
a. Loose soil
b. Heavy textured soil
c. Both a and b
d. None of the above

Answers						
	168. e	171. d	174. c	177. b	180. a	183. d
	169. d	172. a	175. d	178. c	181. b	
	170. a	173. b	176. a	179. d	182. c	

184. The particles of the running water collide with each other resulting in to further breakdown of the particles. This is called
a. Attrition b. Abrasion
c. Solution
d. None of the above

185. Which of the following erosion can be easily removed by normal tillage operations?
a. Rill erosion b. Gully erosion
c. Sheet erosion d. Splash erosion

186. Most common size of raindrop is
a. 2 mm b. 3 mm
c. 4 mm d. 7 mm

187. The maximum impact of the raindrop will be at what angle when it hits the ground?
a. 30° b. 45°
c. 90° d. 180°

188. Which of the following soil separates has more erodability?
a. Sand b. Silt
c. Clay d. Rocks

189. Which of the following types of clay minerals will provide more stable aggregates?
a. Nonexpanding type of clay minerals
b. Expanding type of clay minerals
c. Both a and b
d. None of the above

190. The erodability increase at what size of aggregates?
a. 0.2 mm b. 0.3 mm
c. 0.4 mm d. 0.5 mm

191. Which is the most important index of soil erodibility?
a. Silica content
b. Sesquioxide content
c. Silica-sesquioxide ratio
d. All the above

192. Match the following

a. Man-made erosion	i. Vegetative erosion control
b. Splash erosion	ii. Very productive, nearly level
c. Class-I	iii. Topsoil being washed off of cultivated fields
d. Cover crops	iv. Rain drops shatters surface aggregates

a. i, ii, iii, iv b. iii, iv, ii, i
c. ii, iii, i, iv d. iv, iii, ii, i

193. Match the following

a. Geological erosion	i. Severe limitations
b. Terraces	ii. Wearing away of land's surface by water, wind, and ice
c. Soil erosion	iii. Wearing away of earth's surface under natural environmental conditions
d. Class IV	iv. Mechanical erosion control

a. i, ii, iii, iv b. iii, iv, ii, i
c. ii, iii, i, iv d. iv, iii, ii, i

194. The major role of inter-cultivation tillage is
a. Improvement of soil texture
b. Enhancement of soil aeration
c. Weed control
d. Improvement of soil structure

Answers					
	184. a	187. c	190. a	193. b	
	185. a	188. b	191. d	194. d	
	186. d	189. a	192. b		

9

Environmental Sciences

QUESTIONS :

1. Which of the following is the most likely global effect that would result from a large volcanic eruption ?
   a. An increase in rainfall
   b. An increase in temperature
   c. Decrease in temperature
   d. Decrease in atmospheric CO_2

2. In which subdivision of geologic time did organisms first expand into terrestrial environment ?
   a. Proterozoic b. Paleozoic
   c. Mesozoic d. Cenozoic

3. Which of the following lists contain only greenhouse gases ?
   a. CO_2, CFCs, H_2
   b. CO_2, CO, N_2
   c. CO_2, CH_4, H_2O vapour
   d. CH_4, N_2, N_2O

4. Nutrient cycling often operates at the scale of
   a. Closed systems
   b. Regional scales
   c. Individual space
   d. Local patches
   e. Biogeographic scales

5. Which hypothesis, concerning diversity on Earth, states that biodiversity and ecosystem function are not linked ?
   a. Rivet hypothesis
   b. Redundancy hypothesis
   c. Diversity – stability hypothesis
   d. Idiosyncratic hypothesis

6. What is not an indirect service of the world's ecosystems ?
   a. Nutrient cycling b. Water supply
   c. Waste treatment
   d. Climate regulation

7. The specific aim of ecology is to study
   a. The distribution patterns of plants and animals on Earth
   b. Pollution
   c. How to preserve biodiversity
   d. All of the above

8. Pollutants which are emitted directly from identifiable sources are called
   a. Tertiary b. Secondary
   c. Observable d. Primary

9. Which of the following is not a primary pollutant ?
   a. SO_2 b. H_2SO_4
   c. CO d. Particulate matter

10. The major component of photochemical smog is
    a. Ozone
    b. Particulate matter
    c. NO_2 d. CO

11. Air pollution is likely to be most severe
    a. In summer
    b. In the interior of continents
    c. Near the centre of an anticyclone
    d. When atmosphere is turbulent

12. If excessive amounts of hot water are discharged into a lake, the immediate result will most likely be
    a. An increase in the sewage content of the lake
    b. A decrease in the amount of dissolved oxygen in the lake
    c. An increase in the amount of PCB pollution in the lake
    d. A decrease in the amount of phosphates in the lake

Answers												
	1.	b	4.	a	7.	a	10.	a
	2.	b	5.	d	8.	d	11.	c
	3.	c	6.	b	9.	b	12.	b

13. Which of the following metals is responsible for Itai itai disease in human beings ?
a. Zn b. Hg
c. Cd d. Fe

14. Which metal is not an essential metal ?
a. Ca b. Na
c. Mn d. Pb

15. Eutrophication of lake is caused mainly by
a. P b. K
c. Mg d. Na

16. What was the title of the book Rachel Carson wrote ?
a. Quiet days in Clichy
b. Silent Spring
c. The quiet American

17. Which surface ocean current transports warm water to higher latitudes ?
a. Labrador Current
b. Falidand Current
c. Gulf Stream
d. West Wind Drift

18. Liquid water can store more heat energy than an equal amount of any other naturally occurring substance because liquid water
a. Covers 71% of Earth's surface
b. Has its greatest density at 4°C
c. Has the higher specific heat
d. Can be changed into a solid or a gas

19. Which was the first National Park in the world ?
a. Yellowstone, USA
b. Abisko, Northern Sweden
c. Kaziranga National Park
d. Dowre, Central Norway

20. Which of these is a secondary air pollutant?
a. CO b. NOx
c. PAN d. CO_2

21. Which of these has highest Ozone depleting potential ?
a. CFC
b. Halon
c. HFC
d. Methyl Bromide

22. Which of the following is not a source of greenhouse gasses ?
a. A wind turbine
b. A coal fired power plant
c. A sport utility vehicle
d. Fertilizer

23. Which of the following is not a proxy of past climate ?
a. Sun spot b. Fossils
c. Tree ring d. Corals

24. Which term best describes long term weather condition ?
a. Meteorology b. Weather
c. Isotherms d. Climate

25. Koppen's system of climate classification is based upon
a. Natural vegetation and soils
b. Average annual temperature and pressure
c. Mean monthly temperatures and mean monthly precipitation
d. Relative humidity and hours of sunlight

26. The best general indicator of the climate of a place is its
a. Natural vegetation
b. Soil
c. Bedrock
d. Atmospheric pressure

Answers									
	13.	c	16.	b	19.	a	22.	a	25. c
	14.	d	17.	c	20.	c	23.	a	26. a
	15.	a	18.	c	21.	b	24.	d	

27. A scorpion stalks, kills, and then eats a spider. Based on its behavior, which ecological terms describe the scorpion?
a. Producer, herbivore, decomposer
b. Producer, carnivore, heterotroph
c. Predator, carnivore, consumer
d. Predator, autotroph, herbivore

28. Which organisms are dependent upon other animals for food ?
a. Producers
b. Herbivores
c. Scavengers
d. Primary consumers

29. Certain bacteria living in a human's large intestine help to produce vitamin K. This relationship is an example of
a. Animal parasitism
b. Plant parasitism
c. Commensalism
d. Mutualism

30. According to the heterotroph hypothesis, some early heterotrophs evolved into autotrophs because of their ability to synthesize organic compounds from water and
a. Carbon dioxide
b. Hydrochloric acid
c. Oxygen
d. Hydrogen

31. Hydras, earthworms, grasshoppers, and humans are classified in the same
a. Genus b. Species
c. Phylum d. Kingdom

32. According to the heterotroph hypothesis, autotrophs were able to evolve because heterotrophs made conditions more favorable by
a. Producing chlorophyll for plants
b. Adding carbon dioxide to the environment
c. Storing energy in the bonds of inorganic compounds
d. Manufacturing food from carbon dioxide and oxygen

33. Two of the most important atmospheric conditions affecting the dispersion of pollutants are the strength of the wind and the _____ of the air.
a. Temperature
b. Pressure
c. Stability
d. Visibility

34. Dissolved O_2 of water is determined by
a. Walkley and Black method
b. Winkler's method
c. Gravimetric method
d. Colorimetric method

35. Which is not a 'biotic part' of the ecosystem ?
a. Water b. Plant
c. Bacteria d. Insects

36. What harmful product is filtered by the ozone layer ?
a. Acid rain
b. Greenhouse effect
c. Sewage
d. UV light

37. What is the result when industrial chemicals combine with condensing water vapour ?
a. Global warming
b. Green house effect
c. Acid rain
d. Base rain

Answers									
	27.	c	30.	a	33.	c	36.	d	
	28.	c	31.	d	34.	b	37.	c	
	29.	d	32.	b	35.	a			

38. What is the main source of water pollution in unindustrialized nations ?
    a. CO_2
    b. Pesticides
    c. Industrial chemicals
    d. Untreated sewage

39. These propellants usually found in aerosol cans are thought to be harmful to the ozone layer.
    a. Chlorine b. Carbonate
    c. CFCs d. Nitrate

40. Ultimately, where does the energy within any ecosystem come from ?
    a. National Grid
    b. Falling leaves
    c. Sunlight
    d. Wind energy

41. Which type of ecosystem contains half of the species on Earth ?
    a. Artic Tundra
    b. Chalk grassland
    c. Coral reef
    d. Tropical rainforest

42. What is a niche ?
    a. Small nook in a tree where birds rest
    b. Role an organism plays in an ecosystem
    c. Edge of an ecosystem
    d. A flan made from nuts

43. Which of these organisms is a scavenger ?
    a. Earthworm b. Weevil
    c. Venus Fly Trap d. Bumble Bee

44. The portion of the earth's crust including rocks, mineral and soil required for plant life is known as
    a. Atmosphere b. Hydrosphere
    c. Biosphere d. Lithosphere

45. Food chain refers to
    a. A sequence of organisms each of which is a source of food for the next in order
    b. Plant-eating organisms
    c. The role an organism plays within its natural community
    d. The level at which an organism obtains its nourishment

46. The place where an organism lives is known as
    a. Niche b. Habitat
    c. Trophic level d. Food web

47. Plant-eating organisms are
    a. Carnivore b. Omnivore
    c. Herbivore d. Scavenger

48. Biosphere is
    a. The portion of the earth in which living organisms live and interact with each other and with their non-living environment
    b. The thin envelope of air surrounding the earth and within which all life thrives
    c. The place where an organism lives
    d. The portion of the earth's crust including rocks, mineral and soil required for plant life

49. A wildlife species that no longer exists in a country, but does exist outside is known as:
    a. Vulnerable b. Extirpated
    c. Extinct d. Endangered

50. Tapeworms live inside organisms and feed on the nutrients of the food they eat. A tapeworm is an example of
    a. Mutualism b. Parasitism
    c. Commensalisms d. Cannibalism

Answers										
	38. d	41. d	44. d	47. c	50. b
	39. c	42. b	45. a	48. a	
	40. c	43. a	46. b	49. b	

51. Organisms in an eco system can be classified as producers or consumers. The producers provide food for the consumers. An organism that consumes both producers and other consumers is called as
    a. Carnivore b. Herbivore
    c. Prey d. Omnivore

52. In the hydrological cycle two processes that return water to the earth are
    a. Evaporation and condensation
    b. Evaporation and transpiration
    c. Condensation and precipitation
    d. Transpiration and precipitation

53. The process, in which water, in the water cycle, goes through a phase change, from a gas to a liquid, is called
    a. Condensation b. Precipitation
    c. Evaporation d. Transpiration

54. The following pollutant is not contained in the vehicular exhaust emissions:
    a. Lead
    b. Ammonia
    c. CO
    d. Particulate matter

55. Why is tetra-ethyl lead added to petrol ?
    a. It prevents engine knocking
    b. Reduces vehicular emission
    c. Increases life of tyres
    d. None of the above

56. Bhopal gas tragedy struck in the year 1984 due to the leakage of the following gas
    a. CH_4
    b. N_2O
    c. Methyl Iso Cyanate
    d. CO

57. SPM stands for
    a. Suspended Particles Material
    b. Suspended Particulate Matter
    c. Standard Particles Material
    d. None of the above

58. Health problems related to air pollution include
    a. Coughing b. Bronchitis
    c. Asthma d. All the above

59. A device fitted to motor vehicles to chemically reduce some gases produced by internal combustion engines like NOx, CO, and HC into less harmful products. Name this device.
    a. Catalytic converter
    b. 2-stroke engines
    c. Carburetor
    d. Tail pipe

60. Main sources of water pollution in India are
    a. Municipal sewage
    b. Bathing
    c. Industrial discharge
    d. Both a and c

61. Which minerals are found in the run-off from agricultural land ?
    a. P and C b. N and P
    c. Fe and Mn d. K and As

62. The GAP (Ganga Action Plan) – a project to clean up the polluted waters of the Ganga - plans to intercept and divert municipal sewage falling into the river from 25 large urban conglomerates in thee states. Name them.
    a. UP, Haryana, Punjab
    b. Orissa, Bihar, WB
    c. UP, Bihar, WB
    d. HP, UP, Haryana

Answers										
	51. d	54. b	57. b	60. d
	52. c	55. a	58. d	61. b
	53. a	56. c	59. a	62. c

63. Of the following indications of the health of water body, which is the most widely accepted means of measuring how polluting an effluent is ?
a. Dissolve O_2 b. BOD
c. COD d. Coliform count

64. In a survey recently conducted by the CGWA (Central Ground Water Authority) and CPCB (Central Pollution Control Board), the groundwater samples in one-fourth of the neighborhood tested in New Delhi were unfit for drinking. They contained high levels of two minerals that are not eliminated by ordinary water filters and are extremely harmful at high concentrations. Name them.
a. Hg and Zn
b. Fluoride and As
c. Nitrate and Hg
d. Nitrate and Fluoride

65. Which sector is the single-largest consumer of fresh water in India ?
a. Industry b. Power
c. Domestic d. Agriculture

66. In India and elsewhere, biomass can be obtained from
a. Rice husk
b. Sugarcane bagasse
c. Groundnut shells
d. All of the above

67. Solar cells are simple photovoltaic devices that convert solar energy directly into electricity and are manufactured from the second-most abundant element in the earth's crust. Name it.
a. Bauxite b. Silicon
c. Calcium d. Iron

68. Main component of biogas is
a. CH_4 b. CO_2
c. SO_2 d. N_2O

69. Wind energy is the kinetic energy associated with atmospheric air. It has been used for centuries for which of the following operation ?
a. Grinding grain
b. Running cars
c. Generating electricity
d. None of the above

70. Which state in India is leading in wind energy utilization ?
a. Andhra Pradesh
b. Tamilnadu
c. Orissa
d. Punjab

71. The advantage(s) of biogas is/are
a. A clean and smokeless fuel
b. Slurry left behind is used as fish feed
c. High potential in rural India
d. All of the above

72. Which is the most common non-commercial biological fuel in a large number of developing countries ?
a. Animal dung b. Crop residue
c. Fuel wood d. Coal

73. Large amounts of solar energy are stored in the oceans and seas. The process of harnessing this energy is called
a. OTEC (ocean thermal energy conversion)
b. OTC (ocean thermal conversion)
c. OSTEC (ocean and sea thermal energy conversion)

Answers							
	63. b	66. d	69. c	72. c
	64. d	67. b	70. b	73. a
	65. d	68. a	71. d	

74. This energy is the heat generated by natural process within the earth. The main energy sources are the hot rocks, magma, geysers, and hot-springs. This form of energy is known as
a. Solar energy
b. Geothermal energy
c. Ocean thermal
d. Wind energy

75. Where was the country's first aerobic composting plant set up in 1992 ?
a. Delhi b. Mumbai
c. Kolkata d. Chennai

76. Municipal waste is disposed in the open dumps, landfills, sanitary landfills, and is also burnt in large furnaces. This method is known as
a. Blast furnace b. Incineration
c. Waste furnace d. None of these

77. Landfills are the sites for the disposal of solid waste. While building a landfill it is very essential to take which one of the following factors into consideration ?
a. Below the groundwater level
b. Above the groundwater level
c. In a groundwater source
d. None of the above

78. In the list given below, which waste is not recyclable ?
a. Old medicines b. Newspaper
c. Plastic bags d. Glass bottles

79. Sea level is expected to rise because of warmer climate due to which of the following ?
a. Oceans expand, as they get warmer
b. Glaciers and ice-sheets melt
c. Both the above
d. None of the above

80. Over the last 100 years global sea level has risen by about
a. 10 – 12.5 cm b. 20 - 25 cm
c. Both the above d. None of these

81. Which sector is the largest emitter of greenhouse gases in India ?
a. Transport
b. Domestic
c. Agricultural
d. Electric power generation

82. Which landmark global conference was the FIRST major step towards a global agreement on greenhouse gas emissions reduction and the first to recognize the atmosphere as a natural resource ?
a. The Montreal Protocol in 1987
b. The 'Earth Summit' in Rio in 1992
c. The Vienna Convention in 1985
d. None of the above

83. Name the CFC that is used in refrigerators.
a. Freon b. CO_2
c. Ammonia d. CH_4

84. The massive hole in the ozone layer over the Antarctica was first discovered in
a. 1960 b. 1985
c. 1990 d. 1995

85. The countries were instructed to phase out the production and consumption of the controlled ODS (ozone-depleting substances) within the time frame and limits specified in the
a. Vienna Convention
b. Basel Convention
c. Montreal Protocol
d. Agenda 21

Answers							
	74. b	77. b	80. a	83. a
	75. b	78. c	81. d	84. b
	76. a	79. c	82. b	85. c

86. The term used for the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings is
a. Peripheral conservation
b. Core conservation
c. In-situ conservation
d. Ex-situ conservation

87. Project Tiger, a programme to maintain a viable population of tigers in the country and to chalk out areas for their habitat, was launched in the year
a. 1971 b. 1973
c. 1974 d. 1975

88. Giant Panda, the official symbol of the WWF is found in which country ?
a. China b. India
c. Myanmar d. Newzealand

89. Gir forest in Gujarat is famous for
a. Tiger b. Lion
c. Elephant d. Leopard

90. One of the following bird species was thought to be extinct but has been rediscovered in India by the BNHS (Bombay Natural History Society) in 2002. Name the species.
a. Pink-headed Duck
b. Himalayan Mountain Quail
c. Forest Owlet
d. Masked Finfoot

91. Which state in India is having the largest forest cover ?
a. Madhya Pradesh b. Uttar Pradesh
c. Rajasthan d. Punjab

92. Which state in India is having the cold desert ?
a. Rajasthan
b. Jammu and Kashmir
c. Himachal Pradesh
d. Gujarat

93. On this day in 1972, the Stockholm Conference on Human Environment was held in Sweden. Since then the World Environment Day is celebrated on this day. State the date.
a. March 8 b. April 22
c. June 5 d. November 8

94. The state's and citizens' responsibilities for environmental protection are enshrined in the Constitution of India in the following two articles:
a. 38G and 58A b. 55B and 51D
c. 59B and 12D d. 48A and 51G

95. Which is the first state to implement the path-breaking proposal that environment should be included as a separate subject in schools ?
a. Maharashtra b. Kerala
c. Tamilnadu d. Punjab

96. Which gas is having 21 times more global warming potential than CO_2 ?
a. SO_2 b. NH_3
c. CH_4 d. N_2O

97. What are the environmental costs associated with green revolution ?
a. Vast amounts of fertilizers used
b. Excessive use of underground water due to their higher water requirement
c. Excessive application of pesticides due to their low resistance to pests
d. All the above

Answers									
	86.	d	89.	b	92.	b	95.	b	
	87.	b	90.	c	93.	c	96.	c	
	88.	b	91.	a	94.	d	97.	d	

98. Name the site of the world's worst nuclear accident in 1986.
a. Three Mile Island, USA
b. Chernobyl, erstwhile Soviet Union
c. Bhopal, India
d. Windscale, UK

99. The Wildlife Week is celebrated from
a. 2-8 Oct b. 1-7 Jun
c. 1-7 Jul d. 14-20 Feb

100. What is the primary source of food for marine life ?
a. Phytoplankton b. Zooplankton
c. Sea weed d. Grass

101. Name the Jammu and Kashmir born environmental activist and advocate who was awarded the renowned 'Goldman Environmental Prize' in 1996 and the 'Magsaysay Award' for Public Service in 1997.
a. Mahesh Chandra Mehta
b. Medha Patkar
c. Chandiprasad Bhatt
d. Maneka Gandhi

102. What does EPA stand for ?
a. Earth Protection Association
b. Environment Protection Authority
c. Environmental Project Assistance
d. None of the above

103. Air pollution can harm the health or comfort of which of the following ?
a. Plants
b. Materials
c. Humans and other animals
d. All the above

104. Which scientist introduced the term Ecology ?
a. Charles Darwin
b. James Lovelock
c. Ernst Haeckel
d. James Watt

105. Water bodies in which the water is more salty than freshwater but less salty than water in the oceans are called
a. Brackish b. Pelagic
c. Omniolimnic d. Hypolimnic

106. What is the color code for a moderate Air Quality Index ?
a. Green b. Yellow
c. Orange d. Red

107. BOD means
a. Biological oxygen demand
b. Biochemical oxygen demand
c. Biological oxygen deficit
d. Biochemical oxygen deficit

108. The combination of nitrogen oxides and hydrocarbons in the presence of sunlight causes
a. Smog
b. Ozone hole
c. Acid rain
d. Global warming

109. Ozone in the environment is
a. Beneficial at high altitudes
b. Harmful at low altitudes
c. Both of the above
d. Neither of the above

110. Which of the substances below is contributing the most to acidification ?
a. CO b. CO_2
c. CH_4 d. SO_2

111. How much of the total water on Earth is fresh water ?
a. 90% b. 12%
c. 3% d. 0.75%

Answers									
	98.	b	101.	a	104.	c	107.	b	110.	b
	99.	a	102.	b	105.	a	108.	a	111.	d
	100.	a	103.	d	106.	b	109.	c		

112. Incineration is
- a. Heating of contaminated soil to make toxic compounds less toxic
- b. Injecting air into contaminated soil, which in combination with bacteria will neutralize many toxic compounds
- c. Burning of waste at very high temperatures
- d. All the above

113. Eutrophication is
- a. Initiated by too many nutrients in the water, which causes algal blooms to occur
- b. Causes less sunlight to reach the bottom of the bay
- c. Results in a decrease in dissolved oxygen, water clarity, and marine life
- d. All the above

114. "Run-off" pollution is
- a. Rain carries all pollutants, trash, dirt, and nutrients in its path as it flows into the bay
- b. Toxic chemicals run off the back of a truck and onto the road
- c. Chemicals accumulate in aquatic plant tissue
- d. Crabs run out of the water and onto the shore, carrying all the water pollutants with them

115. When was UNEP, created ?
- a. 1972 b. 1985
- c. 1989 d. 1992

116. A watershed is generally defined as
- a. A building that stores water
- b. All the land area that drains to a given point in a water body
- c. All the water area that drains to a given point in a landform
- d. A moment in time when you cross into a new area

117. How much of the earth's surface is covered by water ?
- a. 75% b. 55%
- c. 30% d. 25%

118. Which greenhouse gas is mainly released from marshes and wetlands ?
- a. CO_2 b. N_2O
- c. CH_4 d. O_3

119. Emissions trading have become a key concept in reducing greenhouse gases worldwide. Which country invented it ?
- a. Australia b. USA
- c. Canada d. UK

120. The factor that is most important in determining the climate of a place is
- a. Latitude b. Longitude
- c. Hemisphere d. Time

121. Climates that are cold year round are
- a. Tropical b. Temperate
- c. Polar d. Mediterranean

122. Clouds close to the earth are called
- a. Sleet b. Snow
- c. Hail d. Fog

123. Clouds high in the sky that are made of ice crystals are
- a. Cirrus b. Nimbus
- c. Cumulus d. Stratus

124. Thunderclouds are also called
- a. Cirrostratus b. Cumulostratus
- c. Stratocumulus d. Cumulonimbus

125. Wind speed is measured by
- a. Barometer b. Hygrometer
- c. Anemometer d. Rain gauge

Answers					
112. c	115. a	118. c	121. c	124. d	
113. d	116. b	119. b	122. d	125. c	
114. a	117. a	120. a	123. a		

126. Lines that separate areas of high and low pressure on a weather map is
- a. Isotherm b. Isobar
- c. Latitude d. Longitude

127. Tropical rain forests occupy what percentage of Earth's land area ?
- a. 7% b. 18%
- c. 2.5% d. 10%

128. This storm is characterized by a narrow funnel cloud that can come on suddenly
- a. Cyclone b. Thunderstorm
- c. Hurricane d. Tornado

129. Hurricanes that occur in the Pacific Ocean are referred to as
- a. Hailstorm b. Twister
- c. Typhoons d. Tsunami

130. Greatest amount of water vapor the air could hold at a certain temperature
- a. Absolute humidity
- b. Relative humidity
- c. Variable humidity
- d. All the above

131. Which action can have the greatest impact on reducing the threat of global warming ?
- a. Reducing energy use
- b. Planting a tree
- c. Composting
- d. Recycling

132. What percentage of the hydrosphere is ocean ?
- a. 25% b. 55%
- c. 75% d. 97%

133. Ozone layer is in the
- a. Troposphere b. Stratosphere
- c. Mesosphere d. Ionosphere

134. The layer of the atmosphere in which weather change occurs is the
- a. Troposphere b. Stratosphere
- c. Mesosphere d. Ionosphere

135. What type of radiation is trapped on the earth's surface by the greenhouse effect?
- a. UV ray b. Gamma ray
- c. X rays d. Infrared rays

136. The vertical movement of air due to the uneven heating is called
- a. Reflection b. Refraction
- c. Convection d. Conduction

137. How thick is the oceanic crust ?
- a. 5 km b. 25 km
- c. 40 km d. 100 km

138. The partially molten layer beneath the lithosphere is called
- a. Crust b. Asthenosphere
- c. Lower mantle d. Outer core

139. The lithosphere is approximately ___ kilometers thick.
- a. 20 km b. 100 km
- c. 250 km d. 1000 km

140. What element makes up most of the Earth's core ?
- a. O_2 b. Si
- c. Fe d. Mg

141. Blue baby disease is caused by
- a. Fluoride b. Lead
- c. Nitrate d. Mercury

142. The transition layer in the ocean below which temperature drops rapidly is known as;
- a. Epilimnion b. Thermocline
- c. Hypolimnion d. Surface water

Answers						
126. b	129. c	132. d	135. d	138. b	141. c	
127. a	130. b	133. b	136. c	139. b	142. b	
128. d	131. a	134. a	137. a	140. c		

143. Increase in concentration of a pollutant along a food chain is known as
a. Biomagnification
b. Bioaccumulation
c. Biomethylation
d. Eutrophication

144. Warmer uppermost layer of a lake is
a. Hypolimnion b. Surface water
c. Epilimnion d. Deep water

145. Motor vehicles act was introduced in the year
a. 1978 b. 1988
c. 1995 d. 1998

146. Earth day is on
a. 1st June b. 15th March
c. 30th June d. 22nd April

147. Chipko movement was aimed at
a. Saving trees
b. Saving water
c. Preventing industrialization
d. Saving farmer's rights

148. Wildlife protection act was formulated in the year
a. 1980 b. 1972
c. 1970 d. 1985

149. Name the environmentalist related with Narmada Bachao Andolan.
a. Medha Patekar
b. Sunderlal Bahugune
c. Maneka Gandhi
d. Anil Aggarwal

150. World forestry day is celebrated on
a. 10th February b. 21st March
c. 12th May d. 25th July

151. Among the following, which gas is found in maximum concentration in atmosphere?
a. Rn b. Xe
c. Kr d. Ar

152. Ventilation coefficient is
a. Maximum mixing depth divided by average wind speed
b. Product of maximum mixing depth and maximum wind speed
c. Maximum mixing height divided by maximum wind speed
d. Product of maximum mixing depth and average wind speed

153. Mosquito repellent coils/mats contain
a. Paraquat
b. BHC
c. Toxaphene
d. Derivatives of Allethrin

154. The concentration of CO_2 in atmosphere is increasing at the rate of about
a. 4 % b. 2 %
c. 0.4 % d. 0.2 %

155. 1 Dobson unit at standard temperature and pressure is equal to ozone column thickness of
a. 1 mm b. 10 mm
c. 100 mm d. 0.01 mm

156. Who is the director of Centre for Science and Environment ?
a. Anil Agarwal
b. Sunita Narayan
c. Menka Gandhi
d. Medha Patekar

157. Which CFC was discovered first ?
a. CFC – 11 b. CFC – 12
c. CFC – 114 d. CFC – 115

Answers					
	143. a	146. d	149. a	152. d	155. d
	144. c	147. a	150. b	153. d	156. b
	145. b	148. b	151. d	154. c	157. b

158. The concentration of ozone is found maximum in
a. Troposphere
b. Upper Stratosphere
c. Lower Stratosphere
d. Mesosphere

159. The National Institute of Oceanography is presently situated at
a. Chennai b. Calicut
c. Goa d. Cochin

160. Mycorrhizae help in the uptake of
a. Potassium b. Phosphorous
c. Nitrate d. Boron

161. Chaparral vegetation is found in which area ?
a. Deccan plateau
b. Coastal India
c. Mediterranean areas
d. Between equator and temperate

162. The resistance time of N_2O in atmosphere is approximately
a. 15 years b. 150 years
c. 15 weeks d. 15 days

163. Which element cycle has no atmosphere reservoir ?
a. Sulphur b. Carbon
c. Nitrogen d. Phosphorus

164. Muscovite is an example of which group of minerals ?
a. Feldspar
b. Ferromagnesium
c. Quartz
d. Mica

165. Highest porosity is found in
a. Sand b. Clay
c. Gravel d. Silt

166. Solubility of gasses in water can be calculated by using which of the following laws ?
a. Darcy's law b. Henry's law
c. Avogadro's law d. Stoke's law

167. The main constituent of biogas is
a. H_2 b. H_2S
c. N_2 d. CH_4

168. The actual global average surface air temperature is about
a. 331 °K b. 288 °K
c. 18 °C d. 21°K

169. The Ministry of Environmental was set up in the year
a. 1970 b. 1975
c. 1980 d. 1985

170. Age of earth is approximately
a. 3.5 billion b. 4.5 billion
c. 45 million d. 3.5 million

171. After methane and carbon dioxide which gas in found in highest concentration in biogas ?
a. CO b. H_2
c. N_2 d. H_2S

172. The target organ of cadmium toxicity is
a. Lung b. Liver
c. Kidney d. Bones

173. Nalgonda technique is used for
a. Chloride b. Fluoride
c. Bromide d. Cadmium

174. The process used for removal of water hardness is
a. Zeolite process
b. Haber's process
c. Oswald process
d. None of the above

Answers						
	158. c	161. c	164. d	167. d	170. b	173. b
	159. c	162. b	165. b	168. b	171. b	174. a
	160. b	163. d	166. b	169. c	172. c	

175. Who gave the term ecosystem and when ?
a. A.G. Tansley (1935)
b. A.G. Tansley (1925)
c. E.P. Odum (1935)
d. E.P. Odum (1925)

176. IPCC came into exist in
a. 1978 b. 1968
c. 1988 d. 1998

177. The first International Conference on Environment Education was held in
a. Tbilisi b. New Delhi
c. Bombay d. Turkey

178. Kyoto Protocol came in force on
a. 16 Feb 2004 b. 16 Feb 2005
c. 16 Feb 2002 d. 16 Feb 2000

179. Indian Institute of Petroleum is situated at
a. New Delhi b. Goa
c. Deharadun d. Bombay

180. Which of the following is mainly responsible for eutrophication ?
a. Phosphate b. Nitrate
c. Carbonate d. Sulphate

181. The normal lapse rate of temperature per kilometer is
a. 6.4 °C b. 4.6 °C
c. 10 °C d. 9 °C

182. The albedo of the earth as a whole is
a. 25 % b. 50 %
c. 30 % d. 10 %

183. Atmospheric humidity is measured by
a. Radiometer b. Hygrometer
c. Hydrometer d. Micrometer

184. The origin of simplest life is attributed to
a. Proteozoic b. Cambrian Era
c. Archaezoic Era d. None

185. The maximum permissible limit of free residual chlorine in water is
a. 2 ppm b. 0.02 ppm
c. 0.2 ppm d. 20 ppm

186. Radiosonde in used to study
a. Earth's albedo at surface
b. Estimate pollutants in air
c. Atmospheric moisture content
d. Upper atmosphere's conditions

187. Which of the following enzymes is involved in the primary carboxylation in C_4 plants ?
a. RUBP Carboxylase
b. PEP
c. Oxygenase
d. None

188. The compound(s) used for artificial rain making/cloud seeding is/are
a. Dry ice b. AgI
c. $HgCI_2$ d. Both a and b

189. How many agro-climatic zones are found in India ?
a. 15 b. 16
c. 17 d. 18

190. About 50% of the atmosphere lies below
a. 5.6 km b. 10 km
c. 15 km d. 30 km

191. The atmosphere layer reflecting radio waves is called as
a. Homosphere
b. Ionosphere
c. Ozonosphere
d. None of the above

192. The specific heat of water is
a. 1 cal/gm/°C
b. 4.18 cal/gm/°C
c. 1 Joule/gm/°C
d. 10 cal/gm/°C

Answers												
	175.	a	178.	b	181.	a	184.	c	187.	b	190.	a
	176.	c	179.	c	182.	c	185.	c	188.	d	191.	b
	177.	b	180.	a	183.	b	186.	d	189.	a	192.	a

193. The first biosphere reserve in India was
a. Sundarban b. Nanda Devi
c. Nilgiri d. Nokrek

194. In which year biodiversity act was proposed ?
a. 2000 b. 2002
c. 2004 d. 1998

195. Headquarter of UNEP is situated at
a. Kenya b. Switzerland
c. U.S.A. d. Britain

196. At which temperature, density of water is found maximum ?
a. 0° C b. 100° C
c. 15° C d. 4° C

197. The important GHG mainly released from paddy field is/are
a. CO_2 b. N_2O
c. CH_4 d. All

198. What is the study of trees as individual in relation to their environment is known as
a. Forest ecology
b. Forest Synecology
c. Forest Autecology
d. All

199. Demography is the statistical study of
a. Human Society
b. Human Population
c. Human Settlement
d. Human life

200. The pH of normal rain is
a. 6.5 b. 5.6
c. 4.6 d. 3.6

201. Which term represents the sum total of life on earth ?
a. Biomass b. Gaia
c. Biosphere d. Biome

202. Any living thing that successfully competes with people for food space or other essential needs is called as
a. Virus b. Bug
c. Parasite d. Pest

203. Of the following environmental assessment terms, which one deals exclusively with the carbon content of the environment ?
a. Biological oxygen demand
b. Chemical oxygen demand
c. Total organic carbon
d. Particulate organic carbon

204. The dominance of a new genetic form as a result of environment change is called as
a. Adaptation
b. Natural selection
c. Succession
d. Synergism

205. What does the term overkill deal with ?
a. Pesticidal poisoning
b. Soil erosion
c. Nuclear holocaust
d. Global warming

206. What is a chemical substance or physical agent capable of inducing inheritable genetic change called ?
a. Carcinogen b. Mutagen
c. Teratogen d. Tumorogen

207. When lakes become acidic due to acid rain, this is added to counteract the acidity of
a. Soil b. Sand
c. Lime d. None

Answers												
	193.	c	196.	d	199.	b	202.	d	205.	c
	194.	a	197.	c	200.	b	203.	c	206.	b
	195.	a	198.	c	201.	c	204.	b	207.	c

208. Which technique can map the concentration of SO_2 over a whole town by operation Gadget from one location ?
a. LIDAR
b. Spectrophotometer
c. Gas Chromatography
d. Mass Spectroscopy

209. Air pollution can be controlled and reduced considerably, but which one of the following factors comes in its way ?
a. Politics b. Economics
c. Manpower d. Geography

210. Photocopying and other electrical equipment produce which one of the following pollutants ?
a. Methane
b. Ozone
c. Hydrogen
d. Nitrogen oxides

211. Which harmful gas is emitted by masonry building materials, even ground water ?
a. H_2S b. Radon
c. Ammonia d. CO_2

222. Which is the most abundant of all the hydrocarbon pollutants in the atmosphere?
a. Propane b. Methane
c. Butane d. Benzene

213. Which oil – tanker accident first alerted the public of the grave problem of soil spills in oceans ?
a. Agro merchant
b. Ocean Eagle
c. Exxon Valdez
d. Torrey Canyon

214. The process of preparing compost with the help of earth worm is known as
a. Composting b. Bioslury
c. Vermicomposting d. Maturing

215. Mycorrhizae is the association of
a. Higher plants and fungi
b. Algae and fungi
c. Lower plants and fungi
d. Both a and c

216. When was Ganga action pian iaunched ?
a. June 1985
b. December 1985
c. May 1984
d. July 1984

217. Largest salt water lake in India is
a. Lonar b. Chilka
c. Sambhar d. Wullar

218. The main pollutant of London smog was
a. SO_2 b. NO_2
c. PAN d. Ozone

219. Which detector for DDT should be used in Gas chromatography ?
a. Electron Capture detector
b. Flame ionized detector
c. Thermal Conductivity detector
d. None of the above

220. In which of the following, inverted pyramid of biomass is found ?
a. Grassland
b. Pond ecosystem
c. Desert ecosystem
d. Forest ecosystem

221. In denitrification process the nitrogen is released in form of
a. NH_3 b. N_2
c. N_2O d. Both b and c

Answers					
	208. a	211. b	214. c	217. b	220. b
	209. b	212. b	215. a	218. a	221. d
	210. b	213. d	216. a	219. a	

222. Who coined the term symbiosis ?
a. A.G. Tansley b. De Bary
c. Clements d. Mc Dougall

223. Which type of symbiosis is obligatory ?
a. Mutualism
b. Protocooperation
c. Commensalism
d. Amensalism

224. Concept of Hyper volume Niche was given by
a. Grinnel b. Clement
c. Hutchinson d. Odum

225. Vehicular pollution emits mainly
a. SO_2 b. CO
c. NO d. Ozone

226. Of the following classes of being, tell which one is least sensitive to nuclear radiations ?
a. Single Celled organism
b. Amphibians
c. Reptiles
d. Birds

227. Which region of the seas and oceans are the most polluted ?
a. Estuarine b. Coastal
c. Sea depths d. Coral

228. Of the following types of nuclear bombs, tell which one was tested on a pacific atoll ?
a. Atom bomb
b. Hydrogen bomb
c. Neutron bomb
d. None

229. Which were the first living beings to establish themselves in rocky slopes ?
a. Toads b. Grasses
c. Lichens d. Frogs

230. What is lost when one organism consume other ?
a. Food b. Water
c. Energy d. Chemicals

231. Who formulated the ecological concept of the pyramid of numbers ?
a. Charles Elton
b. Paul R. Ehrlich
c. Paul Colivaux
d. All

232. Where was the Mitti bachao (save the soil) movement launched in India ?
a. Thane, Maharastra
b. Mysore, Karnataka
c. Darbhanga, Bihar
d. Hoshangabad, M.P

233. When was the use of DDT banned for agricultural purposes in India ?
a. 1962 b. 1985
c. 1974 d. 1971

234. For the production of biogas the Indian biogas plant need what ?
a. Fire wood b. Cattle dung
c. Agricultural Waste d. Kerosene

235. Which forest area in India was first brought under control and protection ?
a. Malabar b. Konkan
c. Garhwal d. Sunderbans

236. When was the first National Forest Policy formulated ?
a. 1948 b. 1980
c. 1964 d. 1952

237. Which plant is known as the gasoline plant ?
a. *Salvadora persica*
b. *Streculia feetida*
c. *Thevetia peraviana*
d. *Euphoribia lathyris*

Answers						
	222. b	225. b	228. b	231. a	234. c	237. d
	223. a	226. a	229. b	232. d	235. a	
	224. c	227. b	230. c	233. b	236. d	

238. When did the Three Mile Island disaster occur ?
a. 1972 b. 1979
c. 1980 d. 1976

239. Flash is the environmental pollutant generated by
a. Thermal Power Plant
b. Oil refinery
c. Fertilizer plant
d. Strip mining

240. Which of the following is known as liquid gold ?
a. Water b. Petroleum
c. Mercury d. Mustard oil

241. Which category of wastewater doesn't require seeding during a BOD test ?
a. Distillery spent wash
b. Dyeing unit effluent
c. Domestic sewage
d. Pulp and Paper mill effluent

242. Permanent hardness of water is caused by
a. Carbonates and chlorides
b. Bicarbonates and sulphates
c. Carbonates and Bicarbonates
d. Chlorides and Sulphates

243. The most commonly used method for desalination of water is
a. Distillation
b. Reverse osmosis
c. Electrodialysis
d. Flash evaporation

244. Elemental chlorine is widely used in
a. Metallurgy
b. Water purification
c. Process industry
d. Deodrants

245. The single largest class of insecticides of total registered pesticides in the world is
a. Organochlorine
b. Organophosphate
c. Carbamate
d. Pyrethriods

246. Cup anemometer is used for measuring
a. Water evaporation
b. Wind speed
c. Wind direction
d. Water flow

247. A community refers to the parts of an ecosystem including
a. All the living organisms and how they interact
b. The animal in one place
c. The physical environment
d. The abiotic organisms

248. In which ecosystem would you find the most dissolved oxygen ?
a. Flowing fresh water
b. Standing fresh water
c. Ocean
d. All

249. Which is not an abiotic factor influencing where prairies are found ?
a. Wind b. Animals
c. Evaporation d. Precipitation

250. When was project tiger launched in India?
a. 1972 b. 1973
c. 1978 d. 1974

251. When was the Jawaharlal Nehru Community Biodiversity movement launched in India ?
a. 1988 b. 1989
c. 1969 d. 1985

Answers					
	238. b	241. c	244. c	247. a	250. b
	239. a	242. d	245. b	248. a	251. b
	240. b	243. b	246. b	249. b	

252. Waste is defined as
a. Human produced refuse
b. Any unwanted or discarded matter
c. Various sources of dump material
d. Incinerated nonrenewable by-products

253. In natural environments, organic waste materials
a. Cause toxic fumes
b. Slowly decompose
c. Are not present
d. Pollute streams

254. Most of the solid waste in the municipal waste stream comes from
a. Paper b. Plastics
c. Yards d. Aluminum

255. What is the relationship of municipal solid waste to residential waste ?
a. The terms are synonymous
b. Residential waste contains municipal waste
c. Municipal waste contains residential waste
d. There is no relationship

256. Waste can be described as all of the following except
a. Solid and flaccid b. Solid and liquid
c. Liquid and gas d. Solid and gas

257. According to the EPA, agricultural solid waste does not include
a. Crop residues b. Manure
c. Certain chemicals d. Dead animals

258. Land reclamation basically means
a. To commence strip mining
b. To declare land unusable
c. To stake a claim on the land
d. To put land back into use

259. Humus can be used as fertilizer and comes from
a. Decomposing organic waste
b. Human bodily waste
c. The incineration process
d. Domestic mushrooms

260. Source reduction is defined as
a. Paper, paperboard, and plastics
b. Reducing waste at its source
c. Restricting the flow of contaminated water
d. Plastics, paper, and aluminum

261. The strategies known as the "Three R's" include
a. Reduce, renew, and/or recycle
b. Reduce, redirect, and/or renew
c. Redirect, recycle, and or renew
d. Reduce, reuse, and/or recycle

262. Foods that should not be placed in a compost heap include
a. Potato peels
b. Meats
c. Coffee grounds
d. Egg shells

263. Which action will not directly contaminate groundwater ?
a. Runoff from yards and gardens
b. Incineration of domestic waste
c. Roadside dumping of large appliances
d. Pouring used motor oil into a storm sewer

264. Two results of decomposition in a sanitary landfill are
a. Methane and leachate
b. Earthworms and humus
c. Photosynthesis and leachate
d. Oxygen and helium

Answers					
	252. b	255. c	258. d	261. d	264. a
	253. b	256. a	259. a	262. b	
	254. a	257. c	260. b	263. b	

265. Which of the following is not an example of point source pollution ?
a. A downstream fish kill
b. An above ground tank spill
c. Accidental manure spill
d. A lagoon overflow

266. Odor from manure is made worse by
a. Good planning
b. Aerobic conditions
c. Anaerobic conditions
d. Aerating lagoons

267. All of the following systems are specifically designed to store liquid manure except
a. Gravitational separators
b. Below ground pits
c. Earth storage basins
d. Above ground storage tanks

268. Dried manure can be used for
a. Feed additives
b. Gravel road beds
c. Making storage bins
d. Runoff diversion and control

269. All of the following are important nutrients of manure except
a. Nitrogen
b. Phosphorous
c. Methane
d. Potassium

270. All of the following by products of manure have the potential for polluting water except
a. Zinc b. Bacteria
c. Nitrates d. Oxygen

271. In addition to nutrients, manure helps the soil by
a. Adding organic matter
b. Controlling grubs
c. Filling in waterways
d. Absorbing inorganic chemicals

272. Nutrients from manure
a. Cannot leach into groundwater
b. Are not available for plant use
c. Are not organic
d. Are not always stable in the soil

273. Two environmentally sound methods of solid waste disposal are
a. Incineration and sanitary landfills
b. Ocean dumping and sanitary landfills
c. Town dumps and sanitary landfills
d. Compaction and town dumps

274. What is responsible for the dark color of smoke ?
a. Reflections
b. Particulate matter
c. Lead
d. Volcanic ash

275. What hazardous pollutant is often found in fish ?
a. Asbestos b. Mercury
c. Arsenic d. Benzene

276. What is the main effect of ozone on forests ?
a. Death
b. Increased vigor
c. Reduced growth
d. More photosynthesis

277. What primary air pollutant is produced when there is insufficient oxygen for complete combustion of a fossil fuel ?
a. Carbon dioxide
b. Nitrogen dioxide
c. Carbon monoxide
d. Sulfur dioxide

Answers					
	265. a	268. a	271. a	274. b	277. c
	266. c	269. c	272. d	275. b	
	267. c	270. d	273. a	276. c	

278. What is normally the most expensive part of controlling air pollution ?
a. Planning studies
b. Operating and maintaining equipment
c. Disposal of pollutants
d. Purchasing and installing the air pollution control equipment

279. Which of the following forms of precipitation may be considered acidic if mixed with acidic deposition ?
a. Rain b. Snow
c. Fog d. All the above

280. What hazardous pollutant is most toxic to human beings ?
a. Asbestos b. Mercury
c. Arsenic d. Benzene

281. What was the result when coal-fired power plants built taller smoke stacks ?
a. The solution to pollution was dilution
b. Acid rain decreased
c. Acid deposition spread over hundreds of miles
d. Emissions were eliminated by 50%

282. What air pollutant, when combined with water vapour, causes acid rain that can physically damage plants and material objects ?
a. Particulate matter
b. Ozone
c. Carbon monoxide
d. Sulfur dioxide

283. The threshold level of an air pollutant is the level at which
a. Acute ill effects are experienced
b. Most health effects are experienced under this level
c. Chronic health effects are experienced
d. None of the above

284. A new car today produces what percent less pollution than a pre-1970 car with no air pollution control devices ?
a. 100% b. 95%
c. 90% d. 85%

285. Neutral is pH 7 on the pH scale. Acidic rain is considered to be
a. pH of 8 up to 14
b. pH of 7 and below
c. pH of 5.6
d. pH of 5.5 or less

286. What part of the human body typically absorbs the largest amount of air pollution ?
a. Skin b. Ears
c. Nose d. Lungs

287. A short term blast of a loud sound at this decibel (dB) level will cause traumatic hearing loss and inner ear damage.
a. 60 dB b. 100 dB
c. 120 dB d. 140 dB

288. What is an efficient method of removing particulates ?
a. Wet scrubber
b. Bag house filter
c. Catalytic converter
d. None of the above

289. When setting air pollution standards, what factor is considered over other factors?
a. The effect of air pollution on human health
b. The effect of air pollution on plants' health
c. The effect of air pollution on material objects
d. All the above

Answers				
	278. d	281. c	284. b	287. d
	279. d	282. d	285. d	288. b
	280. a	283. d	286. d	289. a

290. Of these types of air pollutants, which type has been found to result in pollutants causing a gradual deterioration of various physiological functions over weeks, months or years ?
a. Chronic b. Acute
c. Carcinogenic d. Mutagenic

291. What type of farm activity can decrease the quality of life for neighbors ?
a. Odor from animal feedlots
b. Methane production from animal waste piles
c. Odor from spreading chicken litter as fertilizer
d. All the above

292. Which pollutant reduces the rate of growth of plants ?
a. Ozone
b. Carbon monoxide
c. Sulfur dioxide
d. Nitrogen dioxide

293. When considering noise pollution, what exposure factors determine the damage to a person's ability to hear ?
a. Frequency b. Intensity
c. Duration d. All the above

294. Which of the following is affected by acid precipitation ?
a. Lakes b. Forests
c. Fish d. All the above

295. Anaerobic digestion of animal wastes produces what ?
a. Methane b. Carbon dioxide
c. Hydrogen sulfide d. All the above

296. _____ is the major source of most types of primary air pollutants.
a. Columniation b. Combustion
c. Flatulence d. Electrolysis

297. Particulate pollutants may come from the combustion of
a. Wood b. Coal
c. Diesel d. All the above

298. What is an effective way of controlling air pollution caused by vehicles ?
a. Catalytic converter
b. Electric vehicles
c. Bicycles
d. All the above

299. What is/are the benefits of controlling air pollution ?
a. Human health is improved
b. Agricultural and forest productivity is improved
c. Commercial and sports fishing improves.
d. All the above

300. What primary pollutant, that is not one of the six criteria pollutants, is important in the formation of peroxycetyl nitrates (PAN) ?
a. Carbon monoxide
b. Particulate matter
c. Sulfur dioxide
d. None of the above

301. Of the six criteria pollutants, which one can be formed from secondary reactions in the atmosphere from primary air pollutants ?
a. Carbon monoxide
b. Nitrogen dioxide
c. Sulfur dioxide
d. Ketones

Answers							
	290. a	293. d	296. b	299. d			
	291. d	294. d	297. d	300. d			
	292. a	295. d	298. d	301. d			

302. Which of the following is considered the largest contributor to the problem of acid precipitation ?
a. Sulfur
b. Sulfur dioxide
c. Sulfur monoxide
d. None of the above

303. Which of the following is the method of reducing acid emissions that uses a lime water spray through a smoke stack ?
a. Fluidized bed combustion
b. Scrubbers
c. Lime washer
d. Acid eliminator

304. Acid deposition is
a. The precipitation of acid in lakes
b. Mixing of dry acidic particles with moisture in the atmosphere
c. The leaching of acid from rocks
d. None of the above

305. What is a condition caused by the trapping of radiation underneath layers of polluted atmosphere ?
a. Smog
b. Fog
c. Greenhouse effect
d. None of the above

306. What is an invisible radioactive gas that may get into buildings from the ground ?
a. Methane b. Butane
c. Propane d. Radon

307. Which of the following reduces pollutants ?
a. Reusing
b. Recycling
c. Both a and b
d. None of the above

308. Mining Industry is also a possible source of pollutants for freshwater (True/False).

309. Old or abandoned wells could also create adverse conditions for groundwater sources (True/False).

310. Thermal Pollution created by returning heated water to the water cycle after being used by industrial practices(True/False).

311. Cooling tower is based on the same principle as an automobile (True/False).

312. Radioactive materials can accumulate in animal and human body tissue (True/False).

313. Organic waste utilize oxygen in water as bacteria consume the water for food and place a strain on the aquatic life in these waters (True/False).

314. Inorganic wastes are common in industries which produce detergents, pharmaceuticals, paints, plastics and fertilizers (True/False).

315. Anchouring of shoreline is an issue in some costal regions around the world (True/False).

316. Cooling lagoon is used to allow water to cool before re-entering the water cycle (True/False).

317. Transportation corridors can be a possible source for freshwater contamination (True/False).

318. Biotic factors of an ecosystem include
a. The things that affect the plant growth like sunlight and water
b. The living parts of an ecosystem
c. All parts of the food chain except decomposers
d. Only green plants

Answers							
	302. b	305. c	308. T	311. T	314. T	317. T	
	303. b	306. d	309. T	312. T	315. T	318. b	
	304. b	307. c	310. T	313. T	316. T		

319. How does fertilizer from agricultural fields washing into a pond hurt the fish that live in them ?
a. Nitrogen is toxic to fish
b. Oxygen is depleted from decaying plant materials
c. Fish grow too large for the food available
d. Fish that eat the fertilizer are unsafe

320. _____ breakdown the waste products and organisms that have died into chemical substances that are released into the environment.
a. Producers b. Consumers
c. Decomposers d. All

321. Which are the good crop management practices ?
a. Reducing use of chemical fertilizers if possible
b. No-till
c. Integrated pest management
d. All the above

322. How are contaminant residues generally measured in drinking water ?
a. Parts per thousand (ppt)
b. Parts per million (ppm)
c. Parts per billion (ppb)
d. Parts per hundred (pph)

323. Which of the following toxic substances does not dissolve or suspend in water ?
a. Heavy metals b. Gasoline
c. Oil d. Antifreeze

324. How many gallons does it take to flood one acre, a foot deep (million acre-feet) ?
a. 320,828 b. 325,828
c. 328,828 d. 330,828

325. The largest consumer of water used in agricultural practices is _____.
a. A bulking ingredient
b. Irrigation
c. Stock tanks
d. Food processing

326. What percentage of the human body is made up of water ?
a. 30% b. 65%
c. 75% d. 90%

327. Which type of water keeps soaps from getting sudsy and leaves deposits on pots and pans ?
a. Groundwater b. Surface water
c. Soft water d. Hard water

328. At what depth in the soil are most bacterial and viral contaminants screened out of groundwater ?
a. 1 to 2 feet b. 2 to 4 feet
c. 4 to 6 feet d. 5 to 10 feet

329. Which sphere contains all of the plant and animal life on the earth's surface ?
a. Hydrosphere b. Atmosphere
c. Biosphere d. Lithosphere

330. What three factors have a direct influence on the quality of water ?
a. Amount of precipitation, amount of evaporation, and deforestation
b. Deforestation, global warming, and amount of precipitation
c. Quality of precipitation, deforestation, and precipitation reaction with soil and rocks
d. Precipitation reaction with rocks and soil, quality of precipitation, and the amount of contact of precipitation with surface contaminants

Answers							
	319. b	322. b	325. b	328. d
	320. c	323. a	326. b	329. b
	321. d	324. b	327. c	330. c

331. Which gas is considered to be a natural contaminant of groundwater ?
a. Helium b. Propane
c. Methane d. Hydrogen

332. Which mineral is not considered to be a natural contaminant of groundwater ?
a. Zinc b. Phosphorus
c. Manganese d. Calcium

333. The process that changes water from a gas to a liquid is called _____.
a. Condensation b. Evaporation
c. Transpiration d. Respiration

334. Groundwater possesses its own taste, odor, and color, which is created by dissolved _____.
a. Acids b. Salts
c. Minerals d. Bacteria

335. The build up of plant nutrients in a body of water, which leads to excessive algae growth, is called _____.
a. Equinoctial b. Eradication
c. Eutrophication d. Equatorial

336. Which item is not classified as a hazardous waste ?
a. Water soluble b. Reactive
c. Ignitable d. Corrosive

337. Leachate is a hazardous byproduct produced by _____.
a. Mining
b. Sanitary landfills
c. Agricultural practices
d. Sewer systems

338. Air pollutants which adhere to precipitation and falls to the earth is called _____.
a. Leachate b. Acid drainage
c. Leaching d. Acid rain

339. Which method of disposal is the proper way to dispose of hazardous household chemicals ?
a. Flush chemicals down the toilet
b. Pour chemicals down the drain
c. Put chemicals in landfills
d. Dispose of chemicals at community hazardous waste retrieval events

340. Acid rain is most harmful to which sphere of the hydrologic cycle ?
a. Atmosphere b. Hydrosphere
c. Biosphere d. Lithosphere

341. Which item is not considered to be a hazardous household chemical ?
a. Motor oil
b. Pool chemicals
c. Medicines
d. Leachate

342. Which of the following items provides a direct pathway for contaminants to reach the water table ?
a. Old wells
b. Sanitary landfills
c. Transportation corridors
d. Underground storage tanks

343. What are the two by-products produced by municipal waste treatment plants ?
a. Methane and soil
b. Methane and sludge
c. Carbon dicxide and sludge
d. Carbon dioxide and oil

344. All municipalities must have at least which phase of water treatment implemented to meet federal regulations.
a. Primary b. Secondary
c. Tertiary d. Sludge

Answers									
	331. b	334. b	337. b	340. c	343. b
	332. d	335. d	338. d	341. d	344. a
	333. b	336. a	339. d	342. a	

345. The secondary treatment system removes at least _____ (%) percent of organic wastes found in wastewater.
a. 50 b. 70
c. 90 d. 100

346. It is recommended not to apply animal waste on land which possesses slopes of _____ (%) percent or greater. —
a. 1 b. 5
c. 10 d. 15

347. Which municipal waste treatment phase uses aerobic (oxygen-using) bacteria to decompose and digest waste solids?
a. Primary b. Secondary
c. Solid d. Slurry

348. Pollution caused by discharging heated water into rivers and streams is created by _____.
a. Organic wastes
b. Inorganic wastes
c. Thermal pollution
d. Radioactive materials

349. Which discharged form of water pollution can enter the food chain by adhering to body tissue and can not be cooked out?
a. Organic wastes
b. Inorganic wastes
c. Thermal pollution
d. Radioactive materials

350. Agriculture, industry, and domestic water uses are experiencing an increase in _____ regulation.
a. Governmental b. Federal
c. State d. Local

351. The cost of a glass of water depends largely on what economic principle ?
a. Diminishing returns
b. Supply and Demand
c. Opportunity Costs
d. Depreciation

352. On an average day, one acre of corn can transpire _____ gallons of water under ideal environmental conditions.
a. 1,000 b. 2,000
c. 3,000 d. 4,000

353. When figuring a drinking water equivalent level (DWEL) the average body weight used is_____ ?
a. 68 kg b. 70 kg
c. 72 kg d. 75 kg

354. _____ of all marketable agriculture crops are produced on irrigated land.
a. 1/2 b. 1/4
c. 1/5 d. 1/3

355. Which discharge form of water pollution can enter the food chain by adhering to body tissue and can not be cooked out ?
a. Organic Waste
b. Inorganic Waste
c. Thermal Pollution
d. Radioactive Materials

356. Which municipal waste treatment phase uses aerobic (oxygen-using) bacteria to decompose and digest waste solids ?
a. Primary b. Secondary
c. Solid d. Slurry

357. Which of the following factors affect water quality ?
a. Quality of precipitation
b. Surface contaminants
c. Reaction of precipitation with rocks and soil
d. All of the above

Answers									
	345. c	348. c	351. b	354. d	357. d
	346. c	349. d	352. d	355. d	
	347. b	350. a	353. b	356. c	

358. The hydrologic cycle receives it's energy from
a. Shifts in ocean tides
b. The moon
c. Carbon dioxide
d. The sun

359. _____ is a by-product of human activities which disturbs the natural balance of water quality.
a. Hydrosphere b. Lithosphere
c. Eutrophication d. Acid rain

360. The amount if water used for domestic purposes largely depends on the development of the country.
a. True
b. False

361. Electrical power plants are not capable of producing thermal, organic, and inorganic wastes which have potential to contaminate surface waters.
a. True b. False

362. What factors affect water quality ?
a. Quality of precipitation, surface contaminants, reaction of precipitation with rocks and soil
b. Acid rain, quality of precipitation, eutrophication
c. Hydrosphere, lithosphere, biosphere
d. Quality of precipitation, surface contaminants, acid rain

363. _____ is an example of the cumulative effect of air pollutants on the hydrosphere and the biosphere.
a. Acid rain
b. Nitrogen
c. Inorganic fertilizers
d. Felsic mix

364. What are some possible sources of pollutants for freshwater ?
a. Sewage systems
b. Mining industry
c. Underground storage tanks
d. All the above

365. Fertilizers can be a source of contaminates to freshwater sources if not properly used.
a. True
b. False

366. Most rural homesteads use _____ or _____ for their wastewater disposal.
a. Underground storage tanks, abandoned wells
b. Landfills, lagoon systems
c. Septic tanks, lagoon systems
d. Solid waste system, slurry system

367. Sludge and _____ are the by products associated with waste water treatment.
a. Nitrogen b. Methane
c. Chemicals d. Both a and b

368 It is estimated that one million people can produce up to _____ tons of sludge per year.
a. 33,000 b. 35,500
c. 34,500 d. 35,000

369. The tertiary system is the _____ processing of wastewater.
a. Chemical b. Phosphates
c. Nitrates d. Both b and c

370. Each minute a family member leaves the water running when brushing their teeth requires _____ gallons of water.
a. 2 b. 3
c. 4 d. 5

Answers					
	358. d	361. b	364. d	367. b	370. a
	359. c	362. a	365. a	368. d	
	360. a	363. a	366. c	369. d	

371. When designing an animal waste system, _____ can create problems for the agricultural producers.
   a. Wind erosion
   b. Construction
   c. Geological topography
   d. Insects that kill crops

372. Water that percolates from surface sources to groundwater sources is referred to as
   a. Anchouring of shoreline
   b. Water recharge
   c. Flood control
   d. Water sheds

373. Agricultural produces must also be aware of the effects of watersheds.
   a. True b. False

374. To prevent excess animal waste from being carried into surrounding surface waters, many large-scale livestock operations have implemented this system to prevent the situation from occurring.
   a. Terraces
   b. Agricultural tiling
   c. Buffer Zones
   d. Animal manure treatment

375. Pollution caused by discharging heated water into rivers and streams is created by _____.
   a. Organic wastes
   b. Inorganic wastes
   c. Thermal pollution
   d. Radioactive materials

376. Natural resources
   a. Are only important to plants and animals
   b. Are not important to humans
   c. Are important to humans because they rely upon them for everyday life
   d. Are important to the united states' international trade policy

377. The water quality of surface waters depends heavily on the quality of watershed runoff.
   a. True b. False

378. Wetlands are classified by size.
   a. True b. False

379. Terraces are placed every ____ to ____ feet depending on the degree of the slope.
   a. 100; 200 b. 200; 300
   c. 300; 400 d. 400; 500

Answers			
	371. c	374. d	377. a
	372. b	375. c	378. b
	373. a	376. c	379. a

10

Manures and Fertilizers

QUESTIONS :

1. Of the following, which is a primary nutrient element?
   a. Sulphur b. Cobalt
   c. Sodium d. Potassium

2. Of the following, which is an essential nutrient element?
   a. Aluminium b. Iodine
   c. Boron d. Barium

3. Of the followings, which is an organic chemical fertilizer?
   a. Calcium ammonium nitrate
   b. Urea
   c. Ammonium phosphate
   d. Muriate of potash

4. Of the followings, which is a complex fertilizer?
   a. Ammonium sulphate nitrate
   b. Calcium ammonium nitrate
   c. Single superphosphate
   d. Ammonium phosphate

5. Of the followings, which is an ultra micronutrient?
   a. Boron b. Molybdenum
   c. Zinc d. Iron

6. Of the followings, which is a micronutrient fertilizer?
   a. Calcium sulphate
   b. Magnesium sulphate
   c. Potassium sulphate
   d. Zinc sulphate

7. The number of essential elements required for the growth of most higher plant is
   a. 17 b. 6
   c. 8 d. 16

8. Which is the basic fertilizer ?
   a. Urea
   b. Calcium ammonium nitrate
   c. Sodium nitrate
   d. Ammonium sulphate

9. Which fertilizer material is partly soluble in water?
   a. Urea
   b. Calcium ammonium nitrate
   c. Sodium nitrate
   d. Ammonium sulphate

10. Which fertilizer is highly hygroscopic?
    a. Urea
    b. Calcium ammonium nitrate
    c. Sodium nitrate
    d. Ammonium sulphate

11. Which fertilizer contains sulphur?
    a. Urea
    b. Calcium ammonium nitrate
    c. Sodium nitrate
    d. Ammonium sulphate

12. Percent nitrogen in urea is
    a. 20.5 – 21 b. 33.5 – 34
    c. 26 d. 44 – 46

13. The permissible maximum biuret content of urea produced in India is
    a. 0.5 % b. 1.0 %
    c. 1.5 % d. 2.0 %

14. Single superphosphate is produced by the reaction of rock phosphate with
    a. HNO_3 b. H_3PO_4
    c. H_2SO_4 d. HCl

15. Concentrated super phosphate is produced by the reaction of rock phosphate with
    a. HNO_3 b. H_3PO_4
    c. H_2SO_4 d. HCl

Answers														
	1.	d	4.	d	7.	a	10.	a	13.	c
	2.	c	5.	b	8.	c	11.	d	14.	c
	3.	b	6.	d	9.	b	12.	d	15.	b

16. The chief component of single superphosphate that supplies phosphorous to plant is
    a. Gypsum
    b. Free phosphoric acid
    c. Monocalcium phosphate
    d. Rock phosphate

17. Which is the acid soluble phosphatic fertilizer?
    a. Super phosphate
    b. Dicalcium phosphate
    c. Rock phosphate
    d. Monocalcium phosphate

18. The per cent content of N and P in DAP is
    a. 20-20 b. 18-46
    c. 46-18 d. 22-48

19. Which is the water soluble phosphate?
    a. $Ca(H_2PO_4)_2$ b. $CaHPO_4$
    c. $Ca_3(PO_4)_2$ d. CaH_2PO_4

20. The conversion factor to convert % P to % P_2O_5 is
    a. 1.29 b. 2.90
    c. 2.29 d. 0.4

21. The fertilizer that contains maximum sulphur is
    a. Nitric phosphate
    b. Concentrated super phosphate
    c. Single super phosphate
    d. Enriched super phosphate

22 The super phosphate is largely produced, now-a-days from
    a. Phosphate guanos
    b. Rock phosphate
    c. Bone meal
    d. Basic slag

23. The chemical formula of ammonium metaphosphate is
    a. $NH_4H_2PO_4$ b. NH_4PO_3
    c. $(NH_4)_3HP_2O_7$ d. $(NH_4)_2P_2O_7$

24. The chemical formula of ammonium phosphate sulphate is
    a. $NH_4H_2PO_4 . NH_4NO_3$
    b. $NH_4H_2PO_4 . (NH_4)_2SO_4$
    c. $(NH_4)_2SO_4 . NH_4NO_3$
    d. $NH_4H_2PO_4 . CO(NH_2)_2$

25. The mineral that contains K_2SO_4 is
    a. Carnallite b. Kainite
    c. Sylvinite d. Longbeinite

26. The per cent K_2O in KCl is
    a. 48 b. 64
    c. 127 d. 80

27. The formula for potassium meta phosphate is
    a. $K_4P_2O_7$ b. KH_2PO_4
    c. KPO_3 d. K_2HPO_4

28. Which form of nitrogen absorbed by plant is toxic?
    a. NH_4^+ b. NO_3^-
    c. NO_2^- d. Amide

29. Which is formed in aminization?
    a. NO_3^- b. NO_2^-
    c. NH_4^+ d. R-NH_2

30. Ammonia volatilization is highest from
    a. NH_4Cl b. NH_4NO_3
    c. $CaCO_3.NH_4NO_3$ d. $(NH_4)_2SO_4$

31. The process in which nitrate is reduced is called
    a. Chemo-denitrification
    b. Indirect denitrification
    c. Non-biological nitrification
    d. Denitirification

Answers														
	16.	c	19.	a –	22.	b	25.	d	28.	c	31.	d
	17.	c	20.	c	23.	b	26.	b	29.	d		
	18.	b	21.	c	24.	b	27.	c	30.	d		

32. By denitrification, which gas largely escapes to the atmosphere?
a. N_2O b. NO
c. NO_2 d. N_2

33. Decomposition of nitrite takes place rapidly at what soil pH?
a. 4 or below b. 5-7
c. 8 d. 9

34. From which fertilizer ammonia volatilization will be highest in acid soils?
a. NH_4NO_3 b. NH_4Cl
c. $CO(NH_2)_2$ d. $(NH_4)_2SO_4$

35. The nitrogen fixing capacity of crops may be graded as
a. Pea > Soybean > Alfalfa
b. Alfalfa > Soybean > Pea
c. Soybean > Alfalfa > Pea
d. Pea > Alfalfa > Soybean

36. Which organism fixes atmospheric nitrogen?
a. *Azotobacter* b. *Nitrobacter*
c. *Nitrosomonas* d. *Nitrosococcus*

37. Which organism oxidizes ammonium ions?
a. *Nostoc* b. *Pullularia*
c. *Beijerinkia* d. *Nitrosospira*

38. Which organism is leaf-inhabitant?
a. *Azotobacter* b. *Beijerinkia*
c. *Aerobacter* d. *Clostridium*

39. Which microorganism is responsible for nitrification or nitrite to nitrate?
a. *Nitrosomonas* b. *Nitrobacter*
c. *Clostridium* d. *Nitrosococcus*

40. Conversion of ammonical nitrogen to nitrate nitrogen is known as
a. Ammonification
b. Nitrification
c. Denitrification
d. Nitrate formation

41. Volatilization loss of nitrogen is comparatively more in
a. Acid soils b. Alkaline soils
c. Neutral soils d. Both a and b

42. Ammonia volatilization is highest with
a. NH_4NO_3 b. $(NH_4)_2.SO_4$
c. NH_4Cl d. $CO(NH_2)_2$

43. Dicyan diamide is a
a. Urease inhibitor
b. Nitrification inhibitor
c. Slow release fertilizer
d. Both a and c

44. Ammonia volatilization capacity of the following soils are such that
a. Calcareous soil > Alkaline soil > Acidic soil
b. Acid soil > Alkaline soil > Calcareous soil
c. Alkaline soil > Calcareous soil > Acid soil
d. Calcareous soil > Acid soil > Alkaline soil

45. The form of nitrogen that is specific to denitrification is
a. Amide b. Ammonium
c. Nitrite d. Nitrate

46. Freshly precipitated phosphate in soil is largely composed of
a. Apatite
b. Dicalcium phosphate
c. Monocalcium phosphate
d. Octacalcium phosphate

Answers					
32. a	35. b	38. b	41. b	44. a
33. a	36. a	39. b	42. d	45. d
34. c	37. d	40. b	43. b	46. b

47. Which form of P is more available to plants?
a. Reverted dicalcium phosphate in superphosphate
b. Apatite in rock phosphate
c. Both a and b
d. None

48. Which kind of precipitated phosphorus is more available to plants?
a. Old precipitate
b. Fresh precipitate
c. Both a and b d. None

49. The predominant ionic species of phosphate in soil at pH below 6.7 is
a. PO_4^{3-} b. HPO_4^{2-}
c. $H_2PO_4^-$ d. H_3PO_4

50. The predominant phosphate in single superphosphate is
a. Tricalcium phosphate
b. Dicalcium phosphate
c. Monocalcium phosphate
d. Apatite

51. Root development is stimulated due to supply of
a. N b. P
c. K d. Ca

52. Fixation of phosphate is more in
a. Acid soils b. Neutral soils
c. Submerged soils d. None

53. Which fertilizer contains nutrients other than primary nutrients?
a. Diammonium phosphate
b. Urea
c. Ammonium sulphate
d. Ammonium nitrate

54. Which is the correct chemical formula of sona fertilizer, an Indian product?
a. $(NH_4)_2SO_4 . NH_4NO_3$
b. NH_4NO_3
c. $NH_4H_2PO_4 . NH_4NO_3$
d. $CaCO_3.NH_4NO_3$

55. What is the acid equivalent of 100 kg of ammonium sulphate nitrate?
a. 60 kg $CaCO_3$ b. 80 kg $CaCO_3$
c. 94 kg $CaCO_3$ d. 110 kg $CaCO_3$

56. What is the acidifying capacity of ammonium nitrate expressed in kg of $CaCO_3$ per kg of N supplied?
a. 5.41 b. 3.61
c. 1.89 d. 1.81

57. Which is correct order of fertilizers on the basis of their acidifying capacity expressed in terms of kg $CaCO_3$/kg N in fertilizer?
a. $CO(NH_2)_2 > NH_4NO_3 > (NH_4)_2SO_4 > (NH_4)_2SO_4 . NH_4NO_3$
b. $(NH_4)_2SO_4 > (NH_4)_2SO_4 . NH_4NO_3 > NH_4NO_3 > CO(NH_2)_2$
c. $(NH_4)_2SO_4 . NH_4NO_3 > CO(NH_2)2 > (NH_4)_2SO_4 > NH_4NO_3$
d. $NH_4NO_3 > CO(NH_2)_2 > (NH_4)_2SO_4 . NH_4NO_3 > (NH_4)_2SO_4$

58. Which fertilizer is physiologically neutral?
a. Calcium ammonium nitrate
b. Ammonium sulphate nitrate
c. Ammonium nitrate
d. Ammonium chloride

59. Which is the chemical formula of calcium ammonium nitrate?
a. $Ca(NO_3)_2 . NH_4NO_3$
b. $CaNH_4NO_3$
c. $CaCO_3 . NH_4NO_3$
d. $CaCl_2 . NH_4NO_3$

Answers					
47. a	50. c	53. c	56. c	59. c
48. b	51. b	54. d	57. b	
49. c	52. a	55. c	58. a	

60. Ammonium sulphate placed on the surface of alkali soils causes
a. Volatilization of ammonia
b. Leaching of ammonium ions
c. Fixation of ammonium ions
d. All

61. Highly concentrated widely used solid nitrogenous fertilizer is
a. Ammonia
b. Ammonium nitrate
c. Urea
d. Ammonium sulphate

62. Which fertilizer would you prefer for groundnut grown on light soil?
a. Ammonium sulphate
b. Urea
c. Ammonium nitrate
d. Ammonium sulphate nitrate

63. Which fertilizer would you prefer for low land paddy?
a. Urea
b. Ammonium nitrate
c. Ammonium sulphate nitrate
d. Ammonium sulphate

64. The recommendable method of $(NH_4)_2SO_4$ application to a soil having 8.9 pH is
a. Surface application without incorporation
b. Surface application with incorporation
c. Foliar application
d. All the above

65. Sulphide toxicity may appear in submerged rice soils due to heavy application of
a. $CO(NH_2)_2$
b. $CaCO_3$. NH_4NO_3
c. $(NH_4)_2HPO_4$
d. $(NH4)_2SO_4$

66. In anaerobic soils, sulphate is reduced by
a. Thiobacillus
b. Desulfotomaculum
c. Nitrosomonas
d. Rhodosprillum

67. Nitrites largely accumulates in soil having pH
a. 5.0 b. 6.0
c. 7.0 d. 8.0

68. The fertilizer that may cause maximum phytotoxicity is
a. Urea phosphate
b. Urea
c. Ammonium nitrate
d. Ammonium chloride

69. The fertilizer that is physiologically alkaline is
a. NH_4NO_3
b. $NH_4NO_3.(NH4)_2SO_4$
c. $NH_4NO_3.CaCO_3$
d. $NaNO_3$

70. The fertilizer that greatly induces poor physical condition of soil is
a. $NaNO_3$ b. NH_4NO_3
c. NH_4Cl d. $(NH_4)_2SO_4$

71. The fertilizer that induces the leaching loss of Ca in soil is
a. $NH_4NO_3.(NH_4)_2SO_4$
b. $CO(NH_4)_2$
c. NH_4Cl
d. $NaNO_3$

72. Which is ammonium forming fertilizer?
a. Ammonium sulphate
b. Ammonium chloride
c. Calcium ammonium nitrate
d. Urea

Answers					
60. a	63. a	66. b	69. d	72. d	
61. c	64. b	67. d	70. a		
62. a	65. d	68. b	71. d		

73. The response of crops (as % increase of yield) to added fertilizer is graded as
a. Cereal > Pea > Potato > Bean
b. Pea > Cereal > Bean > Potato
c. Bean > Pea > Potato > Cereal
d. Potato > Bean > Pea > Cereal

74. The cheapest fertilizer is
a. K_2SO_4
b. K_2SO_4. $MgSO_4$
c. K_2HPO_4
d. KCl

75. For acid soils the fertilizer that must be incorporated with soils is
a. $CO(NH_4)_2$ b. NH_4NO_3
c. NH_4Cl d. $(NH_4)_2SO_4$

76. For water logged rice cultivation, the fertilizer that may be avoided is
a. NH_4Cl b. $CO(NH_4)_2$
c. $NaNO_3$ d. $(NH_4)_2SO_4$

77. What is the percentage of phosphorus in organic matter?
a. 5.0 % b. 0.5 %
c. 1.0 % d. 2.5 %

78. What is the percentage of nitrogen in organic matter?
a. 5.0 % b. 0.5 %
c. 1.0 % d. 2.5 %

79. What is the percentage of sulphur in organic matter?
a. 5.0 % b. 0.5 %
c. 1.0 % d. 2.5 %

80. Range of total nitrogen content in Indian soil is _____.
a. 0.05-3.5 % b. 0.1-1.0 %
c. 0.02-0.15 % d. 0.02-2.5 %

81. Range of total potassium content in Indian soil is _____.
a. 0.05-3.5 % b. 0.1-1.0 %
c. 0.02-0.15 % d. 0.02-2.5 %

82. Range of total phosphorus content in Indian soil is _____.
a. 0.05-3.5 % b. 0.1-1.0 %
c. 0.02-0.15 % d. 0.02-2.5 %

83. Percentage of calcium in single super phosphate is
a. 16-18 % b. 12-14 %
c. 26-29 % d. 18-21 %

84. Percentage of sulphur in single super phosphate is
a. 16 % b. 12 %
c. 26 % d. 18 %

85. Percentage of P_2O_5 in single super phosphate is
a. 48-52 % b. 26 %
c. 16 % d. 34 %

86. Percentage of calcium in triple super phosphate is
a. 12-14 % b. 18-21%
c. 48-52 % d. 36-38 %

87. Percentage of P_2O_5 in triple super phosphate is
a. 12-14 % b. 18-21%
c. 48-52 % d. 36-38 %

88. Percentage of calcium in $Ca(NO_3)_2$ in triple super phosphate is
a. 16 % b. 19%
c. 26 % d. 34 %

89. Organic matter can hold how many times its weight in water?
a. Up to 15 b. Up to 20
c. Up to 25 d. Up to 12

Answers						
73. d	76. c	79. b	82. c	85. c	88. b	
74. d	77. b	80. d	83. d	86. a	89. b	
75. a	78. a	81. a	84. b	87. c		

90. Nitrogen percentage in $Ca(NO_3)_2$ is
a. 16 % b. 14 %
c. 15 % d. 20 %

91. Percentage of magnesium in magnesia (MgO) is
a. 45 % b. 55 %
c. 60 % d. 65 %

92. Percentage of magnesium in basic slag is
a. 3-4 % b. 3-8 %
c. 20 % d. 26 %

93. Percentage of P_2O_5 in basic slag is
a. 3-4 % b. 3-8 %
c. 20 % d. 26 %

94. What is the percentage of calcium in basic slag?
a. 18 % b. 20%
c. 34 % d. 26%

95. What is the percentage of magnesium in serpentine?
a. 18 % b. 20%
c. 34 % d. 26%

96. What is the percentage of magnesium in $Mg(NO_3)_2$?
a. 14 % b. 16 %
c. 19 % d. 21 %

97. What is the percentage of calcium in Ca-EDTA?
a. 3-5 % b. 8-9 %
c. 10-15 % d. 3-8 %

98. What is the percentage of magnesium in Mg-EDTA?
a. 3-5 % b. 3-8 %
c. 2-4 % d. 8-9 %

99. What is the percentage of magnesium in $MgCl_2.10H_2O$?
a. 3-5 % b. 3-8 %
c. 2-4 % d. 8-9 %

100. Single super phosphate is best suitable for
a. Neutral and alkaline soils
b. Neutral and acid soils
c. Acid and alkaline soils
d. Neutral soils only

101. Mineralization percentage in tropical soils per year is
a. 1 – 2 % b. 2 – 3 %
c. 1 – 4 % d. 1 – 10 %

102. Mineralization percentage in Indian soils per year is
a. 1 – 2 % b. 2 – 3 %
c. 1 – 4 % d. 1 – 10 %

103. Percentage of carbon utilized by the organisms in soil is
a. 15 % b. 25 %
c. 35 % d. 45 %

104. Immobilization of soil nitrogen occurs when C: N ratio of organic matter is
a. < 20 : 1 b. 20 – 30 : 1
c. > 30 : 1 d. > 300 : 1

105. Mineralization of soil nitrogen occurs when C: N ratio of organic matter is
a. < 20 : 1 b. 20 – 30 : 1
c. > 30 : 1 d. > 300 : 1

106. Immobilization of soil nitrogen occurs when nitrogen percentage in organic matter is
a. < 1.5 % b. 15 – 1.7 %
c. > 1.7 % d. > 0.3 %

107. Mineralization of soil nitrogen occurs when nitrogen percentage in organic matter is
a. < 1.5 % b. 15 – 1.7 %
c. > 1.7 % d. > 0.3 %

Answers												
	90. c	91. b	92 a	93. b	94. b	95. d	96. b	97. a	98. c	99. d	100. a	101. c
	102. a	103. c	104. c	105. a	106. c	107. a						

108. Immobilization of soil phosphorus occurs when C: P ratio of organic matter is
a. < 200 : 1 b. < 300 : 1
c. > 200 : 1 d. > 300 : 1

109. Mineralization of soil phosphorus occurs when C: P ratio of organic matter is
a. < 200 : 1 b. < 300 : 1
c. > 200 : 1 d. > 300 : 1

110. Immobilization of soil phosphorus occurs when phosphorus percentage in organic matter is
a. > 0.1% b. > 0.2%
c. > 0.3% d. > 0.4%

111. Mineralization of soil phosphorus occurs when phosphorus percentage in organic matter is
a. < 0.1% b. < 0.2%
c. < 0.3% d. < 0.4%

112. Immobilization of soil sulphur occurs when C: S ratio of organic matter is
a. < 200 : 1 b. < 300 : 1
c. > 200 : 1 d. > 300 : 1

113. Mineralization of soil sulphur occurs when C: S ratio of organic matter is
a. < 200 : 1 b. < 300 : 1
c. > 200 : 1 d. > 300 : 1

114. Immobilization of soil sulphur occurs when sulphur percentage in organic matter is
a. > 0.5% b. > 0.22%
c. > 0.15% d. > 0.05%

115. Mineralization of soil sulphur occurs when sulphur percentage in organic matter is
a. > 0.5% b. < 0.22%
c. > 0.15% d. > 0.05%

116. Volatilization loss of sulphur from crops is approximately
a. 0.1 – 0.3 % b. 0.3 – 0.6 %
c. 0.6 – 0.9 % d. 0.5 – 1.0 %

117. A potential inhibitor of nitrification is
a. CS_2 b. Nitrogin
c. ST d. U-Form

118. Percentage of nitrogen in ammonium thiosulphate $[(NH_4)_2S_2O_3]$ is
a. 26 % b. 18 %
c. 12 % d. 8 %

119. Percentage of sulphur in ammonium thiosulphate $[(NH_4)_2S_2O_3]$ is
a. 26 % b. 18 %
c. 12 % d. 8 %

120. Percentage of magnesium in serpentine mineral is
a. 26 % b. 18 %
c. 12 % d. 8 %

121. In S reduction, SO_4 to S^0 is carried out by
a. *Desulphovibrio*
b. *Desulphomaculatum*
c. *Desulphomonas*
d. Both a and b
e. All the above

122. In S reduction, SO_4 to S^{2-} is carried out by
a. *Desulphovibrio*
b. *Desulphomaculatum*
c. *Desulphomonas*
d. Both a and b
e. All the above

123. In S reduction, S^0 to S^{2-} is carried out by
a. *Desulphovibrio*
b. *Desulphomaculatum*
c. *Desulphomonas*
d. Both a and b
e. All the above

Answers												
	108. d	109. a	110. c	111. b	112. d	113. a	114. c	115. c	116. b	117. a	118. c	119. a
	120. a	121. d	122. d	123. c								

124. Ionic form of boron at pH 9.2 and above is
a. $H_2BO_3^{2-}$ b. $H_3BO_3^-$
c. $H_4BO_4^-$ d. None

125. Arrange the crops based on their tolerance to Cu in decreasing order.
a. Wheat > Barley > Oats > Rye
b. Rye > Oats > Barley > Wheat
c. Barley > Wheat > Oats > Rye
d. Rye > Oats > Wheat > Barley

126. Percentage of nitrogen in $CaCN_2$ is
a. 24.0 b. 21.0
c. 12 - 14 d. 30.0

127. What is the conversion factor for the conversion of Mg in to MgO?
a. 0.751 b. 0.399
c. 1.658 d. 0.608

128. What is the conversion factor for the conversion of MgO in to Mg?
a. 0.751 b. 0.399
c. 1.658 d. 0.608

129. What is the conversion factor for the conversion of Ca in to CaO?
a. 0.751 b. 0.399
c. 1.129 d. 0.347

130. What is the conversion factor for the conversion of CaO in to Ca?
a. 0.751 b. 0.399
c. 1.129 d. 0.347

131. Percentage of sulphur in potassium sulphate (K_2SO_4) is
a. 21.0 b. 18.5
c. 22.0 d. 12 - 14

132. What is the total acidity of isolated fractions of humus?
a 500-1200 meq/100g
b. 300-800 meq/100g
c. 300-1400 meq/100g
d. 300-1500 meq/100g

133. What is the percentage of sulphur in gypsum?
a. 21.0% b. 23.5%
c. 22.0% d. 18.5%

134. Percentage of sulphur in ammonium sulphate $[NH_4 (SO_4)_2]$ is
a. 21.0% b. 18.5%
c. 22.0% d. 12 – 14%

135. Percentage of calcium in calcium ammonium nitrate (CAN) is
a. 30.0 % b. 18 - 21 %
c. 8.0 % d. 26.0 %

136. What is the percentage of calcium in gypsum?
a. 30.0 % b. 18 - 21 %
c. 8.0 % d. 26.0 %

137. Percentage of calcium in $CaCN_2$ is
a. 40.0 % b. 33.0 %
c. 23.0 % d. 18 - 21 %

138. Percentage of calcium in single super phosphate is
a. 40.0 % b. 33.0 %
c. 23.0 % d. 18 - 21 %

139. Percentage of nitrogen in KNO_3 is
a. 15% b. 16%
c. 13% d. 25%

140. Percentage of nitrogen in $NaNO_3$ is
a. 15% b. 16%
c. 13% d. 25%

141. What is the percentage of sulphur in triple superphosphate?
a. 12 – 14 % b. 4 – 8 %
c. 2 – 2.5 % d. 1– 1.5 %

Answers						
	124. c	127. c	130. a	133. a	136. a	139. c
	125. b	128. d	131. b	134. a	137. a	140. b
	126. b	129. b	132. c	135. c	138. d	141. d

142. Percentage of N in mono ammonium phosphate is
a. 28 – 32 % b. 21 – 38 %
c. 30 – 40 % d. 11– 13 %

143. Percentage of N in urea ammonium phosphate is
a. 28 – 32 % b. 21 – 38 %
c. 30 – 40 % d. 11– 13 %

144. What is the percentage of N in urea sulphate?
a. 28 – 32 % b. 30 – 40%
c. 17.0 % d. 18 – 21%

145. What is the percentage of P_2O_5 in mono ammonium phosphate?
a. 46 – 53 % b. 48 – 62 %
c. 43 – 44% d. 13 – 42 %

146. What is the percentage of P_2O_5 in urea ammonium phosphate?
a. 46 – 53 % b. 48 – 62 %
c. 43 – 44% d. 13 – 42 %

147. What is the percentage of sulphate in urea sulphate?
a. 46 – 53 % b. 43 – 44 %
c. 6 – 11 % d. 24.0 %

148. Which is the first fertilizer produced in India?
a. Single superphosphate
b. Triple superphosphate
c. Urea
d. Diammonium phosphate

149. Which is the high fertilizer consuming state in India?
a. Punjab b. Delhi
c. Haryana d. Bihar

150. What is the desired ratio of NPK India?
a. 2 : 1 : 1 b. 3 : 2 : 1
c. 4 : 2 : 1 d. 4 : 2 : 2

151. Commonly used NPK ratio in India is
a. 8.9 : 2.7 : 1 b. 8 : 3 : 1
c. 9 : 3 : 1 d. 4 : 2 : 1.

152. Example(s) for nitrification inhibitors
a. Nitropyrin and ST b. ST and AM
c. KN_3 d. Both b and c
d. All the above

153. Dicyanamide is a
a. Nitrification inhibitor
b. Slow release N-fertilizer
c. Urease inhibitor
d. Both a and b
e. None of the above

154. In denitrification process, 1 ppm of available carbon will produce _____ ppm of N_2O.
a. 1.17 b. 0.99
c. 1.99 d. 0.17

155. In denitrification process, 1 ppm of available carbon will produce _____ ppm of N_2.
a. 1.17 b. 0.99
c. 1.99 d. 0.17

156. U-form and Urea-Z are _____.
a. Low water soluble compounds
b. Sparingly soluble compounds
c. Soluble or relatively compounds
d. Nitrification inhibitors
e. Urease inhibitors

157. Guanyl urea phosphate and guanyl urea sulphate are
a. Low water soluble compounds
b. Sparingly soluble compounds
c. Soluble or relatively compounds
d. Nitrification inhibitors
e. Urease inhibitors

Answers						
	142. d	145. b	148. a	151. a	154. a	157. c
	143. b	146. d	149. a	152. e	155. b	
	144. b	147. c	150. c	153. a	156. a	

158. Magnesium ammonium phosphate is a
a. Low water soluble compounds
b. Sparingly water soluble compounds
c. Soluble or relatively soluble compounds
d. Nitrification inhibitors
e. Urease inhibitors

159. Oxamide, CDU and IBDU are
a. Low water soluble compounds
b. Sparingly water soluble compounds
c. Soluble or relatively soluble compounds
d. Nitrification inhibitors
e. Urease inhibitors

160. What is the percentage of nitrogen in urea-formaldehyde?
a. 30 b. 35
c. 38 d. 41

161 What is the percentage of sulphur coated urea (SCU)?
a. 30 b. 35
c. 38 d. 41

162. What is the percentage of nitrogen oxamide?
a. 36.8 b. 31.8
c. 32 d. 33 – 35

163. What is the percentage of thiourea?
a. 33 – 35 b. 33 – 38
c. 31. 8 d. 36.8

164. What is the percentage of IBDU?
a. 33 – 35 b. 33 – 38
c. 31. 8 d. 36.8

165. What is the percentage of Urea-Z?
a. 33 – 35 b. 33 – 38
c. 31. 8 d. 36.8

166. Percentage of Mg in kieserite is
a. 16 b. 27
c. 34 d. 19

167. What is the percentage of Mg in epsomite?
a. 16 b. 27
c. 34 d. 19

168. Nitrogen percentage in raw bone meal is
a. 4 – 8 b. 2 – 5
c. 3 – 5 d. 5 – 8

169. Percentage of citrate P_2O_5 in rock phosphate is
a. 25 – 35 % b. 5 – 17 %
c. 22 – 26 % d. 12 – 18 %

170. Na_2CO_3. $2Na_2SO_4$ is the chemical composition of
a. Sylvite b. Sylvinite
c. Schoenite d. Burkite

171. KCl. $MgCl_2.6H_2O$ is the chemical composition of
a. Longbeinite b. Carnalite
c. Sylvite d. Sylvinite

172. KCl. NaCl is the chemical composition of
a. Longbeinite b. Carnalite
c. Sylvite d. Sylvinite

173. _____ and _____ are the structure analogous of urease enzyme which inhibits urease activity.
a. Thiourea and Methyl urea
b. Hydroxamic acids and ammonium thiosulphate
c. Phenyl phosphorodiamide and caprylohydroxamic acids
d. Quinone and Benzoquinone

Answers						
	158. b	161. c	164. c	167. a	170. d	173. a
	159. a	162. b	165. b	168. c	171. b	
	160. c	163. d	166. b	169. b	172. d	

174. _____ and _____ are the urease inhibitors that urease by blocking the sulphydryl group at active site of the enzyme.
a. Thiourea and Methyl urea
b. Hydroxamic acids and ammonium thiosulphate
c. Phenyl phosphorodiamide and caprylohydroxamic acids
d. Quinone and Benzoquinone

175. Urease inhibitors that inhibit the enzyme by binding with Ni^{2+} ions of the enzyme urea.
a. Hydroxamic acids
b. Caprylohydroxamic acids
c. Phenyl phosphorodiamide
d. Ammonium thiosulphate
e. All the above

176. What is the optimum pH for sulphur oxidation?
a. 3.0 and below b. 4.0 and below
c. 5.0 and below d. 6.0 and below

177. What is the product of the reaction NH_3 + $H_4P_2O_7$?
a. Monoammonium phosphate
b. Diammonium phosphate
c. Triammonium phosphate
d. Dicalcium phosphate

178. Dicalcium phosphate is the product of the reaction of
a. Rock phosphate + HCl
b. Rock phosphate + H_3PO_4
c. Rock phosphate + $H_4P_2O_7$
d. Rock phosphate + H_2SO_4

179. The ratio of $CaCO_3$ and NH_4NO_3 in calcium ammonium nitrate (CAN) is
a. 4 : 6 b. 5 : 5
c. 6 : 4 d. 7 : 3

180. What is the number of essential elements required for human beings?
a. 16 b. 17
c. 18 d. 19

181. What is the number of essential elements required for farm animals?
a. 16 b. 17
c. 18 d. 19

182. Of the following nutrient elements, which one is not essential for farm animals?
a. Fluorine b. Iodine
c. Cobalt d. Sodium

183. Of the following nutrient elements, which one is not essential for human beings and farm animals?
a. Iodine b. Boron
c. Cobalt d. Chlorine

184. Who first discovered that plants need mineral nutrients for their growth and developments?
a. Nicholas Theodore de Saussure
b. Jean Baptiste Bousingault
c. Justin von Liebig
d. Both a and b
e. All the above

185. Who showed that the growing plants obtain elements Ca, K, S and phosphorous from the soil?
a. Nicholas Theodore de Saussure
b. Jean Baptiste Bousingault
c. Justin von Liebig
d. John B. Laws

Answers					
	174. d	177. c	180. d	183. b	
	175. e	178. a	181. c	184. d	
	176. b	179. a	182. a	185. c	

186. Who first established that plants obtain their carbon supply from CO_2 in air and from the soil?
a. Nicholas Theodore de Saussure
b. Jean Baptiste Bousingault
c. Justin von Liebig
d. John B. Laws

187. Who first made and used superphosphate in farm?
a. John B. Laws b. J.H Gilbert
c. Gris d. Both a and b

188. Who established the basic principle of 'a cropped soil is restored to fertility only by adding to it all minerals and nitrogen removed by plants?
a. Nicholas Theodore de Saussure
b. Jean Baptiste Bousingault
c. Justin von Liebig
d. John B. Laws

189. Who discovered the essentiality of iron to plants?
a. Gris
b. C. Sprengel
c. A.L. Sommer and C.P. Lipman
d. Theodore de Saussure

190. Who discovered the essentiality of nitrogen to plants?
a. Gris
b. C. Sprengel
c. A.L. Sommer and C.P. Lipman
d. Theodore de Saussure

191. Who discovered the essentiality of boron to plants?
a. C. Sprengel
b. A.L. Sommer and C.P. Lipman
c. K. Warrington
d. D.I. Arnon and P.R. Stout

192. Who discovered the essentiality of molybdenum to plants?
a. C. Sprengel
b. A.L. Sommer and C.P. Lipman
c. K. Warrington
d. D.I. Arnon and P.R. Stout

193. Who discovered the essentiality of zinc to plants?
a. Gris
b. C. Sprengel
c A.L. Sommer and C.P. Lipman
d. Theodore de Saussure

194 In 1954, who discovered the essentiality of Cl^- to plants?
a. T.C. Broyer b. A.B. Carlton
c. C.M. Johnson d. P.R. Stout
e. All the above

195. What is the number of macronutrients?
a. 3 b. 6
c. 16 d. 17

196. Of the following, which is an example of fertilizer elements?
a. N, P and K
b. Ca, Mg and S
c. Both a and b
d. C, H, O, N, P and K

197. Examples of secondary nutrients are
a. N, P and K
b. Ca, Mg and S
c. Fe, Mn, Cu, Cl, Mo, and B
d. All

198. Examples of major nutrients are
a. N, P and K
b. Ca, Mg and S
c. Fe, Mn, Cu, Cl, Mo, and B
d. All

Answers					
	186. c	189. a	192. d	195. b	198. a
	187. a	190. d	193. c	196. a	
	188. c	191. c	194. e	197. b	

199. Examples of macro nutrients are
a. N, P and K b. Ca, Mg and S
c. Fe, Mn, Cu, Cl, Mo, and B
d. Both a and b

200. Which nutrients element is the basic constituent of life?
a. Nitrogen b. Phosphorous
c. Sulphate d. Ca and Mg

201. Which nutrient is essential for the increases in protein content in food fodder crops?
a. Nitrogen b. Phosphorous
c. Sulphate d. Ca and Mg

202. _____ establishes early root development and growth, thereby helping to establish seeding quickly.
a. Nitrogen b. Phosphorous
c. Sulphate d. Both a and b

203. _____ brings about the early maturity of crops, particularly the cereals, and counteracts the effects of excessive nitrogen.
a. Phosphorous b. Potassium
c. Ca and Mg d. Sulphate

204. Which nutrients stimulates flowering and aids in seed form?
a. Phosphorous b. Potassium
c. Ca and Mg d. Sulphate

205. Which of the following nutrients, when applied to legumes, enhances the activity of rhizobia and increases the formation of root nodules ?
a. Phosphorous b. Nitrogen
c. Potassium d. Molybdenum

206. Which of the following elements, when excess may cause deficiencies of trace elements, particularly iron and zinc?
a. Phosphorous b. Nitrogen
c. Potassium d. Molybdenum

207. Which element is not a constituent of plant composition?
a. N b. P
c. K d. Ca and Mg

208. _____ increases the vigour and disease resistance to plants.
a. N b. K
c. S d. Ca and Mg

209. Of the following nutrients, which one increases the winter hardiness, reduces lodging of crops.
a. N b. K
c. S d. Ca and Mg

210. _____ is essential for the formation and transfer of starches and sugars
a. N b. K
c. S d. Ca and Mg

211. Which nutrient is essential for stomatal regulations in plants?
a. Ca b. Mg
c. K d. Mo

212. What is the purpose of nitrification inhibitors?
a. To stop conversion of nitrite to nitrate and hold nitrite by anion exchange to reduce its chances of leaching to ground water
b. To stop rapid mineralization of NH_4^+ ions to reduce leaching losses of N to ground water
c. To convert nitrate to NH_4^+ to reduce the potential losses of N as nitrate to ground water
d. Inhibit conversion of NH_4^+ to nitrite to keep NH_4^+ on exchange sites, reducing losses of nitrate to ground water

Answers					
	199. d	202. b	205. a	208. b	211. c
	200. a	203. a	206. a	209. b	212. b
	201. a	204. a	207. b	210. b	

213. What are the advantages of ammonium phosphates?
   a. Low cost N fertilizer
   b. Good starter fertilizer for seedlings, providing both N and P
   c. Good starter fertilizer for seedlings that besides nutrients has a liming effect on soils
   d. Good starter fertilizer for seedlings that provides significant amounts of sulphur

214. The availability to plants of P from rock phosphate can be improved by
   a. Premixing it and composting it with organic amendments prior to application
   b. Banding beneath the seed rows
   c. Use on alkaline soils rather than acid soils
   d. Use coarse textured rock phosphate

215. Of the following which would require the least amount of lime per acre to increase the pH to a given level assuming purity, moisture content and fineness were the same?
   a. Ground limestone with a calcium carbonate equivalent (CCE) of 100
   b. Dolomitic limestone with a CCE of 109
   c. Hydrated lime with a CCE of 135
   d. Burned lime with a CCE of 179

216. Which of these processes/mechanisms is the main controlling factor in determining the amount of plant available P (PO_4) in soil solution?
   a. Mineralization of P from organic matter
   b. PO_4 precipitation with soluble Fe or Al and PO_4 sorption reactions with solid phases in soil
   c. Biological immobilization of P in organic matter
   d. Solubility of apatite

217. Urea
   a. Is the principle dry form of N fertilizer in the world
   b. Is first hydrolyzed to nitrate in soil and can be surface applied to alkaline soils
   c. Is first hydrolyzed to ammonium in soil and should not be surfaced applied to alkaline soils
   d. Both a and b
   e. Both a and c
   f. None of the above

218. In consideration of plant availability of all essential nutrients, what is a typical range for the optimal pH for many agricultural soils?
   a. 5.2-5.8 b. 5.5-6.3
   c. 6.0-7.5 d. 7.0-8.5

219. Which factors do not usually cause an increase in P availability?
   a. Increasing the $CaCO_3$ content in alkaline soil
   b. Liming an acid soil
   c. Decrease in organic matter
   d. Acidifying an alkaline soil
   e. Both a and c f. All the above

220. Which combination of solid phases of phosphate compounds would be typically found in acid and alkaline soils?
   a. Fe and Al phosphates in acid soil and tricalcium phosphate in alkaline soils
   b. Fe and Al phosphates in alkaline soil and tricalcium phosphate in acid soils
   c. H_2PO_4 in acid soils and PO_4^{2-} in alkaline soils
   d. H_2PO_4 in acid soils and monocalcium phosphate in alkaline soils

Answers
213. b 214. a 215. a 216. b 217. e 218. c 219. e 220. a

221. How can decomposition of organic matter cause soil acidity?
   a. Releases Al^{3+} from organic matter that splits water and releases H
   b. Has a liming effect that causes leaching of basic cations
   c. Produces strong bases during decomposition
   d. Releases CO_2 which forms H_2CO_3

222. Which of the following nutrients is a constituent of the cell wall and activate the growing points?
   a. Ca b. Mg
   c. B d. S

223. _____ is not a constituent of chlorophyll but, it helps in chlorophyll formation and encourages vegetative plant growth.
   a. Phosphorous b. Magnesium
   c. Sulphur d. Nitrogen

224. _____ is an essential constituent of certain volatile compounds and helps in the reduction-oxidation system in respiration.
   a. Phosphorous b. Magnesium
   c. Sulphur d. Nitrogen

225. Which is the element essential for the calcium metabolism, both with its uptake by roots and its efficient use in plants?
   a. Mg b. N
   c. S d. B

226. _____ acts as a regulator of potassium/calcium ratio in the plant.
   a. Mg b. N
   c. S d. B

227. _____ helps in absorption of nitrogen.
   a. Mn b. B
   c. Mo d. Zn

228. Element which is a constituent of cell membrane and essential for cell division is
   a. Mn b. B
   c. Mo d. Zn

229. Of the micronutrients, which element is essential for translocation of sugars in plant?
   a. B b. Mo
   c. Zn d. Mn

230. Of the micronutrients which element is essential for flowering and fruiting process and pollen germination?
   a. B b. Mo
   c. Zn d. Mn

231. A good supply of _____ helps in counteracting the bad effect of poor aeration.
   a. Fe b. Mn
   c. Zn d. Cu

232. _____ is not a constituent of chlorophyll but, it helps in its formation.
   a. Fe b. Mn
   c. Zn d. Cu

233. Which nutrient element influences the formation of some growth hormones in the plant?
   a. Fe b. Mn
   c. Zn d. Cu

234. Which nutrient element brings about the reduction of nitrates to ammonia prior to amino acid and protein synthesis in the cells of the plant?
   a. Boron b. Molybdenum
   c. Zinc d. Iron

Answers
221. d 222. a 223. c 224. c 225. d 226. d 227. b 228. b 229. a 230. a 231. b 232. a 233. c 234. b

235. _____ is essential for nitrogen fixation, both symbiotic and non-symbiotic.
a. Boron b. Molybdenum
c. Zinc d. Iron

236. _____ acts as "electron carrier" in enzymes which brings about oxidation-reduction reactions in plants.
a. Fe b. Mn
c. Zn d. Cu

237. _____ helps in utilization of iron in chlorophyll synthesis.
a. Fe b. Mn
c. Zn d. Cu

238. L.C Broyer and his associates proved the essentiality of _____ for plant.
a. B b. Mo
c. Mn d. Cl

239. Based on the functional basis, which of the following elements are classified as accessory structural elements?
a. C and H b. C, H and O
c. N and P d. All

240. Based on the functional basis, which of the following elements is classified as accessory structural elements?
a. C b. H
c. O d. S

241. Based on the functional basis, which of the following elements are classified as regulators and carriers?
a. C, H, O b. N, P ,S
c. K, Ca, Mg d. Ca, Mg and Fe

242. Based on the functional basis, which of the following elements are classified as main structure elements?
a. C, H, O b. N, P ,S
c. K, Ca, Mg d. Ca, Mg and Fe

243. Based on the functional basis, which of the following elements are classified as catalysts and activators?
a. Fe, Mn, Zn, Cu b. B, Mo, Cl
c. Fe, Mn, Cu, Mo d. All

244. Which nutrient element is essential for the synthesis and translocation of carbohydrates in plant?
a. K b. Ca
c. Mg d. S

245. What is the percentage of magnesium in plant?
a. 0.3 – 6.0 b. 1.0 – 4.0
c. 0.05 – 1.0 d. 0.05 – 1.5

246. What is the percentage of Ca in plant?
a. 0.3 – 6.0 b. 1.0 – 4.0
c. 0.05 – 1.0 d. 0.05 – 1.5

247. What is the percentage of N in plant?
a. 0.3 – 6.0 b. 1.0 – 3.0
c. 0.05 – 1.0 d. 0.05 – 1.5

248. What is the percentage of Fe in plant?
a. 10 – 1000 b. 5 – 500
c. 5 – 100 d. 2 – 50

249. What is the percentage of Zn in plant?
a. 10 – 1000 b. 5 – 500
c. 5 – 100 d. 2 – 50

250. What is the percentage of Mo in plant?
a. 2 – 50 b. 2 – 72
c. 0.01 – 10 d. 100 – 250

251. What is the percentage of B in plant?
a. 2 – 50 b. 2 – 72
c. 0.01 – 10 d. 100 – 250

Answers						
	235. b	238. d	241. c	244. a	247. b	250. c
	236. d	239. c	242. a	245. c	248. a	251. b
	237. d	240. d	243. d	246. b	249. c	

252. The nutrients Ca^{2+} and Mg^{2+} absorbed by plants mush faster rate than K^+ and NH_4^+ (True/False).

253. NO_3^- and Cl^- lost by leaching faster than SO_4^{2-} and $H_2PO_4^-$ (True/False).

254. Which is the largest loss of soil nutrients from the soil?
a. Removal by crops
b. Removal by weeds
c. Loss by leaching
d. Loss by erosion
e. Loss by gaseous form

255. Of the following nutrients, which nutrient's loss is move by leaching?
a. N b. P
c. K d. Zn

256. What is the percentage of major nutrients in well rotten FYM?
a. 0.5 % N, 0.2 % P_2O_5, 0.5 % K_2O
b. 0.5 % N, 0.2 % P, 0.5 % K
c. 0.3 % N, 0.1% P2O5, 0.3% K
d. 0.3% N, 0.1 % P, 0.3% K

257. On an average, _____ of the nitrogen in food consumed by the animals appears in the FYM.
a. 70 – 75 % b. 70 – 80 %
c. 70 – 920 % d 90 – 99 %

258. On an average, _____ of the phosphoric acid in food consumed by the animals appears in the FYM.
a. 70 – 75 % b. 70 – 80 %
c. 70 – 920 % d. 90 – 99 %

259. On an average, _____ of the potash in food consumed by the animals appears in the FYM.
a. 70 – 75 % b. 70 – 80 %
c. 70 – 920 % d. 90 – 99 %

260. On an average, _____ of the organic matter in food consumed by the animals appears in the FYM.
a. 40 % b. 50 %
c. 60 % d. 70 %

261. What is the percentage of water soluble potash in FYM?
a. Nearly 90 % b. 85 %
c. 80 % d. 70 %

262. What is the percentage of water soluble phosphorus in phosphoric acid?
a. About 40 % b. 50 %
c. 60 % d. 65 %

263. The tendency to lose ammonia increases with
a. Increase in the concentration of $(NH_4)_2CO_3$.
b. Increase in temperature
c. Air movement
d. All the above

264. Trench method of preparing FYM has been recommended by
a. Schmidt Eggersgluss
b. Wager and Krosender
c. S.V. Desai
d. C.N. Acharya

265. Siderophores are related to which of the following metal elements?
a. Iron b. Manganese
c. Copper d. Zinc

266. Sugar amine condensation theory of humus formation was given by
a. Waksman b. Stevenson
c. Chowla d. Jackson

Answers					
	252. f	255. a	258. c	261. a	264. d
	253. T	256. a	259. d	262. b	265. a
	254. a	257. c	260. b	263. d	266. b

267. What is the C:N ratio of organic matter?
a. 8 : 1 b. 10 : 1
c. 20 : 1 d. 15 : 1

268. The factor(s) associated with the loss of anhydrous ammonia is/are
a. Soil texture
b. Soil moisture
c Depth and spacing of placement
d. All

269. When anhydrous ammonia is applied on the soil, how much distance it moves vertically into the soil?
a. 2 cm b. 3 cm
c. 4 cm d. 5 cm

270. What is the chemical formula of anhydrous ammonia?
a. NH_4 b. $NH_3 . nH_2O$
c. NH_3 d. $NH_4 . nH_2O$

271. When anhydrous ammonia is applied to the soil, what will happen to the soil pH?
a. pH will increase to 9.0 and above
b. pH will decrease to 3.0 and below
c. pH will increase to 8.0 and above
d. pH will decrease to 4.0 and below

272. Retention of NH_3 in soil is more
a. At or near field capacity
b. With more clay content
c. With increasing depth
d. All

273. What is the nitrogen percentage in aqua NH_3?
a. 21.0 b. 20-25
c. 30 d 33-34

274. Ammonium sulphate nitrate is produced by the reaction of
a. Nitric acid and sulphuric acid with NH_3
b. Nitric acid with ammonium sulphate
c. Sulphuric acid with ammonium sulphate
d. Nitric acid and hydrochloric acid with NH_3

275. Which of the following nitrogenous fertilizers is produced by dual-salt process?
a. Ammonium phosphate
b. Ammonium chloride
c. Ammonium bicarbonate
d. Ammonium sulphate

276. Which is the enzyme involved in the hydrolysis of urea?
a. Urease
b. Nitrogenase
c. Nitrate reductase
d. All

277. Dwell or Etridiazol is
a. A nitrification inhibitor
b. An urease inhibitor
c. A slow release N-fertilizer
d. All

278. Benzoquinones and quinones are
a. A nitrification inhibitor
b An urease inhibitor
c. A slow release N-fertilizer
d. All

279. Caprylohydroxamic acid is
a. A nitrification inhibitor
b. An urease inhibitor
c. A slow release N-fertilizer
d. All

280. Ammonium thiosulphate is
a. A nitrification inhibitor
b. An urease inhibitor
c. A slow release N-fertilizer
d. All

Answers					
	267. b	270. c	273. b	276. a	279. b
	268. d	271. a	274. a	277. a	280. b
	269. d	272. d	275. b	278. b	

281. Francolite is a
a. Chlor-apatite mineral
b. Fluor-apatite mineral
c. Carbonate-apatite mineral
d. Carbonate-fluor-apatite

282. Triple superphosphate is produced by the reaction of
a. Rock phosphate with sulphuric acid
b. Rock phosphate with hydrochloric acid
c. Rock phosphate with phosphoric acid
d. Phosphoric acid with sulphuric acid

283. Single superphosphate is produced by the reaction of
a. Rock phosphate with sulphuric acid
b. Rock phosphate with hydrochloric acid
c. Rock phosphate with phosphoric acid
d. Phosphoric acid with sulphuric acid

284. Treating rock phosphate with sulphuric acid for the production of phosphoric acid is called as
a. Green process b. Wet process
c. Yellow process d. Both a and b

285. Phosphoric acid made by burning is called as
a. White acid b. Furnace acid
c. Green acid d. Both a and b

286. Single super phosphate is
a. A neutral fertilizer
b. An acid producing fertilizer
c. An alkali producing fertilizer
d. None

287. Which of the following phosphatic fertilizer is called as concentrated superphosphate?
a. Single superphosphate
b. Double superphosphate
c. Triple superphosphate
d. All

288. Monoammonium phosphate is produced by the reaction of
a. Single superphosphate with NH_3
b. Triple superphosphate with NH_3
c. Double superphosphate with NH_3
d. Both a and b
e. All the above

289. Variscite is the reaction product of phosphorus in
a. Acid soils
b. Alkali soils
c. Neutral soils
d. Calcareous soils

290. Strengite is the reaction product of phosphorus in
a. Acid soils
b. Alkali soils
c. Neutral soils
d. Calcareous soils

291. CS_2 is a potential inhibitor of
a. Nitrification b. Urease activity
c. Both a and b d. None

292. What is the percentage of Ca in CaEDTA?
a. 2-5% b. 3-5%
c. 5-10% d. 5-12%

293. Slowly available K
a. Can be released from between the partially opened lattices of partially weathered hydrous micas or illite clay minerals
b. Is soluble K^+ in soil solution
c. Is K in primary minerals fixed in the lattice clay structure
d. Is measured in a standard NH_4OAc solution in soil testing

Answers					
	281. d	284. d	287. c	290. a	293. a
	282. c	285. d	288. d	291. a	
	283. a	286. a	289. a	292. b	

294. Commercial phosphate fertilizer such as triple superphosphate
- a. Is made by mining apatite which is reacted with acids to form phosphate fertilizer
- b. Can be made in unlimited amounts
- c. Is made by grinding apatite and using density separation techniques to obtain the P fertilizer
- d. Both b and c
- e. None of the above

295. Anhydrous ammonia and urea have what in common
- a. Will be acid producing and volatilize on the surface of alkaline soils
- b. Will cause alkalinity and volatilize on surface of acid soils
- c. Can not be a source of nitrate for ground water pollution
- d. Are uncommon forms of commercial N fertilizers

296. Keeping a micronutrient in solution and available to plants by forming an organic complex around the micronutrient is called
- a. Chemisorption of the cation with soil organic matter
- b. Chelation
- c. Adsorption
- d. Substitution of one ion for another

297. Besides plant uptake, what is one major fate of sulfate fertilizer added to aerobic soils?
- a. Immobilized in the soil organic matter as sulfides
- b. Immobilized in the soil as ester sulfates, C-bonded S and other organic fractions
- c. Immobilized as sulfate
- d. Volatilized as H_2S

298. Elemental S
- a. Is directly available to plants
- b. Must be oxidized to SO_4 by biological activity before it can be taken up by plants
- c. Does not form sulphuric acid and is not useful to reduce the pH of alkaline soils
- d. Must be reduced to S_2O_3 before it can become available to plants

299. Which form of S in soils is thought to be the most important source for S that will be mineralized during the growing season?
- a. Ester sulfate
- b. Carbon-bounded S
- c. Calcium carbonate-sulfates
- d. FeS

300. Fertilizers containing Cl^- ions are not suitable for
- a. Sugarcane
- b. Potato
- c. Wheat
- d. Pegeonpea

301. How much of muriate of potash is required to supply 50 kg K_2O/ha
- a. 50 kg
- b. 73.3 kg
- c. 83.3 kg
- d. 125.3 kg

302. Amongst oil cakes, the highest nitrogen content is in
- a. Castor cake
- b. Neem cake
- c. Coconut cake
- d. Groundnut cake

Answers

294. a	297. b	300. b
295. a	298. b	301. c
296. b	299. a	302. a

11

Nutritional Disorders

Questions :

1. The ratios of P : Zn in the shoot at tillering to the panicle initiation stage of paddy is a good indicator of Zn deficiency. This value should not exceed
   a. 20-40 : 1 b. 20-50 : 1
   c. 20-60 : 1 d. 20-70 : 1

2. The ratios of Fe: Zn in the shoot at tillering to the panicle initiation stage of paddy is good indicators of Zn deficiency. This value should not exceed
   a. 3-7 : 1 b. 5-7 : 1
   c. 6-9 : 1 d. 11-13 : 1

3. The available level of Zn in soils is 0.6ppm. This is a critical level of Zn below which deficiency will occur when the soil has been extracted with
   a. 1N NH_4-acetate, pH 4.8
   b. DTPA methods
   c. 0.05N HCl
   d. EDTA methods

4. The available level of Zn in soils is 0.8 ppm. This is a critical level of Zn below which deficiency will occur when the soil has been extracted with
   a. 1N NH_4-acetate, pH 4.8
   b. DTPA methods
   c. 0.05N HCl
   d. EDTA methods

5. The available level of Zn in soils is 1.0 ppm. This is a critical level of Zn below which deficiency will occur when the soil has been extracted with
   a. 1N NH_4-acetate, pH 4.8
   b. DTPA methods
   c. 0.05N HCl
   d. EDTA methods

6. The available level of Zn in soils is 1.5ppm. This is a critical level of Zn below which deficiency will occur when the soil has been extracted with
   a. 1N NH_4-acetate, pH 4.8
   b. DTPA methods
   c. 0.05N HCl
   d. EDTA methods

7. Which of the following symptoms of Zn deficiency is similar to other nutrient ?
   a. The symptoms of Zinc deficiency may resemble those of Fe deficiency
   b. On alkaline soils, Zn deficiency is often associated with S deficiency
   c. They may also resemble Mn deficiency
   d. All the above

8. Zn deficiency can be caused by which of the following conditions ?
   a. Small amount of available Zn in the soil
   b. Planted varieties are susceptible to Zn deficiency (i.e., Zn-inefficient cultivars)
   c. High pH (close to 7 or alkaline under anaerobic conditions)
   d. All the above

9. Solubility of Zn decreases by what orders of magnitude for each unit increase in pH?
   a. 1 b. 2
   c. 3 d. 4

10. Zn is precipitated as sparingly soluble $Zn(OH)_2$ when pH increases in acid soil following flooding. This is due to which of the following conditions ?
    a. High HCO_3^- concentration
    b. Depressed Zn uptake
    c. Formation of Zn-phosphates
    d. All the above

Answers									
	1.	c	4.	b	7.	d	10.	d	
	2.	b	5.	c	8.	d			
	3.	a	6.	d	9.	b			

11. Zn is precipitated as sparingly soluble $Zn(OH)_2$ when pH increases in acid soil following flooding. This is due to which of the following conditions ?
    a. Formation of complexes between Zn and organic matter in soils
    b. Precipitation of Zn as ZnS
    c. Excessive liming
    d. All the above

12. Zn deficiency is the most widespread micronutrient disorder in rice. Its occurrence has increased due to which of the following ?
    a. The introduction of modern varieties
    b. Crop intensification
    c. Increased Zn removal
    d. All the above

13. Which of the following soils are prone to Zn deficiency ?
    a. Neutral and calcareous soils containing a large amount of bicarbonate.
    b. Intensively cropped soils where large amounts of N, P, and K fertilizers
    c. Paddy soils under prolonged inundation
    d. All the above

14. Which of the following soils are prone to Zn Deficiency ?
    a. Sodic and saline soils
    b. Peat soils
    c. Soils with high available P and Si status
    d. All the above

15. Which of the following soils are prone to Zn deficiency ?
    a. Highly weathered, acid soils coarse-textured soils containing small amounts of available Zn
    b. Soils derived from serpentine (low Zn content in parent material) and laterite
    c. Leached, old acid sulphate soils with a small concentration of K, Mg, and Ca
    d. All the above

16. Zinc is essential for which biochemical processes in the rice plant ?
    a. Cytochrome and nucleotide synthesis
    b. Auxin metabolism
    c. Chlorophyll production
    d. Enzyme activation
    e. All the above

17. Which of the following is a method of management of Zn deficiency ?
    a. Growing Zn-efficient varieties that are tolerant of high HCO_3^- and low plant-available Zn content
    b. Broadcasting $ZnSO_4$ in nursery seedbed
    c. Dipping seedlings or presoak seeds in a 2-4% ZnO suspension (e.g., 20-40 g ZnO L^{-1} H_2O)
    d. All the above

18. Which of the following is a method of management of Zn deficiency ?
    a. Use of fertilizers that generate acidity
    b. Applying organic manure
    c. Allowing permanently inundated fields
    d. All the above

19. Zinc sulphate is
    a. Soluble and quick acting
    b. Insoluble but quick acting
    c. Insoluble and slow acting
    d. Quick acting

20. Zinc carbonate is
    a. Soluble and quick acting
    b. Insoluble but quick acting
    c. Insoluble and slow acting
    d. Quick acting

Answers									
	11.	d	14.	d	17.	d	20.	d	
	12.	d	15.	d	18.	d			
	13.	d	16.	e	19.	a			

21. Zinc chelate is
a. Soluble and quick acting
b. Insoluble but quick acting
c. Insoluble and slow acting
d. Quick acting

22. Analysis of plant tissues can be done which of the following method ?
a. Nutrients analysis
b. Critical nutrient range or threshold values
c. Visual nutrient deficiency symptoms
d. All the above

23. Which of the following is method of application of fertilizer ?
a. Topdressing b. Broadcast
c. Point injector d. Deep banding
e. All the above

24. Which of the following is a method of application of fertilizer ?
a. Split application b. Side-dressing
c. Fertigation d. Foliar sprays
e. All the above

25. Utilization Efficiency of fertilizer is defined as
a. The percentage of added fertilizer that is actually used by the plants.
b. The change of economic return (often in term of rupees amount) after fertilization, or economic margins
c. Both a and b
d. None of the above

26. Economic Efficiency of fertilizer is defined as
a. The percentage of added fertilizer that is actually used by the plants.
b. The change of economic return after fertilization, or economic margins
c. Both a and b
d. None of the above

27. High utilization efficiency of fertilizers can be obtained by which of the following conditions ?
a. Always use the "Law of the minimum"
b. Understand the concept of factor interactions
c. Maximize recycling
d. All the above

28. High utilization efficiency of fertilizers can be obtained by which of the following conditions ?
a. Budgeting - a balance of input with output
b. Timing and system dynamics
c. Avoiding single, large dose of N and P
d. All the above

29. A mineral element is considered as essential, when
a. Plants cannot complete reproductive stage of life cycle due to its deficiency
b. Deficiency must be corrected only by supplying the element in question
c. When the element is directly involved in the metabolism of the plant
d. All the above

30. Mineral deficiency symptoms can be confused with which of the following events ?
a. Damage caused by insect-pest and disease
b. Salt stress and water stress
c. Light and temperature injury
d. Herbicide damage.
e. All the above

Answers									
	21.	a	24.	e	27.	d	30.	e	
	22.	d	25.	a	28.	d			
	23.	e	26.	b	29.	d			

31. Toxicity of Mo is similar to which of the following ?
a. Se b. P
c. N d. Mg

32. Fe deficiency in mango is similar to which of the following ?
a. Se b. P
c. N d. Cl toxicity

33. Greenish red in sweet potato, bluish green in chili, brown in birdsfoot trefoil or purplish tinge in sugar maple, blueberry and sugarcane are caused by which of the following nutrient deficiency ?
a. Se b. P
c. N d. Cl toxicity

34. Brown spots on leaves, reduced expansion and premature leaf senescence in soybean crop is caused due to which of the following nutrient deficiency ?
a. Se b. P
c. N d. Ca

35. Bitter pit in apple, leaf tip burn in cabbage and lettuce, black heart of celery, cavity spot of carrots vitrescence in melons are the typical disorders of which nutrient deficiency ?
a. B b. P
c. Mg d. Ca

36. Mg deficiency may be induced in tomatoes by high levels of which of the following nutrient solution ?
a. N b. P
c. Mg d. Ca

37. The leaves become narrow and small in chilies due to deficiency of which of the following nutrient deficiency ?
a. N b. P
c. Zn d. Ca

38. 'Khaira' disease in rice results due to the deficiency of
a. N b. P
c. Zn d. Ca

39. The symptoms of "little leaf" or "rosette" occur in deficiency of which of the following nutrient deficiency ?
a. N b. P
c. Zn d. Ca

40. 'Brown heart' in radish and crown choking in coconut are caused by deficiency of which of the following nutrient ?
a. B b. P
c. Zn d. Ca

41. 'Whiptail' in cauliflower is caused by deficiency of which of the following nutrients ?
a. B b. Mo
c. Zn d. Ca

42. Wilting and twisting of leaves in wheat are the symptoms of which nutrient deficiency?
a. B b. Mo
c. Zn d. Cl

43. Which of the following conditions of soils can have boron deficiency ?
a. Soils low in boron such as derived from acid igneous rocks or from sedimentary deposit
b. Highly leached acid soils
c. Light-textured coarse sandy soils
d. Soils low in organic matter
e. All the above

Answers									
	31.	b	34.	d	37.	c	40.	a	43. e
	32.	d	35.	d	38.	c	41.	b	
	33.	b	36.	a	39.	c	42.	d	

44. Which of the following is the condition of Fe/Mn toxicity in rice ?
    a. Reddish brown coloration of water in rice field
    b. Rice susceptible to toxic condition
    c. Low tillering and chlorotic nature of rice leaf
    d. Improper grain filling and poor rice productivity
    e. All the above

45. Which of the following is/are the symptoms of Al toxicity ?
    a. Reddish brown coloration of water in rice field
    b. Rice susceptible to toxic condition
    c. Low tillering and chlorotic nature of rice leaf
    d. Improper grain filling and poor rice productivity
    e. All the above

46. Which of the following crop is/are having low tolerance to Cl toxicity ?
    a. Lemon b. Bean
    c. Peach d. Plum
    e. Apple f. All the above

47. Which of the following crop is having medium tolerance to Cl toxicity ?
    a. Strawberry b. Orange
    c. Rice d. All

48. Which of the following crop is having high tolerance to Cl toxicity ?
    a. Wheat
    b. Tomato
    c. Cotton
    d. All

49. Which of the following is the most important deficiency symptom of nitrogen deficiency in cereals ?
    a. Severe restriction of tillering with stems drying and bronzing
    b. Foliage restricted
    c. No head formation
    d. Number and size of roots severely restricted

50. Which of the following is the most important deficiency symptom of nitrogen deficiency in brassica ?
    a. Severe restriction of tillering with stems drying and bronzing
    b. Foliage restricted
    c. No head formation
    d. Number and size of roots severely restricted

51. Which of the following is the most important deficiency symptom of nitrogen deficiency in cabbage ?
    a. Severe restriction of tillering with stems drying and bronzing
    b. Foliage restricted
    c. No head formation
    d. Number and size of roots severely restricted

52. Which of the following is the most important deficiency symptom of nitrogen deficiency in roots and tubers ?
    a. Severe restriction of tillering with stems drying and bronzing
    b. Foliage restricted
    c. No head formation
    d. Number and size of roots severely restricted

Answers					
	44.	e	47.	d	50. b
	45.	e	48.	d	51. c
	46.	f	49.	a	52. d

53. Which of the following is/are the most common symptom(s) of P deficiency?
    a. Severe restriction in the growth of the plants in both tops and roots
    b. Development of lateral buds suppressed, narrow leaves
    c. Leaves may shed prematurely, flowering / fruiting may be delayed
    d. In cereals, foliage turns bluish green and then strong reddish–purple tints develop on the nodes
    e. All the above

54. Which of the following is/are the most common symptom(s) of K deficiency ?
    a. Chlorotic mottling between the veins and the marginal scorching of the older leaves
    b. Leaf tips and margins scorched and necrotic
    c. Both a and b
    d. None of the above

55. Which of the following is/are the most common symptom(s) of Ca deficiency ?
    a. Retarded growth of both tops and roots
    b. Chlorosis of young leaves
    c. Distortion of the growing points of the stem
    d. Development of die – back in fruit trees
    e. All the above

56. Which of the following is/are the most common symptom(s) of Mg deficiency ?
    a. Yellowing and chlorosis of older leaves leading to chlorotic stripping in the parallel -veined leaves
    b. Varied pattern of chlorosis/necrosis
    c. Pigmentation of older leaves in fruit trees
    d. All the above

57. Which of the following is/are the most common symptom(s) of S deficiency ?
    a. Brassica species highly susceptible to S deficiency
    b. Leaves showing curling
    c. Puckered inwardly between the veins
    d. All the above

58. Which of the following is/are the most common symptoms of Zn deficiency ?
    a. Chlorosis between veins
    b. Reduction in size of young leaves
    c. Bronzing / brown colouration of foliage
    d. All the above

59. Which of the following is/are the most important Zn deficiency symptom(s) in citrus ?
    a. Yellowish - green chlorotic mottling of young leaves, reduction in size of leaf, shoots die-back, restricted root system
    b. At seedling stage, leaves turning light yellow and developing necrotic spots
    c. Young leaves at 3-4 week old seedlings develop reddish brown pigmentation, tissue becomes papery/necrotic, plant growth arrested
    d. Symptoms appearing in third leaf in the form of brownish–grey necrotic lessons, leaf turning dry /papery
    e. Shortening of internodes, curvature of petioles downward curling of leaves

Answers					
	53.	e	56.	d	59. a
	54.	c	57.	d	
	55.	e	58.	d	

60. Which of the following is/are the most important Zn deficiency symptoms in maize ?
a. Yellowish - green chlorotic mottling of young leaves, reduction in size of leaf, shoots die-back, restricted root system
b. At seedling stage, leaves turning light yellow and developing necrotic spots
c. Young leaves at 3-4 week old seedlings develop reddish brown pigmentation, tissue becomes papery/necrotic, plant growth arrested
d. Symptoms appearing in third leaf in the form of brownish–grey necrotic lessons, leaf turning dry /papery
e. Shortening of internodes, curvature of petioles downward curling of leaves

61. Which of the following is/are the most important Zn deficiency symptoms in rice ?
a. Yellowish - green chlorotic mottling of young leaves, reduction in size of leaf, shoots die-back, restricted root system
b. At seedling stage, leaves turning light yellow and developing necrotic spots
c. Young leaves at 3-4 week old seedlings develop reddish brown pigmentation, tissue becomes papery/necrotic, plant growth arrested
d. Symptoms appearing in third leaf in the form of brownish –grey necrotic lesons, leaf turning dry /papery
e. Shortening of internodes, curvature of petioles downward curling of leaves

62. Which of the following is/are the most important Zn deficiency symptom(s) in wheat ?
a. Yellowish - green chlorotic mottling of young leaves, reduction in size of leaf, shoots die-back, restricted root system
b. At seedling stage, leaves turning light yellow and developing necrotic spots
c. Young leaves at 3-4 week old seedlings develop reddish brown pigmentation, tissue becomes papery/necrotic, plant growth arrested
d. Symptoms appearing in third leaf in the form of brownish –grey necrotic lessons, leaf turning dry /papery
e. Shortening of internodes, curvature of petioles downward curling of leaves

63. Which of the following is/are the most important Zn deficiency symptom(s) in tomato ?
a. Yellowish - green chlorotic mottling of young leaves, reduction in size of leaf, shoots die-back, restricted root system
b. At seedling stage, leaves turning light yellow and developing necrotic spots
c. Young leaves at 3-4 week old seedlings develop reddish brown pigmentation, tissue becomes papery/necrotic, plant growth arrested
d. Symptoms appearing in third leaf in the form of brownish –grey necrotic lesions, leaf turning dry /papery
e. Shortening of internodes, curvature of petioles downward curling of leaves

64. Which of the following is/are the critical symptom(s) of boron deficiency in root crops ?
a. Development of roots severely retarded
b. Cracking and distorted
c. Browning and curling of young terminal leaves
d. All the above

Answers			
	60. b	63. e	
	61. c	64. d	
	62. d		

65. Which of the following is/are the critical symptom(s) of boron deficiency in cauliflower ?
a. Young curds developing small water-soaked areas
b. Turning brown, necrotic and decay
c. Leaf margins becoming chlorotic and curled
d. Petioles developing small blisters
e. All the above

66. Which of the following is/are the critical symptom(s) of boron deficiency in maize?
a. Young leaves developing white irregular areas spreading along the veins
b. Apical margins of older leaves turning dry
c. No cob formation under severe deficiency
d. All the above

67. Which of the following is the critical symptom of molybdenum deficiency in cauliflower ?
a. Leaves twisted and elongated with lamina showing various degree of narrowness irregularity known as whiptail
b. Yellowing of young leaves
c. White streaks on the lamina
d. None of the above

68. Which of the following is the critical symptom of molybdenum deficiency in cabbage ?
a. Young leaves becoming brown,
b. Necrotic and malformed at the margins
c. Both a and b
d. None of the above

69. Symptoms of tip burn in plants can be induced by
a. Pathogens
b. Air pollution
c. Salinity
d. Ca deficiency

70. When a nutrient is suddenly no longer available to a rapidly growing plant it is called
a. Acute deficiency
b. Chronic deficiency
c. Both a and b
d. None

71. When there is a limited but continuous supply of a nutrient, at a rate that is insufficient to meet the growth demands of the plant will lead to
a. Acute deficiency
b. Chronic deficiency
c. Both a and b
d. None

72. The early stages of the chlorosis induced by manganese deficiency are somewhat similar to which other nutrient deficiency
a. Fe
b. Mg
c. Zn
d. Cu

73. An early symptom for molybdenum deficiency is a general overall chlorosis, similar to the symptom of which of the following nutrient deficiency but generally without the reddish coloration on the undersides of the leaves
a. Fe
b. Mg
c. N
d. Cu

74. The visual symptoms of sulphur deficiency are very similar to the chlorosis found in which nutrient deficiency
a. Fe
b. Mg
c. N
d. Cu

Answers				
	65. e	68. c	71. b	74. c
	66. d	69. c	72. a	
	67. a	70. a	73. c	

75. Blossom - end rot of tomato (burning of the end part of tomato fruits), tip burn of lettuce, blackheart of celery and death of the growing regions in many plants are the characteristic deficiency symptoms of
a. Ca b. Mg
c. N d. Cu

76. N deficiency is one of the most common problems in rice. It can be caused by which of the following ?
a. Low soil N-supplying power
b. Insufficient application of mineral N fertilizer
c. Low N fertilizer use efficiency (losses from volatilization, denitrification, incorrect timing and placement, leaching, and runoff)
d. All the above

77. N deficiency is one of the most common problems in rice. It can be caused by which of the following ?
a. Permanently submerged conditions that reduce indigenous soil N supply (i.e., in triple cropping systems)
b. N loss caused by heavy rainfall (leaching and seepage)
c. Temporary drying out of the soil during the growing period
d. Poor biological N_2 fixation because of severe P deficiency
e. All the above

78. Soils particularly prone to N deficiency include which of the following types ?
a. Soils with very low soil organic matter content
b. Soils with particular constraints to indigenous N supply (e.g., acid sulphate soils, saline soils, P-deficient soils, poorly drained wetland soils where the amount of N mineralization or biological N_2 fixation is small)
c. Alkaline and calcareous soils with low soil organic matter status and a high potential for NH_3 volatilization losses
d. All the above

79. N is an essential constituent of
a. Amino acids b. Nucleic acids
c. Nucleotides d. Chlorophyll
e. All the above

80. N promotes which of the following ?
a. Increased plant height and tiller number
b. Increased leaf size,
c. Spikelet number per panicle
d. Percentage filled spikelets in each panicle
e. Grain protein content
f. All the above

81. Compared with conventional (inbred) rice varieties, hybrid rice has which of the following important specific characteristics?
a. Greater potential to absorb and use N from the soil because of a more vigorous root system
b. Higher efficiency of N translocation from sources (stem, leaf) to the sink (grain)
c. N uptake peaks at tillering and grain filling stages
d. All the above

82. N deficiency often occurs at which of the following critical growth stages in rice ?
a. Tillering
b. Panicle initiation
c. Both a and b
d. None of the above

Answers					
	75. a	78. d	81. d		
	76. d	79. e	82. c		
	77. e	80. f			

83. The response of N fertilization to crops can vary and depends upon which of the following ?
a. The rice variety
b. Soil type
c. Weather conditions
d. N fertilizer used
e. All the above

84. Which of the following nutrient has negligible residual effect ?
a. N b. P
c. K d. S

85. What is/are the factors affecting the amount and timing of N applications in rice ?
a. Variety grown
b. Crop establishment method
c. Soil N-supplying capacity (indigenous N supply), including residual effects of preceding crops or fallow periods
d. All the above

86. What is/are the factors affecting the amount and timing of N applications in rice ?
a. Water management
b. Type of N fertilizer used
c. Method of application
d. Soil physical and chemical properties affecting fertilizer N transformations
e. All the above

87. Excessive N may reduce yield because of which of the following ?
a. Mutual leaf shading caused by excessive vegetative growth
b. Lodging caused by the production of long, weak stems
c. Increased number of unfilled grains
d. All the above

88. Excessive N may reduce yield because of which of the following ?
a. Reduced milling recovery and poor grain quality
b. Increased incidence of diseases such as bacterial leaf blight (caused by *Xanthomonas oryzae*)
c. Increased incidence of insect pests, particularly leaf folder, *Cnaphalocrocis medinalis*
d. All the above

89. Excessive N may reduce yield because of which of the following ?
a. Sheath blight b. Sheath rot
c. Stem rot d. Blast
e. All the above

90. Excessive N may reduce yield because of which of the following ?
a. Greater leaf growth and dense crop stand
b. Increased number of unproductive tillers that shade productive tillers
c. Reduce grain production
d. All the above

91. Which of the following is a general recommendation made for N fertilizer use in rice ?
a. Apply about 15-20 kg N/t grain yield target
b. Split applications
c. Identify the need depending on soil N release dynamics, variety, and crop establishment method
d. All the above

92. Which of the following is true ?
a. smaller in rainy-season crops
b. N fertilizer requirement is larger in dry-season crops
c. Both a and b
d. None of the above

Answers					
	83. e	86. e	89. e	92. c	
	84. a	87. d	90. d		
	85. d	88. d	91. d		

93. Which of the following is true for rice yield ?
- a. Less sunshine, smaller the potential yield
- b. More sunshine, greater the potential yield
- c. Both a and b
- d. None of the above

94. Which of the following is true for rice yield ?
- a. Larger N application rates result in more tillers
- b. Larger N application rates result in more leaf area
- c. Larger N application rates result in larger grain yield
- d. All the above

95. Application of more basal N is done in which situation ?
- a. When the soil is with low INS (< 40 kg N ha^{-1})
- b. Where the plant spacing is wide (< 20 hills m^{-2}) to enhance tillering
- c. In areas with low air and water temperature at transplanting or sowing
- d. All the above

96. Which of the following is true for rice yield ?
- a. Soils with high INS (> 50 kg N ha^{-1}) often do not require basal N incorporated into the soil
- b. Hybrid rice always requires basal N
- c. Both a and b
- d. None of the above

97. Which of the following is true for rice yield ?
- a. Avoid large basal N fertilizer applications (i.e., > 50 kg N ha^{-1}) in transplanted rice where growth is slow during the first 3 wk after transplanting
- b. Incorporate basal N into the soil before planting or sowing
- c. Use NH_4-N and not NO_3-N as a basal N source
- d. All the above

98. Which of the following is/are true for rice yield ?
- a. N fertilizer should be applied when the crop has the greatest need for N
- b. When the rate of uptake is large
- c. Both a and b
- d. None of the above

99. The highest recovery efficiency of applied N is achieved during
- a. Late tillering to heading stages.
- b. Fruiting stage
- c. Transplanting stage
- d. None of the above

100. Increasing N use efficiency involves which of the following measures ?
- a. N fertilizer placement in the reduced soil layer about 8-10 cm below the soil surface
- b. Slow-release N fertilizer (S-coated urea) or poly-olefin coated urea incorporated as a basal dressing before planting
- c. Both a and b
- d. None of the above

101. Recovery efficiency of N from UAN is
- a. 50 %
- b. 75 %
- c. 25 %
- d. 100 %

Answers						
	93.	c	96.	c	99.	a
	94.	d	97.	d	100.	c
	95.	d	98.	c	101.	a

102. Recovery efficiency of N from granular urea is
- a. 50 %
- b. 70 %
- c. 25 %
- d. 100 %

103. Ammonia volatilization from different N fertilizer sources increases in which of the following order ?
- a. Ammonium sulphate < Urea < Ammonium bicarbonate
- b. Urea < Ammonium sulphate < Ammonium bicarbonate
- c. Ammonium bicarbonate < Urea < Ammonium sulphate
- d. None of the above

104. Which of the following is/are the controlled-release or slow release fertilizer ?
- a. Urea supergranules, briquettes, tablets
- b. Urea - formaldehyde (UF, 38% N)
- c. S-coated urea (SCU, 30-40% N, 6-30% S)
- d. Polymer-coated urea (40-44% N, e.g., Osmocote, Nutricote, Polyon)
- e. Neem-coated urea (locally produced in India but not used widely)
- f. All the above

105. Sulphur Coated Urea costs
- a. Twice as much as conventional urea
- b. Same as conventional urea
- c. Both a and b
- d. None of the above

106. The key principles of N management is/ are
- a. Sufficient N during establishment and tillering to ensure adequate tillers/unit area
- b. Sufficient N just prior to and during panicle initiation to ensure adequate panicle size (sink)
- c. Most of the plants N should be applied prior to or around panicle initiation
- d. All the above

107. The key principles of N management is/ are
- a. Sufficient N during grain filling to ensure production of photosynthates to fill the grains (generally 70% of the plant's needs at this stage come from remobilization from within the plant)
- b. Hold water at 5 cm and raise drains when making mid-season applications to reduce losses due to run-off
- c. Both a and b
- d. None of the above

108. Rules of thumb in case of N management is/are
- a. Everyday the crop is yellow, yield is being lost
- b. Everyday the crop is yellow, yield is being gained
- c. Both a and b
- d. None of the above

109. The total crop N uptake per ton grain produced is approximately
- a. N - 15-20 kg
- b. N - 2-3 kg
- c. N - 15-20 kg
- d. None of the above

110. The total crop P uptake per ton grain produced is approximately
- a. P - 15-20 kg
- b. P - 2-3 kg
- c. P - 15-20 kg
- d. None of the above

Answers						
	102.	c	105.	c	108.	a
	103.	a	106.	d	109.	a
	104.	F	107.	c	110.	b

111. The total crop K uptake per ton grain produced is approximately
- a. K - 15 - 20 kg
- b. K- 2 - 3 kg
- c. K - 15 - 20 kg
- d. None of the above

112. Nutrient management strategy can be
- a. In planted fields, lower or remove the floodwater before applying top-dressed N and then re-irrigate to enhance movement of N into the soil
- b. To reduce volatilization, do not apply urea on to standing water under windy conditions before canopy closure, and at midday when the water temperature is highest
- c. Both a and b
- d. None of the above

113. Improving N fertilizer recovery is to
- a. Incorporate and keep soil continually saturated
- b. If soil alternates between aerobic and anaerobic fertilizer recovery is of the order of 30 - 40% or less for basal applications
- c. With permanent flooding fertilizer recovery of split applications is of the order of 40 - 50% at mid-tillering and 60 - 70% at panicle initiation
- d. All the above

114. Nutrient requirements depend upon
- a. Target yield
- b. Soil nutrient supply
- c. Both a and b
- d. None of the above

115. To estimate fertilizer requirements what is/ are needed to know ?
- a. Target yield
- b. Crop yield with no fertilizer
- c. Fertilizer recovery
- d. Timing
- e. All the above

116. Potassium management strategy can be
- a. In direct seeded plots - apply first dose 10 - 15 days after planting
- b. Split K in at least two doses if soil is sandy with leaching
- c. K at flowering increases resistance to lodging and diseases in dense canopies if the yield target is high
- d. All the above

117. The factor to obtain P_2O_5 from P is
- a. 2.29 b. 1.20
- c. 1.39 d. 1.66

118. The factor to obtain K_2O from K is
- a. 2.29 b. 1.20
- c. 1.39 d. 1.66

119. The factor to obtain CaO from Ca is
- a. 2.29 b. 1.20
- c. 1.39 d. 1.66

120. The factor to obtain MgO from Mg is
- a. 2.29 b. 1.20
- c. 1.39 d. 1.66

121. The benefits of straw incorporation include which of the following ?
- a. Recycling of nutrients from straw without the trouble involved in common late incorporation and decomposition under anaerobic conditions
- b. Improved re-oxidation of the topsoil layer during the fallow period
- c. Substantial water savings
- d. All the above

Answers							
	111. c	114. c	117. a	120. d
	112. c	115. e	118. a	121. d
	113. d	116. d	119. c	

122. Lack of boron in a plant results in
- a. Poor flowering and seed set
- b. The deterioration of root and stem growing points
- c. Stunted roots
- d. Wrinkled leaves
- e. "Hard fruit disease" (especially citrus)
- f. All the above

123. Which of the following is true ?
- a. Boron is essential for reproduction and thus seed and fruit set
- b. Healthy root growth and the root response to gravity are dependent on boron
- c. Sufficient Boron enables plants to become resistant to diseases of many types
- d. All the above

124. A lack of copper in a plant results in
- a. Poor leaf colour and deformed leaves and flowers
- b. Fruit quality and production are adversely affected
- c. Wilted leaves and leaves will suffer from "treatment illness"
- d. All the above

125. A lack of copper in a plant results in
- a. Citrus fruit developing thick oily skins with gum spots
- b. Trees develop abnormal shoots with skew leaves
- c. Up to 50% reduction in yield
- d. All the above

126. Which of the following is true ?
- a. Copper is essential for plant respiration and photosynthesis
- b. Greening of leaves
- c. Development of flowers and thus seed and fruit production
- d. Copper is required to control nitrogen fixation by legumes, and iron uptake by all plants
- e. Copper will also help prevent wilting of leaves in dry periods
- f. All the above

127. Lack of iron in a plant results in
- a. Chlorotic (yellow to white) leaves
- b. The veins may remain dark green
- c. Petioles of tomato plants become purple
- d. Stunted growth with a drop (up to 70%) in crop yield
- e. All the above

128. A lack of manganese in a plant results in
- a. Chlorosis (yellowing) of the leaves
- b. Leaves becoming spotted (marbled effect)
- c. Reduced growth and flowering
- d. Cucumber, beans and many ornamentals are especially susceptible to manganese deficiency
- e. All the above

129. A lack of molybdenum in a plant results in
- a. Yellow/orange spots on the leaves between the veins
- b. A reduced number of flowers which are small and sometimes do not open
- c. Both a and b
- d. None of the above

130. A lack of molybdenum in a plant results in
- a. Deformed reproductive organs
- b. "Whiptail leaf symptom" in cabbages
- c. "Yellow spot" disease in citrus
- d. All the above

Answers				
	122. F	125. d	128. e
	123. d	126. F	129. c
	124. d	127. e	130. d

131. A lack of molybdenum in a plant results in
- a. Cabbages, cauliflower, broccoli and all legumes are most susceptible to deficiency
- b. Reduction in yield of crops (up to 80%)
- c. Both a and b
- d. None of the above

132. A lack of Zn in a plant results in
- a. Poor growth with short stems and internodes and small, curled leaves
- b. Flowers are small in size
- c. Both a and b
- d. None of the above

133. Lack of magnesium in a plant results in
- a. Chlorosis (yellowing) between the leaf veins
- b. In some species, the lower leaves develop a purple colour preceding death
- c. Both a and b
- d. None of the above

134. Lack of magnesium in a plant results in
- a. Flower size and number is reduced
- b. Magnesium deficiency is common after heavy nitrogen, potassium or lime application
- c. Very common in tomatoes and cucumbers
- d. All the above

135. Which of the following is true ?
- a. Manganese is essential for photosynthesis and in particular, sugar production
- b. Manganese also controls the uptake of other ions and nutrients from the soil
- c. Both a and b
- d. None of the above

136. Which of the following is true ?
- a. Molybdenum is needed for sexual reproduction and the development of embryos
- b. Molybdenum is also necessary for the production of proteins (thus increasing the protein yield of a crop) and vitamins, in particular, vitamin C
- c. Both a and b
- d. None of the above

137. Which of the following is true ?
- a. Molybdenum is required for chlorophyll production and thus the greening of leaves
- b. Molybdenum is essential for nitrogen fixation by legumes and for protection against aluminium toxicity in all plants
- c. A seed soak will ensure even germination in the field (e.g. maize)
- d. All the above

138. Which of the following is true ?
- a. Zinc is essential for pollen grains and thus fertilization and fruiting
- b. Zinc increases sugar production and is essential for the production of hormones
- c. Both a and b
- d. None of the above

139. Which of the following is true ?
- a. Magnesium is the most important component of chlorophyll (green pigment) and thus vital for photosynthesis
- b. Magnesium helps to control enzyme operations
- c. Magnesium is important for oil production (e.g. avocado)
- d. All the above

Answers					
	131. c	134. d	137. d		
	132. c	135. c	138. c		
	133. c	136. c	139. d		

140. Possible causes of nutrient deficiencies is
- a. Insufficient amount of available nutrient in soil
- b. The chemical characteristics of soil may reduce availability of nutrients
- c. The nutrient is positionally unavailable
- d. All the above

141. Possible causes of nutrient deficiencies is
- a. Underdeveloped root system which may be due to cool, wet, dry, or compacted soil
- b. Root injury due to mechanical, insect, disease, or herbicide injury
- c. Genetics of the plant
- d. All the above

142. When diagnosing nutrient deficiencies which of the following is important ?
- a. Describe what the symptom looks like
- b. Note the location of the symptom on the plant
- c. Obtain soil information: soil pH, organic matter, soil test values, soil texture
- d. All the above

143. Chlorosis is
- a. Yellowing of leaves
- b. Leaf tissue between veins turns yellow while the veins remain green
- c. Complete drying and death of plant tissue
- d. Shortened internodes
- e. Red, purple, brown colors caused by pigments

144. Interveinal chlorosis - striping is
- a. Yellowing of leaves
- b. Leaf tissue between veins turns yellow while the veins remain green
- c. Complete drying and death of plant tissue
- d. Shortened internodes
- e. Red, purple, brown colors caused by pigments

145. Necrosis means what ?
- a. Yellowing of leaves
- b. Leaf tissue between veins turns yellow while the veins remain green
- c. Complete drying and death of plant tissue
- d. Shortened internodes
- e. Red, purple, brown colors caused by pigments

146. Stunting means what ?
- a. Yellowing of leaves
- b. Leaf tissue between veins turns yellow while the veins remain green
- c. Complete drying and death of plant tissue
- d. Shortened internodes
- e. Red, purple, brown colors caused by pigments

147. Abnormal colouration means what ?
- a. Yellowing of leaves
- b. Leaf tissue between veins turns yellow while the veins remain green
- c. Complete drying and death of plant tissue
- d. Shortened internodes
- e. Red, purple, brown colors caused by pigments

148. Internal cork of apple is due to the deficiency of
- a. Ca
- b. B
- c. Fe
- d. Mn

Answers					
	140. d	143. a	146. c		
	141. d	144. b	147. c		
	142. d	145. c	148. b		

149. Bitter pit of apple is due to the deficiency of
a. Ca b. B
c. Fe d. Mn

150. Stem melanosis disease of wheat is due to the deficiency of
a. Fe b. Mn
c. Zn d. Cu

151. Die back symptom is due to the deficiency of
a. Fe b. Mn
c. Zn d. Cu

152. Bronzing in rice due to the toxicity of
a. Fe b. Mn
c. Zn d. Cu

153. Brown heart or black heart of root crops is due to the deficiency of
a. Ca b. Mg
c. B d. Mo

154. Crinkle leaf of cotton is due to the
a. Deficiency of Cu
b. Toxicity of Cu
c. Deficiency of Mn
d. Toxicity of Mn

155. Nutrient element involved in the synthesis of tryptophane is
a. Cu b. Zn
c. Mn d. Mo

156. Fern leaf in potato is due to the
a. Deficiency of Zn
b. Toxicity of Zn
c. Deficiency of Cu
d. Toxicity of Cu

157. Little leaf of cotton is due to the
a. Deficiency of Zn
b. Toxicity of Zn
c. Deficiency of Cu
d. Toxicity of Cu

158. Malformation of leaves and fruits is due to the
a. Deficiency of Zn
b. Toxicity of Zn
c. Deficiency of Cu
d. Toxicity of Cu

159. Speckled yellow of sugar beet is due to the
a. Deficiency of Cu
b. Toxicity of Cu
c. Deficiency of Mn
d. Toxicity of Mn

160. White bun in maize/sorghum is due to the deficiency of
a. B b. Mo
c. Zn d. Mn

161. Gray speck of oats and marsh spot of peas is due to the deficiency of
a. B b. Mo
c. Zn d. Mn

162. Frenching in citrus is due to the
a. Deficiency of Zn
b. Toxicity of Zn
c. Deficiency of Cu
d. Toxicity of Cu

163. Of the following which one is an important component of urease enzyme ?
a. Co b. Ni
c. Mo d. Fe

164. Deficiency of _____ causes the shifting of Cu pathway to C_3 pathway in plants.
a. K b. Ca
c. Mg d. Na

Answers						
149. a	152. a	155. b	158. a	161. d	164. d	
150. d	153. c	156. a	159. c	162. a		
151. d	154. d	157. a	160. c	163. b		

165. Indicator plants used for the deficiency of N, Ca and Fe are
a. Rapseed and Sugarbeet
b. Oat and potato
c. Cauliflower and Cabbage
d. Potato and Sugarbeet

166. Indicator plant used for the phosphorus of deficiency of N, Ca and Fe is
a. Potato b. Rapseed
c. Sugarbeet d. Oat

167. Indicator plant used for the deficiency of potassium is
a. Potato b. Raped
c. Sugarbeet d. Oat

168. Indicator plant used for the deficiency of boron is
a. Cauliflower b. Cabbage
c. Sugarbeet d. Potato

169. Indicator plant used for the deficiency of sodium is
a. Cauliflower b. Cabbage
c. Sugarbeet d. Potato

170. When variability from chemical determination in the same sample occurs it is called
a. Analytical error b. Sampling error
c. Sub-sampling error d. All

171. Taking a representative sample represents a
a. Judgment sampling
b. Wrong sampling
c. Representative sampling
d. Random sampling

172. Taking soil samples in a coordinate system is called
a. Judgment sampling
b. Wrong sampling
c. Representative sampling
d. Random sampling

173. When samples are collected at regular distances away from each other it is called
a. Judgment sampling
b. Systematic sampling
c. Representative sampling
d. Random sampling

174. Measurement of soil pH by pH indicator/ pH paper is best when
a. Specific pH indicator is used
b. Composite indicator is used
c. Both a and b
d. None of the above

175. Usually deficiency of which nutrients is more in soil if pH increases ?
a. Fe b. Mn
c. Cu d. Zn
e. All the above

176. Usually deficiency of which nutrients is more in soil if pH decreases ?
a. Ca b. Mg
c. S d. Mo
e. All the above

177. As the soil water ratio increases, the pH increases for
a. Acidic soils
b. Alkaline soils
c. Neutral soils
d. Both acidic and alkaline soils

178. If soil Eh at pH 7.0 varies from +400 mV to +700mV soil is
a. Well oxidized
b. Well reduced
c. Moderately oxidized
d. Highly reduced

Answers						
165. c	168. c	171. a	174. b	177. d		
166. b	169. c	172. d	175. e	178. a		
167. a	170. a	173. b	176. e			

179. If soil Eh at pH 7.0 varies from +200 mV to + 400mV soil is
a. Well oxidized
b. Well reduced
c. Moderately oxidized
d. Highly reduced

180. If soil Eh at pH 7.0 varies from -100 mV to +100mV soil is
a. Well oxidized
b. Well reduced
c. Moderately oxidized
d. Highly reduced

181. If soil Eh at pH 7.0 varies from -300 mV to -100mV soil is
a. Well oxidized
b. Well reduced
c. Moderately oxidized
d. Highly reduced

182. The unit of conductance is
a. mho b. ohm
c. Siemens d. Milli siemens

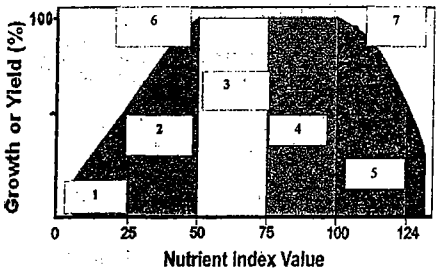
183. In the mineral elements analysis in HCl digest, the filtrate can be utilized for the estimation of
a. Total P b. Sesquioxides
c. Basic cations d. All

184. The Na_2CO_3 fused sample is used for the determination of
a. Se b. Al
c. Ca d. Mg
e. All the above

185. Which of the following is added to estimate Fe and Ti in the $Na_2 CO_3$ fused sample?
a. HF b. Silica
c. HCl d. $Na_2 CO_3$

186. Which of the following acid is used in the $Na_2 CO_3$ fused sample ?
a. $HClO_4$ b. H_2SO_4
c. HCl d. HNO_3
e. All the above

Following figure is a famous deliberation for nutrient index *vs* growth of the plants. See the figure carefully and answer following questions.



187. The zone represented by number 1 is
a. Deficient
b. Hidden hunger
c. Luxury consumption
d. High consumption
e. Toxic consumption

188. The zone represented by number 2 is
a. Deficient
b. Hidden hunger
c. Luxury consumption
d. High consumption
e. Toxic consumption

189. The zone represented by number 3 is
a. Deficient
b. Hidden hunger
c. Luxury consumption
d. High consumption
e. Toxic consumption

Answers								
	179. c	182. a	185. a	188. b
	180. b	183. d	186. e	189. c
	181. d	184. e	187. a	

190. The zone represented by number 4 is
a. Deficient
b. Hidden hunger
c. Luxury consumption
d. High consumption
e. Toxic consumption

191. The zone represented by number 5 is
a. Deficient
b. Hidden hunger
c. Luxury consumption
d. High consumption
e. Toxic consumption

192. Which of the following nutrient is highly mobile in plants ?
a. N b. Mg
c. S d. B

193. Which of the following nutrient is highly mobile in plants ?
a. P b. Mg
c. S d. B

194. Which of the following nutrient is highly mobile in plants ?
a. K b. Mg
c. S d. B

195. Which of the following nutrient is moderately mobile in plants ?
a. P b. Mg
c. N d. B

196. Which of the following nutrient is moderately mobile in plants ?
a. N b. P
c. S d. B

197. Which of the following nutrient is moderately mobile in plants ?
a. N b. P
c. K d. Mo

198. Which of the following nutrient is immobile in plants ?
a. Ca b. P
c. S d. K

199. Which of the following nutrient is immobile in plants ?
a. Fe b. P
c. S d. K

200. Which of the following nutrient is immobile in plants ?
a. Zn b. P
c. S d. K

201. Which of the following nutrient is immobile in plants ?
a. B b. P
c. S d. K

202. Leaves (first older ones) turn yellow/ brown, plants are spindly, lack vigour and may be dwarfed. This is a sign of which nutrient deficiency ?
a. N b. P
c. S d. K

203. Not easily detected from appearance. Where deficiency is severe plant will be stunted, the leaves will take on a purplish tint and the stem will be reddish in colour. This is a sign of which nutrient deficiency ?
a. N b. P
c. S d. K

204. Interveinal chlorosis occurs first on older leaves. This is a sign of which nutrient deficiency ?
a. Mg b. P
c. S d. K

Answers								
	190. d	193. a	196. c	199. a	202. a
	191. e	194. a	197. d	200. a	203. b
	192. a	195. b	198. a	201. a	204. a

205. Roots are usually affected first – growth is impaired and rotting often occurs. In vegetative growth, deficiency may show in distorted leaves, brown scorching or spotting on foliage or bitter fruit (e.g. apple) or blossom-end rot (e.g. tomato). This is a sign of which nutrient deficiency ?

a. Mg b. Ca
c. S d. K

206. Yellow/brown spots appear on older leaves and/or necrosis of edges. This is a sign of which nutrient deficiency ?

a. Mg b. Ca
c. S d. K

207. Symptoms vary with plant type – in cereals young plants display purpling, whereas in broad-leaved plants symptoms include interveinal chlorosis, reduced leaf size and sparse foliage. This is a sign of which nutrient deficiency ?

a. Mg b. Ca
c. K d. Zn

208. Chlorosis of the tips of the youngest leaves and die-back of growing points. This is a sign of which nutrient deficiency ?

a. Mg b. Cu
c. K d. Zn

209. In crops, other than cereals, the apical growing point on the main stem dies and lateral buds fail to develop shoots. This is a sign of which nutrient deficiency ?

a. Mg b. Cu
c. B d. Zn

210. Marginal scorching and cupping of leaves. Wilting is common in brassica. This is a sign of which nutrient deficiency ?

a. Mo b. Cu
c. B d. Zn

211. Interveinal chlorosis, first on older leaves. This is a sign of which nutrient deficiency?

a. Mo b. Cu
c. Mg d. Zn

Answers			
205. b	208. b	211. c	
206. c	209. c		
207. d	210. a		

12

Soil Pollution

QUESTIONS :

1. Agricultural wastes of manurial value can be classified into
   a. Crop Residues after grain removal
   b. Oil cakes after oil extraction
   c. Biomass of weeds or uncultivated plants
   d. All the above

2. Agricultural wastes of manurial value can be classified into
   a. Wastes from fruit/vegetable processing factories
   b. Fodder/feed fed to animals and animal wastes
   c. Crop wastes due to post harvest losses.
   d. All the above

3. Phospho-Sulpho-Nitro compost is prepared by which of the following step(s)?
   a. Fresh cow dung: Soil: Well rottened compost is mixed in the ratio of 1:1:0.5 on oven dry basis
   b. Slurry is prepared, mixed with MRP (17.2 % P_2O_5) + Chopped straw (5-6 cm) @ 5 parts P_2O_5 per 100 parts straw
   c. Fe-Pyrite (22.2 %S) and Urea N are added @ 10 and 1 %
   d. Allowed for 4 months with 4 turnings
   e. All the above

4. Losses of nutrients from FYM can be considerably reduced by which of the following method?
   a. Trench method of FYM preparation
   b. Spreading FYM evenly on the field and mixing with soil, instead of exposing.
   c. By use of preservatives like gypsum and superphosphate/rock phosphate.
   d. All the above

5. Which of the following depicts correctly the constrains in using agricultural wastes?
   a. Collection and transport of residues to field is laborious
   b. Pre incorporation of residue is needed for decomposition
   c. Provision of adequate moisture required for decomposition
   d. All the above

6. Which of the following is used as microbial culture for compost making?
   a. Cellulolytic fungal culture
   b. Phosphotika
   c. Azotobacter culture
   d. All

7. Biofertilizers are applied as
   a. Seed treatment
   b. Seedling root dip
   c. Soil treatment
   d. All

8. Which of the following culture is used as nitrogenous culture?
   a. Rhizobium
   b. Azotobacter/Azospirillum
   c. Azotobacter
   d. Blue-Green Algae (BGA) and Azolla
   e. All the above

9. Possible indicator(s) of changes in soil quality is/are
   a. Soil fertility and nutrient balance
   b. Soil physical conditions
   c. Soil Organic Matter status
   d. All

Answers

1.	d	4.	d	7.	d
2.	d	5.	d	8.	e
3.	e	6.	d	9.	d

10. Which of the following is a Biological Indicators of Soil Quality?
    a. Potentially mineralizable N
    b. Microbial biomass C and N
    c. Soil respiration
    d. All

11. Depending upon BGA morphology they are classified into
    a. Unicellular b. Colonial
    c. Filamentous d. Complex forms
    e. All

12. What is/are the advantages of water hyacinth compost?
    a. Ponds lakes and water reservoirs remain clean
    b. Decreases the incidence of mosquitoes
    c. No difficulty in fishing as the obstacle disappear
    d. All the above

13. Which of the following is a type of turn heap compost?
    a. Traditional Method
    b. Rapid Method (Trichoderma)
    c. Bio-Enriched Method (Trichoderma and Azotobacter)
    d. All the above

14. The organic materials, which are generated everyday from human activities and bi-product of agro-based industries can be recycled by which of the following way(s)?
    a. Incineration b. Pyrolysis
    c. Direct recycling d. Composting
    e. All the above

15. Which of the following is/are (an) important effect of worm casts in soil?
    a. Earthworms excreta are an excellent soil conditioning material with a high water holding capacity and hence increase water retention power of the soil.
    b. Worm casts acts as good pulverizer of organic matter and hasten the process of decomposition
    c. It supplies all the essential nutrients in a readily available form
    d. All the above

16. Which of the following is/are (an) important effect of worm casts in soil?
    a. Worm casts bring in soil aggregation by secreting gums and gluing agents in soils
    b. Vermicompost increases humic substances by 40-60 percent which is higher than the value obtained by any composting
    c. Worm castings decrease bio available metals by 35-55 percent within two months of its application
    d. All the above

17. Which of the following is/are (an) important effect of worm casts in soil?
    a. Bioremediation: worm casts are capable of degrading toxic contaminants for reclamation of the polluted sites. It boosts soil health by improving soil pollution
    b. Microbial secretions and growth of fungal hyphae stabilizes the worm casts. Worm worked soil is relatively water stable and will resist soil compaction and run off due to rains
    c. Both a and b
    d. None of the above

Answers

10.	d	13.	d	16.	d
11.	e	14.	e	17.	c
12.	d	15.	d		

18. Which of the following is/are (an) important effect of worm casts in soil?
    a. It neutralizes highly acidic or basic soils. Castings can prove to be most effective agents of soil amendment
    b. It reduces plant pest attacks i.e. improves resistance
    c. It increases the population of beneficial microflora like N fixing bacteria, phosphate solubilizers
    d. All the above

19. Visual and morphological observations in the field caused by degradation can be recognized by
    a. Loss of top soil
    b. Water erosion as indicated by rills, gullies, stones on the exposed soil surface, exposed roots, and uneven topsoil
    c. Terrain deformation/mass movement
    d. All the above

20. Of the following, what is/are the example(s) for physical degradation?
    a. Crusting b. Hard pan,
    c. Poor physical condition
    d. Waterlogging of foot hill lands
    e. All the above

21. Forest ecosystems of hills are being threatened by
    a. Loss of forest lands to agriculture (mainly for shifting cultivation), industries, infrastructures and human settlements
    b. Loss of forestland due to multipurpose projects, construction of roads, transmission lines etc., quarrying, and encroachments
    c. Degradation causes by illicit felling, lopping for fodder and fuel wood, overgrazing, removal of forest floor litter, forest fires, over felling etc.
    d. Population explosion and encroachment of forest land
    e. All the above

22. What is/are the basic concept for restoring the degraded land?
    a. Exact knowledge about the actual condition of the problems, including causes and impact
    b. Monitoring of the problems to get an insight into temporal development whether stable, increasing or decreasing
    c. Restoration measures concept to conservation of nutrients in degraded lands
    d. All the above

23. Vegetative cover protects the soil by which of the following processes?
    a. Physical binding of soil by plant roots
    b. Enrichment of soil nutrient reserves by recycling between roots, litter fall and soil
    c. Improvement of soil infiltration along the dead and living root channels
    d. Build up of soil organic matter for structural and moisture retention qualities
    e. All the above

24. Addition of FYM in the soil will immediately lead to increase in which of the followings?
    a. Biological oxygen demand
    b. Nitrogen level
    c. Phosphorus level
    d. Potassium level

Answers

18. d	21. e	24. a	
19. d	22. d		
20. e	23. e		

25. Chemical oxygen demand can be measured by which of the followings?
    a. Potassium dichromate
    b. Potassium permanganate
    c. Potassium oxalate
    d. Potassium citrate

26. In order to grow healthy and productive plants, the soil fertility can be maintained by which of the following ways?
    a. Recycling of organic wastes, e.g. organic manures and leaving the crop residues in the field, either directly or treated (composted, fermented, etc.)
    b. Handling organic fertilizers in such a way that nutrients are not leached by excessive rain or volatized by high temperature (lower altitude) or solar radiation
    c. Reducing run-off and soil erosion, which removes nutrients and organic matter
    d. Reducing the burning of biomass under shifting cultivation to intensify the farming, as this leads to losses organic matter
    e. All the above

27. In order to grow healthy and productive plants, the soil fertility can be maintained by which of the following ways?
    a. Reducing nutrient losses through leaching by maintaining a high soil organic matter content in the soil, soil cover and intercropping plant species with different rooting depths
    b. Pumping up partly leached nutrients from subsurface layers of soil and bringing them back to the topsoil by using litter from trees or other deep-rooted plants
    c. Fixing nitrogen by microorganisms living in symbiosis with leguminous trees, shrubs or cover crop
    d. Both a and b
    e. All the above

28. In order to grow healthy and productive plants, the soil fertility can be maintained by
    a. Harvesting of nutrients by capturing water sediments from out side the farm; this can be done with special soil conservation practices
    b. Integrating livestock into the farming systems
    c. Use of crop germplasm with superior resource use efficiency and adaptation to soil acidity associated fertility constraints
    d. Both a and c
    e. Both a and b
    f. All the above

29. Phosphates in ground water originate from
    a. Geologic b. Atmosphere
    c. Surface waters d. All

30. Phosphates in ground water originate from
    a. Domestics wastes fertilizers
    b. Compost
    c. Bone meal and industrial wastes
    d. All

31. The pollutant(s) of soil and water from pulp and paper industries is/are
    a. Phenols
    b. Sulphite
    c. Heavy metals
    d. Nitrogen and Phosphorus
    e. TDS.
    f. All the above

Answers

25. a	28. f	31. f	
26. e	29. d		
27. e	30. d		

32. The pollutants of soil and water from petroleum refining industries are
    a. Chloride, copper and cyanide
    b. Iron, lead and zinc
    c. Mercaptons, nitrogen, phosphorous and sulphate
    d. TOC, turbidity and odour
    e. All the above

33. The pollutants of soil and water from steel industries are
    a. Cyanide and phenols
    b. Iron and zinc
    c. Tin and chromium
    d. All the above

34. The pollutants of soil and water from organic chemical industries are
    a. TOC and phenols
    b. Phosphorus and nitrogen
    c. Heavy metals and cyanide
    d. All the above

35. The pollutants of soil and water from plastic and synthetic industries are
    a. Phosphorus and nitrate
    b. Organic nitrogen
    c. Chlorinated benzoids, polynuclear aromatics and mercaptans
    d. Ammonia, cyanide and zinc
    e. All the above

36. The pollutants of soil and water from nitrogen fertilizer industries are
    a. Sulphate, phosphate
    b. Organic nitrogen compounds,
    c. Calcium, sodium, zinc and iron
    d. COD and pH
    e. All the above

37. The pollutants of soil and water from phosphate fertilizer industries are
    a. Acidity
    b. Aluminium and iron
    c. Arsenic
    d. Phenols

38. The pollutants of soil and water from phosphate fertilizer industries are
    a. Mercury b. Nitrogen
    c. Sulphate d. All

39. The pollutants of soil and water from phosphate fertilizer industries are
    a. Uranium b. Fluoride
    c. Cadmium d. All

40. The pollutants of soil and water from electroplating industries are
    a. Chromium and nickel
    b. Copper and iron
    c. Cadmium
    d. All

41. Suitable policy measures (OECD 1988) include
    a. Strictly enforcing and strengthening the existing environmental regulations
    b. Controlling agricultural production through decoupling income support from price support, eliminating target prices, and, in some countries, reducing the total area cultivated
    c. Reviewing current research programs and developing new ones which seek to reduce the pollution associated with the use of agricultural chemicals
    d. Reducing the intensity of cultivation practices via input taxes
    e. All the above

Answers							
	32. e	35. e	38. d	41. e			
	33. d	36. e	39. d				
	34. d	37. c	40. d				

42. Kind of quality measurement in compost is determined by
    a. Plant growth measurement
    b. Nutrient content
    c. pH and soluble salts
    d. All

43. Kind of quality measurement in compost is determined by
    a. Man-made inerts
    b. Maturity and biological stability
    c. Particle size
    d. Toxic substance e. All the above

44. What is/are the common instrumental techniques for measuring heavy metals?
    a. Flame Atomic absorption spectrophotometer
    b. Non-flame Atomic absorption spectrophotometer
    c. Inductively Coupled Plasma –Optical Emission Spectrophotometry
    d. Anodic Stripping Voltammetry
    e. High Pressure Liquid Chromatography (HPLC)
    f. All the above

45. How can be a treated organic material used in the agricultural land?
    a. Supplier of nutrients
    b. Soil Conditioner
    c. Both d. None

46. Composts can be prepared by
    a. Farm animals refuse
    b. Agricultural byproducts and residues
    c. Food processing wastes
    d. Municipal solid waste (MSW)
    e. Biosolids (municipal sewage sludge)
    f. All the above

47. Composts have which of the following definite advantages?
    a. Source of nutrients
    b. Soil conditioners
    c. Allows recycling of wastes
    d. All

48. MSW composts can have which of the following?
    a. Contains pathogenic organisms
    b. Toxic xenobiotics (organic compounds that are not normally biosynthesized)
    c. Toxic Heavy metals
    d. All the above

49. Heavy metal inputs to the biosphere stem from
    a. Geogenous sources (e.g. volcanic activity)
    b. Industrialization
    c. Changes in life-style
    d. All the above

50. Which of the following is the impact of solid waste compost borne heavy metal on environment?
    a. Heavy metal enrichment in soils
    b. Phytotoxicity → resulting in reduction in yield
    c. Contamination of food chain
    d. Adverse effect of beneficial soil microflora, fauna
    e. Contamination of Groundwater
    f. All the above

51. Which of the following is the major impact of heavy metals on soil?
    a. Greater impact on light textured soil
    b. Increase in heavy metal concentration results decreasing microbial biomass C: soil ratio
    c. Shift in microbial diversity characteristics: fungal population increases
    d. All the above

Answers							
	42. d	45. c	48. d	51. d			
	43. e	46. f	49. d				
	44. f	47. d	50. e				

52. Estimation in natural soil solution of heavy metals will have which of the following benefits?
   a. Better measure of availability
   b. Contents are very low (<1 ppm, sometimes < 1 ppb)
   c. Measurement is sometimes very difficult
   d. But provides a snapshot of very dynamic equilibrium
   e. All the above

53. Extractability of toxic metals depends on
   a. Complex with organic matter
   b. Chemisorb on minerals
   c. Precipitate as insoluble sulfides, carbonates, phosphates or oxides
   d. Co-precipitate in other minerals
   e. All the above

54. Which of the following is/are the controlling process for heavy metals availability?
   a. Desorption or dissolution
   b. Diffusion and convection
   c. Sorption or precipitation at new sites
   d. Absorption by roots
   e. Translocation in plants
   f. All the above

55. Regulation of heavy metals entry through biosolids and composts can be done by
   a. Limit values for concentrations of HM in composts (biosolids/MSW)
   b. Limit values for concentrations in the source materials
   c. Limit values for amount of metals that can be added annually
   d. Heavy metal standards for soils to which composts to be added
   e. Limiting cumulative additions of HM in the soils
   f. All the above

56. Different limits for regulation purpose is governed by which of the following process?
   a. Ceiling conc. limits
   b. Pollutant conc. (PC) limits
   c. Cumulative Pollutant Loading Rate CPLR
   d. Annual Pollutant Loading Rate APLR
   e. All the above

57. Which of the following process is used to determine Annual Whole Biosolid Application rate (sold in bags/containers) (AWBAR)?
   a. Analyze a sample for each 10 regulated metals
   b. Calculate an AWBAR for each pollutant using the equation
   c. Phytotoxicity threshold, PT50
   d. All the above

58. Compost produce quality is evaluated by which of the following physical properties?
   a. Free flow
   b. Particle size and man-made inert
   c. Odorless
   d. Colour
   e. All the above

59. Compost produce quality is evaluated by which of the following chemical properties?
   a. Total organic carbon
   b. Total nitrogen
   c. C/N ratio
   d. Ash content
   e. All the above

Answers

52. e	55. f	58. e	
53. e	56. e	59. e	
54. f	57. d		

60. Compost produce quality is evaluated by which of the following chemical properties?
   a. Cation exchange capacity
   b. Cation exchange capacity /Total organic carbon
   c. pH
   d. EC
   e. All the above

61. Compost produce quality is evaluated by which of the following chemical properties?
   a. Water soluble C and hydrolysable carbohydrates
   b. Biodegradability index
   c. Both a and b
   d. None of the above

62. Compost produce quality is evaluated by which of the following phytotoxic properties?
   a. Short chain organic acids
   b. Phenolic compounds
   c. Minimum content of heavy metals
   d. All the above

63. Which of the following is/are the method of city recycling process?
   a. Incineration
   b. Pyrolysis
   c. Direct recycling
   d. Composting
   e. All the above

64. Which of the following is a typical thermophillic bacterial species development during composting?
   a. *Bacillus*
   b. *Humicolla*
   c. *Absidia*
   d. *Chectonium*

65. Which of the following is/are the typical thermophillic fungal species development during composting?
   a. *Bacillus*
   b. *Humicolla*
   c. *Streptothermophilus*
   d. Both a and c

66. Which of the following is a typical thermophillic actinomycetes species development during composting?
   a. *Bacillus*
   b. *Humicolla*
   c. *Streptothermophilus*
   d. *Nocardia*

67. Which of the following is a typical mesophillic actinomycetes species development during composting?
   a. *Cellumonas*
   b. *Humicolla*
   c. *Streptothermophilus*
   d. *Nocardia*

68. Waste recycling is often done for
   a. Supplying organic matter to the soil
   b. Bridging the gap between supply and demand for plant nutrients
   c. Keeping the environment clean
   d. Composting is the most widely accepted process of handling diverse wastes
   e. All the above

69. The excellent potential of sugarcane based composting processes is due to which of the following reasons?
   a. The most voluminous solid waste fit for composting is known to be press mud
   b. Composting of press mud along with sugar mill effluents and distillery effluents, namely, spent wash has become extremely popular
   c. This protects the environment on one hand and generates valuable organic manure as a byproduct on the other
   d. All the above

Answers

60. e	63. e	66. d	69. d
61. c	64. a	67. a	
62. d	65. b	68. e	

70. Which of the following is/are the popular use of pressmud cake?
a. A source of plant nutrients
b. An ameliorant for acidic and sodic soils
c. A medium for raising sugarcane seedlings, and
d. A carrier for legume bio-inoculants
e. All the above

71. Distillery effluents are characterized by which of the following facts?
a. Foul odour
b. Highly biodegradable matter
c. High dissolved solid
d. Disposal problems
e. All the above

72. Chemical Oxygen Demand (COD) is a measure of
a. The total amount of oxygen, which is required to completely oxidize all of the organic matter in a water sample to carbon-di-oxide and water.
b. The amount of oxygen required by microorganisms to decompose the organic matter in water sample under specific conditions
c. Both a and b d. None

73. Chemical Oxygen Demand (COD) of water increases with
a. Increasing organic matter concentrations.
b. Decreasing organic matter concentrations
c. Constant organic matter concentrations
d. All the above

74. Farm operations impact water quality in which of the following ways?
a. Soil erosion b. Manure
c. Septic system effluent
d. Milk house wastes
e. All the above

75. Which of the following ways problems of bacteria can be minimized using the practices given below?
a. Contain runoff from manure storages, livestock yards and silos
b. Ensure that the water well is properly maintained and protected from surface contamination
c. Properly treat or store milk house waste water
d. Ensure that the domestic septic system is working properly and is not discharging into a drainage system
e. All the above

76. Which of the following ways problems of nitrate contamination can be minimized using the practices given below?
a. Complete a nutrient-management plan for the farm.
b. Avoid spreading excessive amounts of manure or fertilizer on a field.
c. Where a lot of manure and forages are used, the nitrate soil test can help to determine nitrogen requirements.
d. Reduce nitrogen fertilizer when the previous crop was a legume or when manure was applied
e. All the above

77. Fertilizers vary in toxicity per unit of plant nutrient due to
a. Differences in the amount of salts contained in the fertilizer per unit of plant nutrient
b. Differences in the solubility of the salts in the soil
c. The presence of specific materials or elements that is particularly toxic
d. All the above

Answers					
	70. e	73. a	76. e		
	71. e	74. e	77. d		
	72. a	75. e			

78. Heavy metal toxicity can result in which of the following?
a. Damaged or reduced mental and central nervous function
b. Lower energy levels, and damage to blood composition
c. Lungs, kidneys, liver, and other vital organs
d. All the above

79. Long-term exposure of heavy metals may result in which of the following?
a. Slowly progressing physical, muscular, and neurological degenerative processes that mimic Alzheimer's disease
b. Parkinson's disease
c. Muscular dystrophy
d. Multiple sclerosis
e. All the above

80. The symptoms of heavy metals toxicity on humans include which of the following?
a. Usually severe
b. Rapid in onset
c. Associated with a known exposure or ingestion
d. All the above

81. The symptoms of heavy metals toxicity resulting from chronic exposure include which of the following?
a. Impaired cognitive, motor, and language skills
b. Learning difficulties
c. Nervousness and emotional instability
d. Insomnia, nausea, lethargy, and feeling ill
e. All the above

82. "Heavy metals" are chemical elements with a specific gravity that is at
a. Least 5 times the specific gravity of water
b. Least 2 times the specific gravity of water
c. Least 3 times the specific gravity of water
d. Least 1 times the specific gravity of water

83. Toxic metallic elements with a specific gravity that is 5 or more times that of water are
a. Cadmium and Arsenic
b. Iron and Lead
c. Mercury and Cadmium
d. All the above

84. Diagnostic medical applications of heavy metals include which of the following?
a. Direct injection of gallium during radiological procedures
b. Dosing with chromium in parenteral nutrition mixtures
c. The use of lead as a radiation shield around x-ray equipment
d. All the above

85. Heavy metals are used in industrial applications for which of the following purposes?
a. In the manufacture of pesticides
b. Batteries, textile dyes, steel
c. Alloys
d. Electroplated metal parts
e. All the above

86. Heavy metals become toxic when
a. They are not metabolized by the body
b. Accumulate in the soft tissues
c. Both a and b
d. None of the above

Answers					
	78. d	81. e	84. d		
	79. e	82. a	85. e		
	80. d	83. d	86. c		

87. Heavy metals may enter the human body through
    a. Food
    b. Water
    c. Air
    d. Absorption through the skin
    e. All the above

88. Less common routes of exposure of heavy metals includes which of the following?
    a. During a radiological procedure
    b. From inappropriate dosing
    c. Monitoring during intravenous (parenteral) nutrition
    d. All the above

89. Acute poisoning of heavy metals is more likely to result from
    a. Inhalation or skin contact of dust
    b. Fumes or vapors
    c. Materials in the workplace
    d. All the above

90. Which of the following is number one in acute heavy metals poisoning?
    a. Arsenic b. Mercury
    c. Lead d. Cadmium

91. Arsenic is released into the environment by
    a. The smelting process of copper, zinc, and lead
    b. By the manufacturing of chemicals and glasses
    c. Both a and b
    d. None of the above

92. Sources of arsenic are
    a. Paints and Rat poisoning
    b. Fungicides and Rat poisoning
    c. Wood preservatives and Fungicides
    d. All the above

93. Which of the heavy metals accounts for most of the cases of pediatric heavy metal poisoning?
    a. Arsenic b. Mercury
    c. Lead d. Cadmium

94. Which of the following heavy metal is a very soft metal and was used in pipes, drains, and soldering materials for many years?
    a. Arsenic b. Mercury
    c. Lead d. Cadmium

95. Target organs of lead toxicity generally include which of the following?
    a. The bones and Brain
    b. Blood and Kidneys
    c. Thyroid gland and Brain
    d. All the above

96. Mercury is generated naturally in the environment
    a. From the degassing of the earth's crust
    b. From volcanic emissions
    c. Both a and b
    d. None of the above

97. Mercury exists in which of the following three forms?
    a. Elemental mercury b. Organic
    c. Inorganic mercury d. All the above

98. Mining operations, chloralkali plants, and paper industries are significant producers of which of the following heavy metals?
    a. Mercury b. Lead
    c. Silica d. Arsenic

Answers								
	87. e	90. a	93. c	96. c
	88. d	91. c	94. c	97. d
	89. d	92. d	95. d	98. a

99. Atmospheric mercury is dispersed across the globe by winds and returns to the earth via
    a. Rainfall
    b. Accumulating in aquatic food chains
    c. Fish in lakes
    d. All the above

100. Which of the following is continuously being used in thermometers, thermostats, and dental amalgam?
    a. Hg b. Pb
    c. As d. Cd

101. Which of the following is the most common cause of Hg Contamination?
    a. Inhalation b. Ingestion
    c. Absorption d. Digestion

102. Target organs of Hg toxicity are
    a. The brain b. Kidneys
    c. Both a and b d. None of these

103. Commercial fertilizers are the common source of which of the following heavy metals?
    a. Cd b. Pb
    c. As d. Hg

104. Lesser-known sources of exposure of Cd is/are
    a. Dental alloys b. Electroplating
    c. Motor oil d. All the above

105. Target organs of Cd exposure is/are
    a. The liver
    b. Placenta
    c. Kidneys, lungs, brain, and bones
    d. All the above

106. Hemochromatosis is a disease of caused due to
    a. More iron b. Less iron
    c. Both a and b d. None of these

107. Target organs of iron toxicity is/are
    a. The liver
    b. Cardiovascular system,
    c. Kidneys
    d. All the above

108. Exposure to toxic heavy metals is generally classified
    a. As acute, 14 days or less
    b. As Intermediate, 15-354 days
    c. As Chronic, more than 365 days
    d. All the above

109. Acute toxicity is usually from a sudden or unexpected exposure to a high level of the heavy metal as
    a. From careless handling
    b. Inadequate safety precautions
    c. An accidental spill or release of toxic material often in a laboratory, industrial, or transportation setting
    d. All the above

110. Chronic toxicity results from
    a. Repeated or continuous exposure
    b. An accumulation of the toxic substance in the body
    c. Inadequate safety precautions
    d. Both a and-b
    e. All the above

111. Chronic exposure may result from
    a. Contaminatedfood b. Air
    c. Water, or dust d. All the above

112. Chronic exposure may result from
    a. Living near a hazardous waste site
    b. In areas with deteriorating lead paint
    c. Maternal transfer in the womb
    d. All the above

Answers								
	99. d	102. c	105. d	108. d	111. d
	100. a	103. a	106. a	109. d	112. d
	101. a	104. d	107. d	110. d	

113. Routes of exposure of chronic toxicity are often similar to many common conditions and may not be readily recognized and includes which of the following?
a. Inhalation
b. Skin or eye contact
c. Ingestion
d. All the above

114. Hyperpigmentation is caused due to
a. As b. Al
c. Si d. Hg

115. Hyperkeratosis is caused due to
a. As b. Al
c. Si d. Hg

116. Autism in children is caused due to
a. Hg b. As
c. Cd d. Pb

117. Which of the following element based coagulants are used in the purification of water?
a. Al b. Si
c. As d. Hg

118. Which element levels can be measured in blood, urine, hair, and fingernails?
a. As b. Hg
c. Pb d. Cd

119. Blood lead levels in children higher than 10 meq/dL are considered to be of concern for which heavy metal?
a. Hg b. Pb
c. Cd d. As

120. "Lead line" that indicate failure of the bone to rebuild in children is caused due to
a. Hg b. Cd
c. As d. Pb

121. The pollutants of soil and water from phosphate fertilizer industries is/are
a. Iron, Mercury, Nitrogen
b. Sulphate and Uranium
c. Fluoride and Cadmium
d. All the above

122. The pollutants of soil and water from phosphate fertilizer industries is/are
a. Sulphate and Uranium
b. Fluoride, and Cadmium
c. Phosphate and Sodium
d. Both a and b
e. All the above

123. The pollutants of soil and water from nitrogen fertilizer industries is/are
a. Calcium
b. Chemical oxygen demand
c. Iron
d. All the above

124. The pollutants of soil and water from nitrogen fertilizer industries is/are
a. pH
b. Phosphate and Sodium
c. Organic nitrogen
d. Both a and b
e. All the above

125. The pollutants of soil and water from plastic and synthetic industries is/are
a. Phosphorus b. Nitrate
c. Organic nitrogen d. All the above

126. The pollutants of soil and water from organic chemical industries is/are
a. Total organic carbon
b. Phosphorus
c. Heavy metals
d. All the above

Answers					
	113. d	116. a	119. b	122. d	125. d
	114. a	117. a	120. d	123. d	126. d
	115. a	118. a	121. a	124. d	

127. The pollutants of soil and water from steel industries is/are
a. Cyanide b. Phenols
c. Iron d. All the above

128. The pollutants of soil and water from petroleum refining industries are
a. Chloride and Copper
b. Phosphate and Sodium
c. Cyanide
d. Both a and c
e. All the above

129. The pollutants of soil and water from petroleum refining industries is/are
a. Iron b. Lead
c. Zinc d. All the above

130. The pollutants of soil and water from petroleum refining industries is/are
a. Mercaptons b. Nitrogen
c. Phosphorous d. All the above

131. Which of the following is/are (an) important effect of worm casts in soil?
a. Unlike fertilizers vermicompost does not burn plants when applied even in higher amounts.
b. It supplies balanced nutrition to growing plants. As nutrient content analysis shows it has all the major, secondary and micro- nutrients.
c. It has growth promoting hormones and gives seedlings a good start in life.
d. All the above

132. Soil function as
a. Chemical filter b. Biological filter
c. Both d. None of these

133. The first line of defense against pollutants is imparted by
a. Soil b. Water
c. Air d. Plasma

134. Soils check the mobility of pollutants by
a. Sorption
b. Biological degradation
c. Chemical degradation
d. All

135. Which of the following is/are acids anions?
a. Phenols b. Benzoates
c. Phenoxy d. All

136. Which of the following is/are cationic bases?
a. Triazines b. Amines
c. Both d. None of these

137. Which of the following is/are quaternary ammonium cations?
a. Diquat b. Paraquat
c. Both d. None of these

138. Which of the following is/are moderately polar compound?
a. Organophosphates b. Carbamates
c. Dinitroanilines d. All

139. The shape of adsorption isotherms are generally characterized by how many types?
a. 1 b. 2
c. 3 d. 4

140. L-types adsorption isotherm reflects
a. High affinity b. Weak affinity
c. Same affinity d. All

141. A standard solution is one whose strength is
a. Known b. Unknown
c. Both a and b d. None of these

Answers					
	127. d	130. d	133. a	136. c	139. d
	128. d	131. d	134. d	137. c	140. a
	129. d	132. c	135. d	138. d	141. a

142. What is known by "strength "of a solution?
- a. The amount of a substance
- b. Amount present in definite volume
- c. Amount present in definite volume of a solution
- d. None of the above

143. Strength of a solution is expressed as
- a. Molarity
- b. Percentage by weight
- c. Molality
- d. Both a and b
- e. Both b and c

144. Which of the following is a primary standard?
- a. Oxalic acid
- b. Anhydrous sodium carbonate
- c. Zinc oxide
- d. All the above

145. A primary standard should be
- a. In a stage of high purity
- b. Should not be hygroscopic
- c. Efflorescent
- d. Should be stable in solid as well as solution
- e. All the above

146. If the rider is an 20th division of the beam how much is it's weight?
- a. 0.004 gms
- b. 0.008 gms
- c. 0.016 gms
- d. 0.024 gms

147. What will be the normality of M/5 Na_2CO_3 solution?
- a. 0.25
- b. 0.4
- c. 0.1
- d. 0.5

148. The weight of rider is
- a. 1 mg
- b. 10 mg
- c. 100 mg
- d. 1000 mg

149. Presence of impurity in a substance can change which of its properties?
- a. Melting point
- b. Solubility
- c. Density
- d. All the above
- e. None of the above

150. Which is the purest form of a substance?
- a. Solid
- b. Liquid
- c. Gas
- d. Crystalline form

151. What is the common name of ferrous sulphate?
- a. Green vitriol
- b. Blue vitriol
- c. Alum
- d. All

152. The solubility of a substance depends upon
- a. Nature of the solute
- b. Nature of the solvent
- c. Temperature of the solution
- d. Pressure, when the solute is a gas
- e. All the above

153. Generally solubility of a substance with rise in temperature
- a. Increases
- b. Decreases
- c. Neither increases nor decreases
- d. All

154. Which of the following's solubility decreases with increase in temperature?
- a. KOH
- b. $CaCO_3$
- c. Both a and b
- d. None of these

155. Solubility curve denotes
- a. A plot of solubility of a substance vs Temperature
- b. A plot of solubility of a substance vs Pressure
- c. A plot of solubility of a substance vs Molarity
- d. A plot of solubility of a substance vs Molality

Answers					
	142. c	145. e	148. a	151. a	154. c
	143. d	146. a	149. d	152. e	155. a
	144. d	147. b	150. a	153. a	

156. What is the pH of pure water?
- a. 6.0
- b. 6.5
- c. 7.0
- d. 7.5

157. Which kind of redox reaction occurs at anode?
- a. Oxidation
- b. Reduction
- c. Both
- d. None of these

158. Which kind of redox reaction occurs at cathode?
- a. Oxidation
- b. Reduction
- c. Both
- d. None

159. What is known by Blue Vitriol?
- a. $Cu\ SO_4 . 5H_2O$
- b. $Fe\ SO_4 . 7H_2O$
- c. $Mg\ SO_4 . 7H_2O$
- d. $Ca\ SO_4 . ½\ H_2O$

160. What is known by epsom salt?
- a. $Cu\ SO_4 . 5H_2O$
- b. $Fe\ SO_4 . 7H_2O$
- c. $Mg\ SO_4 . 7H_2O$
- d. $Ca\ SO_4 . ½\ H_2O$

161. What is known by Plaster of Paris?
- a. $Cu\ SO_4 . 5H_2O$
- b. $Fe\ SO_4 . 7H_2O$
- c. $Mg\ SO_4 . 7H_2O$
- d. $Ca\ SO_4 . ½\ H_2O$

162. What is known by salt petre?
- a. KNO_3
- b. $NaHCO_3$
- c. NaCl
- d CaO

163. What is known by Baking soda?
- a. KNO_3
- b. $NaHCO_3$
- c. NaCl
- d. CaO

164. What is known by quick lime?
- a. KNO_3
- b. $NaHCO_3$
- c. NaCl
- d. CaO

165. What is known by brine solution?
- a. KNO_3
- b. $NaHCO_3$
- c. NaCl
- d. CaO

166. What is known by milk of lime?
- a. $Ca(OH)_2$
- b. $CaOCl_2$
- c. C_6H_5OH
- d $MgSiO_3$
- e. Na_2SiO_3

167. What is known by Bleaching Powder?
- a. $Ca(OH)_2$
- b. $CaOCl_2$
- c. C_6H_5OH
- d $MgSiO_3$
- e. Na_2SiO_3

168. What is known by Carbolic Acid?
- a. $Ca(OH)_2$
- b. $CaOCl_2$
- c. C_6H_5OH
- d $MgSiO_3$
- e. Na_2SiO_3

169. What is known by Talc?
- a. $Ca(OH)_2$
- b. $CaOCl_2$
- c. C_6H_5OH
- d $MgSiO_3$
- e. Na_2SiO_3

170. What is known by water glass?
- a. $Ca(OH)_2$
- b. $CaOCl_2$
- c. C_6H_5OH
- d $MgSiO_3$
- e. Na_2SiO_3

171. What is called magnesia mixture?
- a. $MgCl_2$
- b. NH_4Cl
- c. $MgCl_2 + NH_4Cl$
- d. $MgCl_2 + NaCl$

172. Oils can be classified into following main groups
- a. Terpenes
- b. Straight-chain compounds
- c. Benzene derivative
- d. All

Answers						
	156. c	159. a	162. a	165. c	168. c	171. c
	157. a	160. c	163. b	166. a	169. d	172. d
	158. b	161. d	164. d	167. b	170. e	

173. Hydro-distillation is a process in which
   a. Distillation is carried out with water
   b. Distillation is carried out water vapors
   c. Distillation is carried out with sodium hydroxide
   d. Distillation is carried out with $NaHCO_3$

174. Which pollutant reduces the rate of growth of plants?
   a. Ozone
   b. Carbon monoxide
   c. Sulfur dioxide
   d. Nitrogen dioxide

175. Anaerobic digestion of animal waste produces what gases?
   a. Propane, nitrogen dioxide, and sulfur dioxide
   b. Butane, carbon monoxide, and sulfur monoxide
   c. Methane, carbon dioxide, and hydrogen sulfide
   d. Ethane, nitrogen monoxide, and sulfur trioxide

176. The signal word "caution" on a label indicates _____.
   a. No toxicity
   b. Low toxicity
   c. Moderate toxicity
   d. High toxicity

177. Soil organic matter is measured in which of the following units?
   a. Ounces
   b. Inches
   c. Percentages
   d. Pounds

178. All of the following types of energy may be obtained from solid waste except which of the following?
   a. Methane
   b. Electricity
   c. Leachate
   d. Biomass Fuel

179. Management practices to reduce the risk of nitrate losses include
   a. Growing cover crops whenever manure is applied in late summer or early fall
   b. Timing nitrogen applications close to crop nitrogen uptake
   c. Reduced total nitrogen applications
   d. All the above

180. There are how many metals that concern humans because of occupational or residential exposure?
   a. 20
   b. 30
   c. 10
   d. 40

Answers

173. b	176. b	179. d
174. a	177. c	180. b
175. c	178. c	

13

Soil Testing and Analysis

QUESTIONS :

1. "TC" in volumetric glasswares means
   a. To contain
   b. To content
   c. Total concentration
   d. Total content

2. "TD" glasswares are better than "TC" glasswares (True/False)

3. True weight of any substances is weighed only in
   a. Air b. Vacuum
   c. Water d. Sea

4. True weight of a substance is always
   a. Greater
   b. Smaller
   c. Equal
   d. All than the weight recorded in air

5. What is the density of air ?
   a. 0.0012 g/ml b. 0.012 g/ml
   c. 0.12 g/ml d. 1.12 g/ml

6. Measuring containers made of glass are subject to an expansion co-efficient of _____ with respect to temperature.
   a. 0.00025 b. 0.00025
   c. 0.0025 d. 0.025

7. Which method is used for the determination of dissolved oxygen ?
   a. Winuler method
   b. Walkley-Black method
   c. Bray and Kurtz method
   d. All

8. The equilibrium concentration of CO_2 in water is about
   a. 7 mg/L b. 0.7 mg/L
   c. 0.07 mg/L d. 70 mg/L

9. Free CO_2 in water samples having pH 8.3 or above is
   a. More b. Less
   c. Free d. All

10. Which of the following is an alkalinity end indicator ?
    a. Phenolphthalein b. Methyl orange
    c. Thymol blue d. Cresol red
    e. All the above

11. Suppose that a water sample shows phenolphthalein alkalinity as zero, then it indicates
    a. Bicarbonate only
    b. Carbonate only
    c. Both a and b
    d. None

12. If a water sample contains less than half total alkalinity, then the sample contains
    a. Carbonate b. Bicarbonate
    c. Both a and b d. All

13. If a water sample contains half of its alkalinity then the sample contains
    a. Carbonate b. Bicarbonate
    c. Both a and b d. None

14. Total hardness of water sample contains only
    a. Ca^{2+} b. Mg^{2+}
    c. K^+ d. Both a and b

15. Transparency of a water body is recorded with
    a. Secchic disc b. Resin disc
    c. Both a and b d. None

16. Which chemical is commonly used to keep water sample for long time for analysis ?
    a. Toluene b. Ethanol
    c. Methanol d. Phenyl

Answers															
	1.	a	4.	a	7.	a	10.	e	13.	a	16.	a			
	2.	T	5.	a	8.	b	11.	a	14.	d					
	3.	b	6.	a	9.	c	12.	c	15.	a					

17. What is the specific conductivity of KCl solution at 25°C ?
    a. 1.4118 dS/m b. 14.118 dS/m
    c. 0.14118 dS/m d. None

18. Determination of boron in water sample by curcumin method is suitable only up to
    a. 0.1-1.0 ppm b. 1-10 ppm
    c. 10-100 ppm d. None

19. Determination of boron in water sample by carmine method is suitable only up to
    a. 1-10 ppm b. 0.1-1.0 ppm
    c. 10-100 ppm d. 100-1000 ppm

20. Sodium can be determined by
    a. Gravimetric method
    b. Volumetric method
    c. Colorimetric method
    d. Flame photometric method
    e. All the above

21. For irrigation with sewage water, their biological oxygen demand should preferably be within
    a. 100-150 ppm b. 200-350 ppm
    c. 400-500 ppm d. 1-10 ppm

22. ISI standards for industrial effluents for biological oxygen demand in inland surface water is
    a. 30 mg/L b. 250 mg/L
    c. 300 mg/L d. None

23. ISI standards for industrial effluents for chemical oxygen demand in inland surface water is
    a. 200 mg/L b. 250 mg/L
    c. 300 d. None

24. ISI standards for industrial effluents for TDS (total dissolved salts) in inland surface water is
    a. 210 mg/L b. 2100 mg/L
    c. 2-10 mg/L d. None

25. ISI standards for industrial effluents for TSS (total suspended solids) in inland surface water is
    a. 100 mg/L b. 10 mg/L
    c. 1000 d. None

26. If a soil feels very gritty, forms very easily broken balls, little sticky and with no ribbon formation in feel method of textural determination, then it is having which textural class ?
    a. Sand b. Loamy sand
    c. Sandy loam d. Loam

27. If a soil feels moderately gritty, forms fairly firm balls which are easily broken and stains the fingers with no ribbon formation in feel method of textural determination, then it is having which textural class?
    a. Sand b. Loamy sand
    c. Sandy loam d. Loam

28. If a soil feels neither very gritty nor very smooth and forms firm balls with stains in fingers in feel method of textural determination, then it is having which textural class ?
    a. Sand b. Loamy sand
    c. Sandy loam d. Loam

29. If a soil feels smooth or slick buttery feel. Forms firm balls, stains in the fingers and has slight tendency to form ribbon with flaky surface, then it is having which textural class ?
    a. Loam b. Silt loam
    c. Clay loam d. Clay

Answers															
	17.	a	20.	e	23.	b	26.	b	29.	b					
	18.	a	21.	a	24.	b	27.	c							
	19.	a	22.	a	25.	a	28.	d							

30. If a soil feels slightly gritty, forms moderately hard balls when dry and stains in the fingers and ribbon's out on squeezing which also breaks easily, then it is having which textural class ?
a. Loam b. Silt loam
c. Clay loam d. Clay

31. If a soil feels very smooth, forms moderately hard balls when dry, stains in the fingers and shows some flaking on ribbon surface similar to silt loam, then it is having which textural class ?
a. Loam b. Silty clay loam
c. Clay loam d. Clay

32. If a soil feels very smooth, forms hard balls when dry which cannot be crushed by fingers and stains definitely and when squeezed forms out into long ribbons, then it is having which textural class ?
a. Loam b. Silt loam
c. Clay loam d. Clay

33. 10% H_2O_2 addition in soil results in
a. Frothing
b. Evolution of gas
c. Change in soil colour
d. All

34. Which of the following is a soil dispersing agent ?
a. Sodium fluoride
b. Sodium chloride
c. Sodium phosphate
d. Sodium hexameta phosphate

35. Which of the following reducing agent is required for the removal of free iron oxides ?
a. Sodium dithionate
b. Sodium citrate
c. Sodium fluoride
d. Both a and b
e. All the above

36. Presence of $CaCO_3$ in soils
a. Increase the dispersion
b. Decrease the dispersion
c. Will not affect the dispersion
d. None of the above

37. Use of water compared to non-polar compounds gives
a. Higher particle density value
b. Lower particle density value
c. No effect on particle density value
d. None of the above

38. Bulk density in soil can be estimated by
a. Core method
b. Excavation method
c. Both a and b
d. None

39. Soil core samples should not be taken from
a. Wet soils b. Dry soils
c. Both a and b d. None

40. Bulk density of soil is influenced by the
a. Application of green manures
b. Application of soil conditioners
c. Tillage operation
d. All the above

41. What is the role of Ca in monocalcium phosphate used as an extractant in available sulphur determination ?
a. Increase flocculation
b. Decrease flocculation
c. Prevent the S extraction from organic S
d. All the above

Answers								
	30. c	33. d	36. b	39. c
	31. b	34. d	37. a	40. d
	32. d	35. d	38. c	41. c

42. What is the colour formed by the reaction of Fe with orthophenonthroline in colorimetric determination of iron ?
a. Green b. Blue
c. Red d. Yellow

43. Mn toxicity occur in soils with pH
a. Below 4.0 b. Below 4.5
c. Below 5.0 d. Below 5.5

44. What is the colour formed by the reaction of Mn with potassium periodate in strongly acid medium in colorimetric determination of Mn ?
a. Pink b. Blue
c. Red d. Yellow

45. What is the colour formed by the reaction of Zn with dithiozone in colorimetric determination of Zn ?
a. Pink b. Blue
c. Red d. Yellow

46. What is the colour formed by the reaction of Cu with 2, 2-biquinoline in acid medium in colorimetric determination of Cu ?
a. Pink b. Purple
c. Red d. Yellow

47. What is the colour formed by the reaction of B with quinalizarine in strongly acid medium in colorimetric determination of boron ?
a. Pink b. Blue
c. Red d. Yellow

48. Which is the indicator used for the estimation of CO_3^{2-} in the soil ?
a. Phenolphthalein
b. Methyl orange
c. Methyl red
d. Both a and b

49. Which is the indicator used for the estimation of HCO_3^- in the soil ?
a. Phenolphthalein
b. Methyl orange
c. Methyl red
d. Both a and b

50. Which is the indicator used for the estimation of Cl^- in the soil ?
a. Phenolphthalein
b. Methyl orange
c. Methyl red
d. Potassium chromate

51. Sources of water include
a. Rain b. Tap water
c. Lake d. Streams
e. All the above

52. Sources of irrigation water include
a. Canal
b. Shallow and deep wells
c. Tube well
d. Run-off
e. All the above

53. If pH decreases by one unit, what will be the corresponding decrease in voltage ?
a. 0.59 mV b. 5.91 mV
c. 59.1 mV d. None

54. Buffer solution for pH measurements include
a. pH 4.0 b. pH 7.0
c. pH 9.2 d. All

55. For accurate pH measurement, which of the following is often used ?
a. Colour chart
b. pH meter
c. Dye solution
d. Pocket pH meter

Answers								
	42. c	45. c	48. a	51. e	54. d
	43. c	46. b	49. b	52. e	55. b
	44. a	47. b	50. d	53. c	

56. As the pH of the solution increases above 8.0, which of the following will be more?
a. Cl^- b. SO_4^{2-}
c. CO_3^{2-} and HCO_3^- d. All

57. Unit of electrical conductivity (EC) is/are
a. Micro mhos/cm b. Milli mhos/cm
c. dS/m d. All

58. Conductivity meter is
a. Digital only
b. Non-digital only
c. Both a and b d. None

59. By what per cent EC increases for each degree °C rise in temperature ?
a. 1.0 b. 2.0
c. 3.0 d. 4.0

60. Which is the C2 rating of salinity in irrigation water ?
a. < 250 b. 250-750
c. 750-2250 d. > 2250

61. A soil is sandy in texture in which using of saline water is
a. More harmful b. Less harmful
c. No harm d. None

62. When a soil is clayey in texture, which type of salinity can be tolerated?
a. Low b. High
c. Both a and b d. None

63. To calculate ppm salt in solution, which is the best equation?
a. $EC25 \times 10^3 \times 640$
b. $EC25 \times 10^3 \times 12,5$
c. $EC25 \times 10^3 \times 0.064$
d. $EC25 \times 10^3 \times 0.36$

64. To calculate osmotic pressure in atmosphere, which is the best equation?
a. $EC25 \times 10^3 \times 3.6$
b. $EC25 \times 10^3 \times 36$
c. $EC25 \times 10^3 \times 0.36$
d. $EC25 \times 10^3 \times 0.036$

65. Which is a Ca indicator?
a. Mureoxide b. EBT
c. Both a and b d. None

66. Which of the following is a Mg indicator?
a. Mureoxide b. EBT
c. Diphenylamine d. Calcon

67. Ca and Mg in the solution is determined by
a. Flame photometer
b. Atomic absorption spectrophotometer
c. Both a and b
d. None of the above

68. More of Ca^{2+} and Mg^{2+} in water samples can be found from
a. Humid regions b. Arid region
c. Both a and b d. None

69. For a good water sample, EC value must be
a. < 2.0 b. < 1.0
c. < 4.0 d. < 4.0

70. For saline water, the EC value will be
a. > 2.0 b < 2.0
c. > 1.0 d. < 1.0

71. For a good water sample, the SAR value must be
a. < 10 b. < 20
c. < 5 d. < 1

72. Which of the following is/are used to stabilize the turbidity in suspension in S determination?
a. Gum acacia b. Gelatine
c. Glycerol d. All

Answers									
	56. c	59. b	62. b	65. a	68. a	71. a
	57. d	60. b	63. a	66. b	69. a	72. d
	58. c	61. b	64. b	67. c	70. a	

73. Interference of organic matter is eliminated by adding which of the following?
a. Activated charcoal
b. Gum acacia
c. Gelatin d. Glycerol

74. Which of the following is a heavy metal complexing reagent?
a. KCN
b. K, Na-Ferrocyanide
c Hydroxylamine hydrochloride
d. TEA
e. All

75. EDTA titration method is a
a. Less sensitive method
b. More sensitive method
c. Quite complex
d. None

76. Na is estimated by flame photometer in a
a. Blue flame b. Green flame
c. White flame d. Black flame

77. Interference in Na estimation is more if solution is having K/Na ratio of
a. Greater than 5.0 b. Equal to 5.0
c. Less than 5.0 d. None

78. Interference in Na estimation is more if solution is having Ca/Na ratio of
a. Greater than 10
b. Less than 10
c Greater than 20
d. Greater than 40

79. Interference in Na estimation is more if solution is having Mg/Na ratio of
a. Greater than 100
b. Less than 100
c. Greater than 120
d. Less than 120

80. Presence of borate, phosphate and silicates influences CO_3^{2-} and HCO_3^- at
a. Low pH b. High pH
c. Neutral pH d. None

81. HCO_3^- associated with Na causes
a. Fe chlorosis in plants
b. Fe sufficiency in plants
c. Both a and b
d. None

82. HCO_3^- concentration in appreciable quantity reduces
a. Elongation of radish seedlings
b. Depress protein synthesis
c. Both a and b
d. None

83. Decline in vigour in apple is caused by the application of irrigation water having
a. CO_3^{2-}
b. HCO_3^-
c. Both a and b
d. None of the above

84. Water samples having low concentration of CO_3^- causes
a. Ca^{2+} and Mg^{2+} deficiency
b. K deficiency
c. Na deficiency
d. None

85. RSC index for safe use of water concept was given by
a. Eaton b. Wilox
c. Arnon d. Stout

86. The water is not safe to use if RSC value of the water exceeds
a 2.25 meq/L b. 2.5 meq/L
c. 2.0 meq/L d. 5.0 meq/L

Answers						
	73. a	76. a	79. a	82. c	85. b
	74. e	77. a	80. b	83. b	86. a
	75. b	78. a	81. a	84. a	

87. The concentration of CO_3^{2-} and HCO_3^- in irrigation water can be controlled by adding
a. Acidic fertilizer
b. Alkaline fertilizer
c. Both a and b
d. Neutral fertilizers

88. Which class of SAR of water can be safely used?
a. S1 b. S2
c. S3 d. S4

89. Water samples having high SAR can be made useful by treating the water with
a. Sulphuric acid b. Gypsum
c. Both a and b d. None

90. In a flame photometric analysis of K, addition of which of the following will improve the spraying properties of the solution?
a. Ethyl alcohol b. Butyl alcohol
c. Propyl alcohol
d. Isopropyl alcohol

91. Irrigation to a depth of 5 cm by water containing 1.0 meq/L of K would add
a. 20 kg K/ha b. 10 kg K/ha
c. 30 kg K/ha d. 40 kg K/ha

92. Well water rich in KNO_3 are highly valued for application to which of the following crop?
a. Tobacco b. Potato
c. Tea d. Strawberry

93. Example(s) for chloride sensitive crops is/are
a. Citrus b. Peaches
c. Grapes d. All

94. Cl as $CaCl_2$ is
a. More dangerous than NaCl
b. Less dangerous than NaCl
c. Having same effect as NaCl
d. None of the above

95. Which of the following glasswares are low in boron content?
a. Sigcol glasswares
b. Carning glasswares
c. Borosilicate glasswares
d. Both a and b
e. All

96. Which of the following anions interferes in B estimation in water sample?
a. NO_3^- b. $H_2PO_4^-$
c. SO_4^{2-} d. CO_3^{2-}

97. The red colour complex ion B estimation "Rose cyanine" is intensified by the presence of
a. Malic acid b. Oxalic acid
c. Citric acid d. Formic acid

98. Which of the following crop is high sensitive to boron?
a. Tobacco b. Lemon
c. Potato d. Rice

99. Which of the following crop is less sensitive to boron?
a. Lemon b. Alfalfa
c. Cauliflower d. Cabbage

100. Which of the following can effectively absorb impurities in water samples?
a. Darco G-60 b. Ethyl alcohol
c. Gum acacia d. Agar

101. Devarda alloy is composed of
a. 50% Cu, 45% Al and 5% Zn
b. 50% Zn, 45% Al and 5% Cu
c. 50% Al, 45% Cu and 5% Zn
d. 50% Al, 45% Cu and 5% Zn

Answers					
87. a	90. b	93. d	96. a	99. b	
88. b	91. a	94. a	97. b	100. a	
89. c	92. a	95. d	98. b	101. a	

102. NO_3^- is
a. Mobile in plants
b. Immobile in plants
c. Mobile in roots and immobile in shoots
d. None of the above

103. Chloride in water sample when applied to tobacco provides
a. Earthly flavour b. Burning ability
c. Fluorescent ability d. None

104. In tobacco KNO_3 improves
a. Burning quality b. Earthly flavour
c Both a and b d. None

105. Soils having low Mo can induce
a. NO_3^- deficiency
b. NH_4^+ deficiency
c. Both a and b
d. None

106. A plant show high concentration of NO_3^- despite having deficiency symptoms of nitrogen, then the reason could be
a. Deficiency of Mo.
b. Deficiency of K
c. Deficiency of I
d. None

107. Approximately what percentage of organic N is present in soils?
a. > 90% b. < 70%
c < 50% d. < 5%

108. Approximately what percentage of organic P is present in soils?
a. > 50% b. < 5%
c. < 20% d. < 1%

109. Approximately what percentage of organic S is present in soils?
a. > 75% b. < 75%
c. < 50% d. < 5%

110. Per cent organic matter varies in soils and in peat and muck soils generally it is
a. > 70% b. < 5%
c. < 10% d. < 1%

111. Per cent organic matter in sandy arid soils is
a. < 0.3% b. > 10%
c. < 0.1% d. < 0.05%

112. Generally soil organic matter contains
a. 1% of N b. 2% of N
c. 4% of N d. 5% of N

113. In general soil N:P:S ratio is
a. 10 : 1 : 1 b 5 : 1 : 1
c. 1 : 1 : 1 d. 100 : 10 : 1

114. In general organic matter of a soil contains
a. 55% of C b. 58% of C
c. 60% of C d. 40% of C

115. 1.724, a multiplying factor to obtain per cent organic matter from per cent organic carbon is called as
a. van Bemmelen factor
b. Vant-hoff factor
c. Bray factor
d. Wilkinson factor

116. Organic matter content of soils is estimated by
a. Titrimetric method
b. Colorimetric method
c. Both a and b
d. None

117. Titrimetric method of organic carbon estimation is also known as
a. Dry digestion method
b. Wet digestion method
c. Both a and b
d. None

Answers						
102. a	105. a	108. a	111. a	114. b	117. b	
103. a	106. a	109. a	112. d	115. a		
104. a	107. a	110. a	113. a	116. c		

118. Titrimetric method of organic carbon estimation oxidizes
a. High per cent of total organic carbon in soil
b. Low per cent of total organic carbon in soil
c. Both a and b
d. None of the above

119. Addition of NaF or H_3PO_4 in organic carbon determination is aimed to get
a. High heat of dilution
b. Sharp end point
c. Both a and b
d. Faster oxidation

120. Interfering ions that can compete with organic matter in reducing chromic acid is
a. Cl^- b. Br^-
c. I^- d. F^-

121. In the EDTA titration method of Ca and Mg determination, Calcon indicator is used for the estimation of
a. Ca alone b. Mg alone
c. Ca + Mg d. None

122. What is the correction factor in Walkley-Black method of organic carbon determination?
a. 1.724 b. 1.3
c. 1.5 d. 1.0

123. Per cent organic matter is obtained by multiplying per cent organic carbon with
a. 1.724 b. 1.3
c. 1.0 d. 1.6

124. Methods for available N determination in soils include
a. Assimilable forms
b. Hydrolysable forms
c. Both a and b d. None

125. Assimilable forms of N in soils are
a. NO_3^- b. NH_4^+
c. Organic N d. Both a and b

126. Hydrolysable forms of N in soils include
a. NO_3^- b. NH_4^+
c. Organic N d. All

127. 1 meq of HCl is equal to _____ in nitrogen determination.
a. 1.4 mg of N b. 14 mg of N
c. 0.14 mg of N d. 140 mg of N

128. Which is the most important method of soil NO_3^- - N determination?
a. Nessler reagent
b. Nitrophenoldisulfenic yellow colour method
c. Titration method
d. None of the above

129. Which of the following is Nessler's reagent?
a. I_4HgK_2 b. $HgOHg(NH_2)I$
c. KOH d. None

130. Digestion of the organic material in NO_3^--N determination is carried out by adding which catalyst?
a. Hg b Cu
c. Se d. All

131. Which is used to raise the temperature in digestion in the determination of total N?
a. K_2SO_4 b. Na_2SO_4
c Both a and b d. None

132. In total digestion for N estimation which prevents loss of NO_3^--N?
a. Salicylic acid b. Malic acid
c. Oxalic acid d. Formic acid

Answers					
	118. a	121. a	124. c	127. b	130. d
	119. b	122. a	125. d	128. b	131. c
	120. a	123. a	126. d	129. a	132. a

133. Which converts NO_3^--N to NH_4^+-N?
a. $Na_2S_2O_3$ b. K_2I_4Hg
c. MgO d. MgO

134. What is the low rating of total N?
a. > 0.06 b. < 0.03
c. 0.03-0.06 d. < 0.01

135. Soils containing which of the following value are adjudged deficient in Ca^{2+}?
a. < 1.5 meq/100g soil
b. < 4.5meq/100g soil
c. < 2:5meq/100g soil
d. < 5.5meq/100g soil

136. Soils containing which of the following value are adjudged deficient in Mg^{2+}?
a. < 1.0 meq/100g soil
b. < 2.0 meq/100g soil
c. < 3.0 meq/100g soil
d. < 4.0 meq/100g soil

137. General purpose guidelines for plant analysis was given by
a. Stout b. Arnon
c. Aldrich d. Liebig

138. How much per cent of total irrigated area is under canals?
a. 19.8% b. 30.2%
c. 36.2% d. 7.3%

139. How much per cent of total irrigated area is under tube wells?
a 36.2% b. 30.2%
c. 19.8% d. 20.3%

140. How much per cent of total irrigated area is under wells?
a. 36.2% b. 30.2%
c. 19.8% d. 18.3%

141. How much per cent of total irrigated area is under tanks?
a. 34.2% b. 39.2%
c. 19.8% d. 7.3%

142. EC value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

143. Ca^{2+} value for which of the industrial waste water is highest?
a Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

144. Mg^{2+} value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

145. Na^+ value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

146. Cl^- value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

Answers					
	133. a	136. a	139. b	142. b	145. a
	134. b	137. c	140. c	143. b	146. c
	135. a	138. c	141. d	144. b	

118. Titrimetric method of organic carbon estimation oxidizes
a. High per cent of total organic carbon in soil
b. Low per cent of total organic carbon in soil
c. Both a and b
d. None of the above

119. Addition of NaF or H_3PO_4 in organic carbon determination is aimed to get
a. High heat of dilution
b. Sharp end point
c. Both a and b
d. Faster oxidation

120. Interfering ions that can compete with organic matter in reducing chromic acid is
a. Cl^- b. Br^-
c. I^- d. F^-

121. In the EDTA titration method of Ca and Mg determination, Calcon indicator is used for the estimation of
a. Ca alone b. Mg alone
c. Ca + Mg d. None

122. What is the correction factor in Walkley-Black method of organic carbon determination?
a. 1.724 b. 1.3
c. 1.5 d. 1.0

123. Per cent organic matter is obtained by multiplying per cent organic carbon with
a. 1.724 b. 1.3
c. 1.0 d. 1.6

124. Methods for available N determination in soils include
a. Assimilable forms
b. Hydrolysable forms
c. Both a and b d. None

125. Assimilable forms of N in soils are
a. NO_3^- b. NH_4^+
c. Organic N d. Both a and b

126. Hydrolysable forms of N in soils include
a. NO_3^- b. NH_4^+
c. Organic N d. All

127. 1 meq of HCl is equal to _____ in nitrogen determination.
a. 1.4 mg of N b. 14 mg of N
c. 0.14 mg of N d. 140 mg of N

128. Which is the most important method of soil NO_3^- - N determination?
a. Nessler reagent
b. Nitrophenoldisulfenic yellow colour method
c. Titration method
d. None of the above

129. Which of the following is Nessler's reagent?
a. I_4HgK_2 b. $HgOHg(NH_2)I$
c. KOH d. None

130. Digestion of the organic material in NO_3^--N determination is carried out by adding which catalyst?
a. Hg b Cu
c. Se d. All

131. Which is used to raise the temperature in digestion in the determination of total N?
a. K_2SO_4 b. Na_2SO_4
c Both a and b d. None

132. In total digestion for N estimation which prevents loss of NO_3^--N?
a. Salicylic acid b. Malic acid
c. Oxalic acid d. Formic acid

Answers					
	118. a	121. a	124. c	127. b	130. d
	119. b	122. a	125. d	128. b	131. c
	120. a	123. a	126. d	129. a	132. a

133. Which converts NO_3^--N to NH_4^+-N?
a. $Na_2S_2O_3$ b. K_2I_4Hg
c. MgO d. MgO

134. What is the low rating of total N?
a. > 0.06 b. < 0.03
c. 0.03-0.06 d. < 0.01

135. Soils containing which of the following value are adjudged deficient in Ca^{2+}?
a. < 1.5 meq/100g soil
b. < 4.5meq/100g soil
c. < 2:5meq/100g soil
d. < 5.5meq/100g soil

136. Soils containing which of the following value are adjudged deficient in Mg^{2+}?
a. < 1.0 meq/100g soil
b. < 2.0 meq/100g soil
c. < 3.0 meq/100g soil
d. < 4.0 meq/100g soil

137. General purpose guidelines for plant analysis was given by
a. Stout b. Arnon
c. Aldrich d. Liebig

138. How much per cent of total irrigated area is under canals?
a. 19.8% b. 30.2%
c. 36.2% d. 7.3%

139. How much per cent of total irrigated area is under tube wells?
a 36.2% b. 30.2%
c. 19.8% d. 20.3%

140. How much per cent of total irrigated area is under wells?
a. 36.2% b. 30.2%
c. 19.8% d. 18.3%

141. How much per cent of total irrigated area is under tanks?
a. 34.2% b. 39.2%
c. 19.8% d. 7.3%

142. EC value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

143. Ca^{2+} value for which of the industrial waste water is highest?
a Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

144. Mg^{2+} value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

145. Na^+ value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

146. Cl^- value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

Answers					
	133. a	136. a	139. b	142. b	145. a
	134. b	137. c	140. c	143. b	146. c
	~~135. a~~	138. c	141. d	144. b	

118. Titrimetric method of organic carbon estimation oxidizes
a. High per cent of total organic carbon in soil
b. Low per cent of total organic carbon in soil
c. Both a and b
d. None of the above

119. Addition of NaF or H_3PO_4 in organic carbon determination is aimed to get
a. High heat of dilution
b. Sharp end point
c. Both a and b
d. Faster oxidation

120. Interfering ions that can compete with organic matter in reducing chromic acid is
a. Cl^- b. Br^-
c. I^- d. F^-

121. In the EDTA titration method of Ca and Mg determination, Calcon indicator is used for the estimation of
a. Ca alone b. Mg alone
c. Ca + Mg d. None

122. What is the correction factor in Walkley-Black method of organic carbon determination?
a. 1.724 b. 1.3
c. 1.5 d. 1.0

123. Per cent organic matter is obtained by multiplying per cent organic carbon with
a. 1.724 b. 1.3
c. 1.0 d. 1.6

124. Methods for available N determination in soils include
a. Assimilable forms
b. Hydrolysable forms
c. Both a and b d. None

125. Assimilable forms of N in soils are
a. NO_3^- b. NH_4^+
c. Organic N d. Both a and b

126. Hydrolysable forms of N in soils include
a. NO_3^- b. NH_4^+
c. Organic N d. All

127. 1 meq of HCl is equal to _____ in nitrogen determination.
a. 1.4 mg of N b. 14 mg of N
c. 0.14 mg of N d. 140 mg of N

128. Which is the most important method of soil NO_3^- - N determination?
a. Nessler reagent
b. Nitrophenoldisulfenic yellow colour method
c. Titration method
d. None of the above

129. Which of the following is Nessler's reagent?
a. I_4HgK_2 b. $HgOHg(NH_2)I$
c. KOH d. None

130. Digestion of the organic material in NO_3^--N determination is carried out by adding which catalyst?
a. Hg b Cu
c. Se d. All

131. Which is used to raise the temperature in digestion in the determination of total N?
a. K_2SO_4 b. Na_2SO_4
c Both a and b d. None

132. In total digestion for N estimation which prevents loss of NO_3^--N?
a. Salicylic acid b. Malic acid
c. Oxalic acid d. Formic acid

Answers					
	118. a	121. a	124. c	127. b	130. d
	119. b	122. a	125. d	128. b	131. c
	120. a	123. a	126. d	129. a	132. a

133. Which converts NO_3^--N to NH_4^+-N?
a. $Na_2S_2O_3$ b. K_2I_4Hg
c. MgO d. MgO

134. What is the low rating of total N?
a. > 0.06 b. < 0.03
c. 0.03-0.06 d. < 0.01

135. Soils containing which of the following value are adjudged deficient in Ca^{2+}?
a. < 1.5 meq/100g soil
b. < 4.5meq/100g soil
c. < 2:5meq/100g soil
d. < 5.5meq/100g soil

136. Soils containing which of the following value are adjudged deficient in Mg^{2+}?
a. < 1.0 meq/100g soil
b. < 2.0 meq/100g soil
c. < 3.0 meq/100g soil
d. < 4.0 meq/100g soil

137. General purpose guidelines for plant analysis was given by
a. Stout b. Arnon
c. Aldrich d. Liebig

138. How much per cent of total irrigated area is under canals?
a. 19.8% b. 30.2%
c. 36.2% d. 7.3%

139. How much per cent of total irrigated area is under tube wells?
a 36.2% b. 30.2%
c. 19.8% d. 20.3%

140. How much per cent of total irrigated area is under wells?
a. 36.2% b. 30.2%
c. 19.8% d. 18.3%

141. How much per cent of total irrigated area is under tanks?
a. 34.2% b. 39.2%
c. 19.8% d. 7.3%

142. EC value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

143. Ca^{2+} value for which of the industrial waste water is highest?
a Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

144. Mg^{2+} value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

145. Na^+ value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

146. Cl^- value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

Answers					
	133. a	136. a	139. b	142. b	145. a
	134. b	137. c	140. c	143. b	146. c
	135. a	138. c	141. d	144. b	

147. N and K value for which of the industrial waste water is highest?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

148. Which of the following is generally having high pH?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

149. Which of the following is generally having high BOD?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

150. Which of the following is generally having high N, P and K?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

151. Which of the following is generally having high SO_4^{2-}?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

152. Which of the following is generally having high Ca?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

153. Which of the following is generally having high Mg?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

154. Which of the following is generally having high CO_3^{2-}?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

155. Which of the following is generally having high HCO_3^-?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

156. Which of the following is generally having high Na?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

157. Which of the following is generally having high EC?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

158. Which of the following is generally having high Cl^-?
a. Raw sewage b. Settled sewage
c. SP effluent d. Plain water

159. Of the following, which is generally high in plain water?
a. K b. HCO_3^-
c. Ca d. Mg

160. In general for the overall assessment of soil quality
a. Annual sampling is preferred
b. Half yearly sampling is preferred
c. Biannually sampling is preferred
d. None of the above

161. A good time of year to sample when
a. Climate is stable b. Post harvest
c. Winter d. All

162. While sampling, what are the considerations have to be given?
a. Row versus inter-row areas
b. Differences in crop growth
c. Eroded versus non-eroded areas
d. Wet versus non-wet areas
e. Both a and b
f. All the above

Answers						
	147. a	150. a	153. b	156. b	159. b	162. f
	148. b	151. c	154. b	157. a	160. a	
	149. a	152. a	155. c	158. c	161. d	

163. A minimum of what samples truly represent soil type management?
a. 1 b. 2
c. 3 d. 4

164. When measuring EC, pH and soil nitrates at the field scales, how many representative samples would be better?
a. 1 b. 2
c. 3 d. 4

165. The best time to run the soil respiration test is
a. When the field is moist
b. When the field is at field capacity
c. When the field is dry
d. When the field is super saturated

166. A soil has been wet, after how many hours, soil respiration test is better?
a. 24 hrs b. 48 hrs
c. 64 hrs d. 72 hrs

167. Soil respiration test is an indicator of
a. Good soil b. Bad soil
c. Soil health d. All

168. A soil with high activity indicates that the soil is
a. Healthy b. Stable
c. Unstable d. None

169. Bulk density is an indicator of
a. Compaction b. Porosity
c. Both a and b d. None

170. Soil bulk density is defined as
a. Weight of oven dry soil/Volume of soil
b. Weight of wet soil/Volume of soil
c. Total soil weight/volume of soil
d. All the above

171. Volumetric water content (g/cm^3) can be calculated by which of the following formula?
a. Soil water content × Bulk density
b. Soil water content/Bulk density
c. Bulk density/Soil water content
d. All the above

172. Volume of soil (cm^3) is represented as
a. Total soil volume-Volume of rocks
b. Soil volume/Volume of rocks
c. Volume of rocks-Total soil volume
d. All the above

173. Aggregate stability should preferably be determined in the top
a. 3 inches of soil b. 6 inches of soil
c. 9 inches of soil d. 12 inches of soil

174. Slake test for aggregate stability in soil is a
a. Qualitative test b. Quantitative test
c. Both a and b d. None

175. Soil stability serves as a qualitative indicator of
a. Biological activity b. Energy flow
c. Nutrient cycling d. All

176. Soil respiration that measures only
a. CO_2 evolved by microbes
b. Live roots
c. Both a and b
d. None

177. Soil respiration is a
a. Variable entity b. State entity
c. Both a and b d. None

178. Suppose a soil is light coloured it shows high respiration rate then it has
a. High organic matter
b. Low organic matter
c. Both a and b
d. None

Answers						
	163. c	166. a	169. c	172. a	175. d	178. b
	164. b	167. d	170. a	173. a	176. c	
	165. b	168. c	171. a	174. a	177. a	

179. Soil respiration rate is zero then the soil is virtually
a. Biologically active
b. Biologically sterile
c. Biologically sick
d. None

180. Suppose a soil shows high respiration rate then it will indicate
a. Low biological activity
b. High biological activity
c. High decomposition of organic residues
d. Both b and c

181. Suppose a soil is dry then soil respiration will be higher in
a. Crops shown in rows
b. Crops shown in inter-rows
c. Both a and b
d. None

182. Which soil type shows low infiltration?
a. Sandy b. Loamy
c. Clayey d. All

183. Infiltration rate of water in soil is affected by
a. Soil type b. Soil structure
c. Initial soil water level
d. All

184. Bulk density is a
a. Dynamic property of soil
b. Static property of soil
c. Both a and b
d. None

185. Compact soils have
a. High bulk density
b. Low bulk density
c. Constant bulk density
d. All

186. Suppose a soil is sandy, what is the value of bulk density above which it will restrict root growth?
a. 1.6 g/cc b. 1.7 g/cc
c. 1.8 g/cc d. 1.5 g/cc

187. Suppose a soil is sandy clay loam, what is the value of bulk density above which it will restrict root growth?
a. 1.4 g/cc b. 1.6 g/cc
c. 1.5 g/cc d. 1.75 g/cc

188. Suppose a soil is silty, what is the value of bulk density above which it will restrict root growth?
a. 1.3 g/cc b. 1.6 g/cc
c. 1.75 g/cc d. 1.5 g/cc

189. Suppose a soil is clayey, what is the value of bulk density above which it will restrict root growth?
a. 1.1 g/cc b. 1.34 g/cc
c. 1.2 g/cc d 1.47 g/cc

190. If a soil has EC value of 0.98 dS/m at 25°C it will
a. Affect sensitive crops
b. Affect resistant crops
c. Not affect any crops
d. None

191. If a soil has EC value of 1.5 dS/m at 25°C it will
a. Affect sensitive crops
b. Affect resistant crops
c. Not affect any crops
d. None

192. If a soil has EC value of 1.5 dS/m at 25°C it will affect
a. Nitrification process
b. Denitrification process
c. Both a and b
d. None

Answers					
	179. b	182. c	185. a	188. c	191. a
	180. d	183. d	186. c	189. d	192. c
	181. a	184. a	187. d	190. c	

193. If a soil has EC value of 2.5dS/m at 25°C it will affect the yield of
a. Most crops b. Few crops
c. No crops d. None

194. If a soil has EC value of 3.0 dS/m at 25°C it will affect
a. Major microbial processes
b Respiration
c. Ammonification
d. All

195. If a soil has EC value of 5 dS/m at 25°C it will affect
a. Tolerant crops b. Sensitive crops
c. Both a and b d. None

196. If a soil has EC value of 5 dS/m at 25°C it will affect
a. Salt tolerant microorganisms
b. Predominant fungi
c. Actinomycetes
d. Bacteria e. All

197. Beyond EC value of >6 dS/m at 25°C then only
a. Saprophytes will be active
b. Halophytes will be active
c. Detritivores will be active
d. None of the above

198. Which of the following crops are sensitive crops for EC in soil?
a. Apple, Avocado, Bean and Blackberry
b. Cotton and Pineapple
c. Rice, Wheat, Oat and Barley
d. All the above

199. Which of the following crops are sensitive crops for EC in soil?
a. Carrot and Cherry
b. Grapefruit and Lemon
c. Wheat and Oat
d. Both a and b e. All the above

200. Which of the following crops is/are sensitive crops for EC in soil?
a. Lime b. Loquat
c. Mango d. Okra
e. All the above

201. Which of the following crops are sensitive crops for EC in soil?
a. Onion, Orange and Passion fruit
b. Pea, Orange and Passion fruit
c. Pea, Onion and Orange
d. All the above

202. Which of the following crops are sensitive crops for EC in soil?
a. Peach and Peas
b. Plums and Pummelo
c. Peach and Pummelo
d. All

203. Which of the following crops are sensitive crops for EC in soil?
a. Raspberry b. Rice
c. Sapota d. Strawberry
e All the above

204. Which of the following crops is/are tolerant to high EC values in soils?
a. Rye and Wheat
b. Rice, Oat, Barley
c. Sugarbeet and Datepalm
d. Both a and b
e. Both a and c

205. Which of the following crops is/are tolerant to high EC values in soils?
a. Grasses b. Asparagus
c. Barley
d. Bermuda grasses e. All the above

Answers					
	193. a	196. e	199. d	202. d	205. e
	194. d	197. b	200. e	203. e	
	195. c	198. a	201. d	204. e	

206. Which of the following crops is/are moderately tolerant to high EC values in soils?
a. Alfalfa, Beet, Canary grass and Clover
b. Tomato, Brinjal and Bindi
c. Tomato and Potato
d. All the above

207. Which of the following crops is/are moderately tolerant to high EC values in soils?
a. Cowpea, Fig, Olive and Papaya
b. Tomato, Brinjal and Bindi
c. Tomato and Potato
d. All the above

208. Which of the following crops is/are moderately tolerant to high EC values in soils?
a. Pineapple b. Pomegranate
c. Rhodes grass d. Rescue grass
e. All the above

209. Which of the following crops is/are moderately sensitive to EC values in soils?
a. Sesbania b. Squash
c. Sugarcane d. Sweet potato
e All the above

210. Which of the following crops is/are moderately sensitive to EC values in soils?
a. Carrot, Beet and Radish
b. Turnip, Watermelon, Radish and Pumpkin
c. Carrot, Beet, Radish and Potato
d. All the above

211. Which of the following crops is/are moderately sensitive to EC values in soils?
a. Potato b. Pepper
c. Orchard grass d. Oat grass
e. All the above

212. Which of the following crops is/are moderately sensitive to EC values in soils?
a. Muskmelon b. Foxtail millet
c. Lettuce d. Kohlrabi
e. All the above

213. Which of the following crops is/are moderately sensitive to EC values in soils?
a. Grapes b. Flax
c. Eggplant d. Clover
e. All the above

214. Excess salts affect plant growth by
a. Direct toxicities
b. Disrupt the ionic balance in plants
c. Interfering with nutrient uptake
d. Reducing the availability of water by lowering osmotic potential
e All the above

215. Effect of soil moisture on EC measurement will be negligible when soil water content is
a. At field capacity
b. At saturated condition
c. At super saturated condition
d. All

216. If a soil has more than 2% organic matter, it will
a. Increase aggregate stability
b. Decrease aggregate stability
c. Keep the aggregate stability constant
d. None of the above

217. In a soil with kaolinitic type clay mineral, the aggregate stability is
a. More b. Less
c. Negligible d. None

Answers				
	206. a	209. e	212. e	215. a
	207. a	210. b	213. e	216. c
	208. e	211. e	214. e	217. b

218. Pesticides include
a. Herbicides b. Insecticides
c. Fungicides d. All

219. Triazine herbicides include
a. Atrazine b. Limozine
c. Cyannizine d. All

220. Carbamate fungicides include
a. Carboryl, Methomyl and Carbofuron
b. Carbedazim, Benomyl and Thiophanate
c. Phorate, Chlorpyrifos and Isophos
d. All the above

221. Organophosphates includes
a. Carboryl, Methomyl and Carbofuron
b. Carbedazim, Benomyl and Thiophanate
c. Phorate, Chlorpyrifos and Isophos
d. All the above

222. Carbamate based insecticides include
a. Carboryl, Methomyl and Carbofuron
b. Carbedazim, Benomyl and Thiophanate
c. Phorate, Chlorpyrifos and Isophos
d. All the above

223. Nematicides include
a. D-D b. Metham-sodium
c. Methyl bromide d. All

224. Eroded soil will have
a. Reduced Ap horizon
b. Reduced B horizon
c. Reduced C horizon
d. All

225. The most important intrinsic property of a soil is its
a. Buffering capacity b. pH
c. Clay d. Nutrient status

226. The significance of a proton sink in soil depends upon
a. Acid neutralization capacity
b. Rate by which it take up protons
c. The pH range in which protonation takes place
d. All the above

227. If soil A is having higher buffering capacity than soil B, then
a. Soil A will require less lime than soil B for pH
b. Soil A will require more lime than soil B for pH
c. Both the soil will require same amount of lime
d. None of the above

228. Variable pH change of a soil is
a. pH dependent b. pH independent
c. Both a and b d. None

229. Variable charge of a soil is due to
a. Organic colloids b. 1 : 1 minerals
c. Both a and b d. All

230. The method to determine pHo was developed by
a. Gilman and Vehera
b. Walkley and Black
c. Arnon and Stout
d. None

231. Total acidity of a soil is also termed as
a. Hydrolytic acidity
b. Titratable acidity
c. Both a and b
d. None

232. Exchangeable acidity of a soil
a. Is a sum of total H^+ and Al^{3+} in the soil
b. Consists of monomeric Al or Fe
c. Is more when pH is < 5.5
d. All the above

Answers					
	218. d	221. c	224. a	227. d	230. a
	219. d	222. a	225. a	228. a	231. c
	220. b	223. d	226. d	229. c	232. d

233. Non-exchangeable acidity is due to
a. Extractable acidity-exchange acidity
b. Exchange acidity-extractable acidity
c. Total acidity-extractable acidity
d. None of the above

234. Active acidity of a soil can be what times lower than exchangeable acidity?
a. 1/50,000 b. 1/5000
c. 1/500 d. 1/50

235. When a soil is having smaller value of lime potential, its buffering capacity will be
a. More b. Less
c. Unity d. None

236. 1mg of H^+ will be equal to
a. 20 mg of Ca^{2+} b. 9 mg of Al^{3+}
c. 12 mg of Mg^{2+} d. All

237. Anion exchange capacity of a soil is defined as
a. Phosphate bound at pH 4.0
b. Phosphate bound at pH 7.0
c. Phosphate bound at pH 9.0
d. None

238. The proportion of nutrient in the soil reserve is called as
a. Quantity factor b. Intensity factor
c. Both a and b d. None

239. The proportion of nutrient in the soil solution is called as
a. Quantity factor b. Intensity factor
c. Both a and b d. None

240. Phosphate potential measures the intensity with which
a. Soil is holding its removable phosphates
b. Soil is holding its non-removable phosphates
c. Both a and b
d. None of the above

241. The more is the phosphate potential
a. The more strongly P is held
b. The weakly P is held
c. The availability of P is more
d. None

242. The Q/I relationship of soil phosphorus provides
a. A measure of immediately available P
b. Information on phosphate buffering capacity of soil
c. The probability of getting crop response to added P
d. All the above

243. Higher the value of ARcK, the tendency for K supply is
a. Lower b. Higher
c. Same d. None

244. If K potential of a soil is -4.00 to -3.50, then it is
a. Deficient in available K
b. Adequate in available K
c. K toxicity
d. All

245. If K potential of a soil is <–2.00, then it is
a. Deficient in available K
b. Adequate in available K
c. K toxicity d. All

246. Sampling of soils for immobile nutrients should be up to
a. Tillage depth b. Deeper depth
c. 10 cm d. All

247. For mobile nutrients like SO_4^{2-} and NO_3^- sampling should be up to
a. 30 cm b. 15 cm
c. 45 cm d. 1 m

Answers					
	233. a	236. d	239. b	242. d	245. c
	234. a	237. a	240. a	243. b	246. a
	235. a	238. a	241. b	244. a	247. d

248. For sampling soft and moist soils, which can be used?
a. Tube auger b. Spade
c. Post hole auger d. All

249. For sampling hard soils, which can be used?
a. Tube auger b. Spade
c. Post hole auger d. All

250. What is the preferable temperature and relative humidity for air-drying, respectively?
a. 25°C and 60%
b. 50°C and 100%
c. 10°C and 50%
d. 75°C and 75%

251. Ferroin indicator is _____ in organic carbon estimation.
a. Better suited than diphenylamine indicator
b. Not suited as compared to diphenylamine indicator
c. Same as that of diphenylamine indicator
d. All the above

252. Ammonium acetate method of K estimation is suitable for
a. Neutral soils b. Acidic soils
c. Alkaline soils d. None

253. Mureoxide is better than _____ in Ca estimation by EDTA method.
a. Calcon b. Ferroin
c. Diphenylamine d. All

254. Soil tests are basically based on
a. Viett's approach
b. Jackson's approach
c. Both a and b
d. None

255. The most suitable conditions in DTPA extractions for micronutrient estimations are
a. pH 7.3, 2 hrs shaking period, 25°C
b. pH 6.3, 3 hrs shaking period, 25°C
c. pH 7.3, 3 hrs shaking period, 25°C
d. pH 6.3, 2 hrs shaking period, 25°C

256. If liming materials have passing of 3–10 mesh than its efficiency is
a. 100% b. 60%
c. 20% d. 10%

257. While shaking the soil with DTPA for micronutrient extraction which cationic micronutrient will be more if shaking period of the solution increases?
a. Zn b. Cu
c. Mn d. Fe
e. All the above

258. While shaking the soil with DTPA for micronutrient extraction which cationic micronutrient will be more if temperature of the solution increases?
a. Zn b. Cu
c. Mn d. Fe
e. All the above

259. While shaking the soil with DTPA for micronutrient extraction which cationic micronutrient will be more if pH of the solution increases?
a. Zn b. Cu
c. Mn d. Fe
e. None of the above

260. Ammonium oxalate is also called as
a. Calcon reagent b. Ferroin reagent
c. Grigg's reagent d. All

Answers					
	248. a	251. a	254. a	257. e	260. c
	249. c	252. a	255. a	258. e	
	250. a	253. a	256. c	259. e	

261. Hot water method for B estimation was given by
a. Walkley and Black
b. Berger and Troug
c. Kenny and Bremner
d. Palaskar *et al*

262. Waxy coating on leaf surfaces of plant samples can be removed by
a. 0.2% liquid detergent
b. 0.1 N HCl
c. Deionised water
d. All

263. Metallic contamination of plant samples can be removed by
a. 0.2% liquid detergent
b. 0.1 N HCl
c. Deionised water
d. All

264. The fresh tissues should be washed in a sequence of
a. Detergent-0.1N HCl-Deionised water
b. Deionised water-Detergent-0.1N HCl
c. 0.1N HCl-Deionised water-Detergent
d. None of the above

265. Plant samples are dried in
a. Open shade b. Hot Air Oven
c. Both a and b d. None

266. The index tissue for sampling rice crop is
a. 3rd lead from apex b. Flag leaf
c. Lower leaf d. Matured leaf

267. The index tissue for sampling wheat crop is
a. 3rd lead from apex b. Flag leaf
c. Lower leaf d. Matured leaf

268. The index tissue for sampling maize crop is
a. 3rd lead from apex b. Flag leaf
c. Lower leaf d. Matured leaf

269. The index tissue for sampling pulses is
a. 2nd lead from apex
b. 3rd leaf from the bottom
c. Lower leaf
d. Matured leaf

270. The index tissue for sampling groundnut is
a. Recently matured leaf
b. Youngest matured leaf blade
c. 3rd leaf from top
d. Petioles of recently matured leaf

271. The index tissue for sampling soybean is
a. Recently matured leaf
b. Youngest matured leaf blade
c. 3rd leaf from top
d. Petioles of recently matured leaf

272. The index tissue for sampling sunflower is
a. Recently matured leaf
b. Youngest matured leaf blade
c. 3rd leaf from top
d. Petioles of recently matured leaf

273. The index tissue for sampling Jute is
a. Recently matured leaf
b. Youngest matured leaf blade
c. 3rd leaf from top
d. Petioles of recently matured leaf

274. The index tissue for sampling sugarbeet is
a. Recently matured leaf
b. Youngest matured leaf blade
c. 3rd leaf from top
d. Petioles of recently matured leaf

275. Soil quality term was first introduced by
a. Warkentine and Fletcher
b. A. N. Puri
c. J. S. Kanwar
d. None

Answers					
	261. b	264. a	267. b	270. a	273. d
	262. a	265. b	268. c	271. c	274. d
	263. b	266. a	269. d	272. b	275. a

276. Which of the following technique is used for the soil fertility evaluation?
a. Soil testing
b. Plant tissue testing
c. Biological testing
d. All

277. A sound soil testing programme has how many phases?
a. One b. Two
c. Three d. Four

278. The axiom "The analysis can be no better than the sample" holds true for
a. Soil testing b. Plant testing
c. Both a and b d. None

279. Heterogeneity in vast land can be sampled properly by
a. More soil units b. More samples
c. Less samples d. Both a and b

280. Samples are proper for a hilly when
a. Lowland samples are mixed with upland surface
b. When these are sampled individually
c. Both a and b
d. None of the above

281. Soil samples are dried in
a. Shade b. Hot air oven
c. Roads d. Both a and b

282. Soil samples are grinded by
a. Mortar b. Roller
c. Motorized grinder d. All

283. Of the following, which is/are the methods of soil sample partitioning?
a. Quartering
b. Riffle technique
c. Paper quartering
d. All

284. Fine mesh sieve is used for analyzing
a. Organic carbon b. pH
c. Sand d. Silt

285. Coarse sieve is used for the determination of
a. Soil pH
b. Electrical conductivity
c. Both a and b
d. None

286. Of the following ratio, which is/are used for soil: water suspension in pH determination?
a. 1 : 1 b. 1 : 2.5
c. 1 : 5 d. 1 : 10
e. All the above

287. What is the colour of oxidized form of chromium (Cr^{6+})?
a. Yellow b. Green
c. Red d. Orange

288. What is the colour of reduced form of chromium (Cr^{6+})?
a. Yellow b. Green
c. Red d. Orange

289. Which of the following forms of phosphorus is/are sparingly soluble?
a. Calcium phosphate
b. Iron phosphate
c. Aluminium phosphate
d. All

290. Soil : extractant ratio in Bray and Kurtz No.1 method of P analysis is
a. 1 : 10 b. 10 : 1
c. 1 : 30 d. 30 : 1

291. CaO is also called as
a. Unslaked lime b. Hydrated lime
c. Builder's lime d. All

Answers						
	276. d	279. d	282. d	285. c	288. b	291. d
	277. d	280. b	283. d	286. e	289. d	
	278. c	281. a	284. a	287. a	290. a	

292. Which kind of slag is popularly used?
a. Blast-furnace slag
b. Blast slag
c. Electric furnace slag
d. All

293. The time period required for complete reaction of CaO is
a. Few weeks b. One year
c. Two years d. Three years

294. The time period required for complete reaction of $Ca(OH)_2$ is
a. Few weeks b. One year
c. Two years d. Four years

295. The time period required for complete reaction of $CaCO_3$ is
a. Few weeks b. One year
c. Two years d. Four years

296. The time period required for complete reaction of dolomite ($CaCO_3.MgCO_3$) is
a. Few weeks b. One year
c. Two years d. Four years

297. Example(s) for high lime requiring crops is/are
a. Beans b. Peas
c. Soybean d. All

298. Example(s) for high lime requiring crops is/are
a. Sunflower b. Sugarbeet
c. Cotton d. All

299. Medium lime requiring crops are
a. Wheat, Tobacco, Sweet potato
b. Rice, Rye, Watermelon
c. Tea, Coffee, Pineapple
d. Cotton, Barley, Cowpea

300. Low lime requiring crops are
a. Wheat, Tobacco, Sweet potato
b. Rice, Rye, Watermelon
c. Tea, Coffee, Pineapple
d. Cotton, Barley, Cowpea

301 Very low lime requiring crops are
a. Wheat, Tobacco, Sweet potato
b. Rice, Rye, Watermelon
c. Tea, Coffee, Pineapple
d. Cotton, Barley, Cowpea

302. The method of sampling to be used depends on
a. Apparent specific gravity
b. True density
c. Both a and b
d. None

303. Bulk density is also called as
a. Apparent specific gravity
b. True density
c. Dry particle density
d. Both a and b
e. All the above

304. Particle density is also called as
a. True density
b. Apparent specific gravity
c. Dry particle density
d. Both a and b
e. All the above

305. Which is used as a measure of surface area of a soil?
a. Glycerol retention
b. Slaking test
c. Dry sieving technique
d. Wet sieving technique

306. Which chemical is used to destroy the organic matter in soil?
a. NaF b. CaO
c. H_2O_2 d. None

Answers					
	292. d	295. b	298. d	301. c	304. a
	293. a	296. c	299. a	302. d	305. a
	294. a	297. d	300. b	303. a	306. c

307. Why plant sample high in sugars should be freeze dried before analysis?
a. It gets charred on drying at 70°C
b. High sugar content will increase the nutrient concentration
c. High sugar content will decrease the nutrient concentration
d. All the above

308. Digestion mixture ratio for ashing is
a. 10 : 1 : 1 b. 1 : 1 : 1
c. 10 : 5 : 1 d. 10 : 10 : 1

309. Plant and soil sample digested with di-acid mixture is suitable for the analysis of
a. P b. K
c. Ca and Mg d. All

310. Plant and soil sample digested with di-acid mixture is not suitable for the analysis of
a. N b. P
c. K d. S

311. Tri-acid digestion is particularly recommended for the analysis of
a. P b. K
c. Both a and b d. None

312. Wet digestion method is normally not used for the estimation of
a. B b. Mo
c. Ca d. Both a and b

313. Dry ashing is the preferred method for the analysis of
a. B b. Mo
c. Ca d. Both a and b

314. Dry ashing is the preferred method for the analyzing the soil and plant nutrients except N because of
a. Good precision
b. Easy to carry out
c. Rapid method
d. All

315. Dry ashing is not suitable for the analysis of
a. N b. P
c. S d. All

316. To avoid explosion in the samples containing high fats and oils, which of the flowing is recommended?
a. Pre-digestion
b. Direct wet digestion
c. Ashing
d. All

317. Critical requirements for organic matter destruction by dry ashing method is
a. Nature of the ashing vessel
b. Placement in the muffle furnace
c. Ashing temperature
d. Ashing time
e. All the above

318. The vessels use for ashing should preferably be of
a. Silica
b. Platinum crucible
c. Glass
d. Both a and b

319. Temperature used for ashing varies from
a. 475 to 600 °C b. 100 to 200 °C
c. 50 to 100 °C d. 280 to 580 °C

320. The time duration required for ashing is
a. 1-2 hrs b. 2-3 hrs
c. 3-4 hrs d. 4-12 hrs

321. Final sample dilution in ashing should contain
a. 1% lithium b. 1% lanthanum
c. 1% barium d. All

Answers					
	307. d	310. a	313. d	316. a	319. a
	308. a	311. c	314. d	317. e	320. d
	309. d	312. d	315. d	318. d	321. b

322. Two most common oxidant/fuel combination used in atomic absorption spectrophotometer is
a. Air-acetylene and N_2O-acetylene
b. Air-acetylene
c. N_2O and halogen
d. All

323. What is the temperature of air-acetylene furnace in atomic absorption spectrophotometer?
a. 200-2400 °C b. 2600-2800 °C
c. 3000-3400 °C d. > 4000 °C

324. What is the temperature of N_2O-acetylene furnace in atomic absorption spectrophotometer?
a. 200-2400 °C b. 2600-2800 °C
c. 3000-3400 °C d. > 4000 °C

325. For determination of Zn, instead of hallow cathode lamp what is preferred?
a. Electrodes discharge lamp
b. Sodium lamp
c. Both a and b
d. None

326. The ICP woks on
a. Emission spectrometry
b. Optical emission spectrometry
c. Absorption spectrometry
d. All

327. Which of the following forms of water is present in fertilizers?
a. Water of crystallization
b. Water of absorption
c. Free water
d. All

328. Which method is used for analyzing water in different fertilizers?
a. Oven-dry method
b. Vacuum desiccator
c. Karl Fisher titration method
d. Evaporation method
e. All the above

329. Oven-dry method for water determination in fertilizers is not suitable for
a. Thermo-sensitive fertilizers
b. Volatile fertilizers
c. Hygroscopic fertilizers
d. All

330. Oven-dry method for water determination in fertilizers is not suitable for
a. Ammonium sulphate
b. Single superphosphate
c. Muriate of potash
d. Sulphate of potash
e. All

331. Vacuum desiccator method is suitable for
a. Ammonium chloride
b. Diammonium phosphate
c. Ammonium phosphate
d. All

332. Karl Fisher method for moisture estimation in fertilizers is suitable for
a. Urea
b. Calcium Ammonium Nitrate
c. Nitrophosphates
d. All

333. Karl Fisher method for moisture estimation in fertilizers is not suitable for
a. Rock phosphate
b. Single superphosphate
c. Triple superphosphate
d. All

Answers				
	322. a	325. a	328. e	331. d
	323. a	326. b	329. a	332. d
	324. b	327. d	330. e	333. d

334. Karl Fisher method of moisture determination in fertilizers determines
a. Total water
b. Available water
c. Water of hydration
d. All

335. Karl Fisher method of moisture determination in fertilizers can be used for
a. Solid fertilizers
b. Liquid fertilizers
c. Both a and b
d. None

336. Karl Fisher's reagent contains
a. Iodine b. SO_2
c. Pyridine d. Both a and c
e. All

337. Which is the oxidizing agent that interferes in Karl Fisher analysis?
a. Chromates b. Dichromates
c. Cu^{2+} d. Fe^{3+}
e. All the above

338. Which is the reducing agent that interferes in Karl Fisher analysis?
a. Thiosulphates b. Sn^{2+}
c. Salts d. Sulphides
e All the above

339. Devarda alloy converts
a. NO_3^- into NH_4^+
b. NH_3 into NO_3^-
c. NO_3^- into organic nitrogen
d. None

340. In Devarda alloy, Zn and Al acts as
a. An oxidizing agent
b. A reducing agent
c. A hygroscopic agent
d. All

341. What does Cu do in Devarda alloy?
a. Increase bitterness of alloy
b. Prevent pumping during distillation
c. Both a and b
d. None of the above

342. Which of the following can be used as anti-foaming agent in N analysis?
a. Triputyl citrate b. Paraffin
c. Both a and b d. All

343. Which of the following methods is/are used for the analysis of phosphates?
a. Gravimetric quinolinium
b. Volumetric quinolinium
c. Spectrophotometric method
d. All

344. Which of the following methods is/are used for the analysis of potassic fertilizers?
a. Volumetric STPB
b. Gravimetric STPB
c. Gravimetric chloroplatinate method
d. Flame photometer method
e. All the above

345. Zephiran chloride is also known as
a. Bezarkonium chloride
b. Ammonium chloride
c. Lithium chloride
d. Ammonium purpurate

346. Reliable method for estimating Zn in fertilizer is/are
a. EDTA titration
b. Dithiozone method
c. Atomic absorption spectrophotometer method
d. All the above

Answers					
	334. d	337. e	340. b	343. d	346. d
	335. c	338. e	341. c	344. e	
	336. e	339. a	342. c	345. a	

347. Reliable method for estimating Fe in fertilizer is/are
a. $KMnO_4$ titration method
b. Orthophenonthroline
c. Atomic absorption spectrophotometer method
d. All the above

348. Reliable method for estimating Mn in fertilizer is/are
a. Potassium periodate method
b. Atomic absorption spectrophotometer method
c. Both a and b
d. None of the above

349. Reliable method for estimating Cu in fertilizer is/are
a. $Na_2S_2O_3$ titration method
b. Carbamate method
c. Atomic absorption spectrophotometer method
d. All the above

350. Reliable method for estimating B in fertilizer is/are
a. NaOH direct titration method
b. Atomic absorption spectrophotometer method
c. Both a and b
d. None of the above

351. Reliable method for estimating Mo in fertilizer is/are
a. Thiocyanide $SnCl_2$ method
b. Atomic absorption spectrophotometer method
c. Both a and b
d. None of the above

352. What is the working wavelength range for Zn in atomic absorption spectrophotometer?
a. 0.2-2.0 ppm b. 2-20 ppm
c. 5-50 ppm d. 200-400 ppm

353. What is the working wavelength range for Fe in atomic absorption spectrophotometer?
a. 0.2-2.0 ppm b. 2-20 ppm
c. 5-50 ppm d. 50-100 ppm

354. What is the working wavelength range for Mn in atomic absorption spectrophotometer?
a. 0.2-2.0 ppm b. 2-20 ppm
c. 0.5-5 ppm d. 20-50 ppm

355. What is the working wavelength range for B in atomic absorption spectrophotometer?
a. 2-20 ppm b. 400-1000 ppm
c. 2-5 ppm d. 20-50 ppm

356. What is the working wavelength range for Mo in atomic absorption spectrophotometer?
a. 2.0-20 ppm b. 20-60 ppm
c. 400-1600 ppm d. 0.2-20 ppm

357. The science dealing with determination of composition of the constituents in terms of element and compounds is called as
a. Chemical chemistry
b. Organic chemistry
c. Analytical chemistry
d. Physical chemistry

358. Law of mass action theory was given by
a. Arnold
b. Guldeberg and Waag
c. Arnon and Stout
d. None

Answers				
	347. d	350. c	353. b	356. b
	348. c	351. c	354. c	357. c
	349. d	352. a	355. b	358. b

359. Example(s) for the methods of separation is/are
a. Distillation b. Precipitation
c. Dialysis
d. Chromatography
e. All the above

360. The degree of ionization of water at 25 °C is
a. 1.9×10^{-9} b. 1.5×10^{-9}
c. 1.1×10^{-9} d. 1×10^{-9}

361. Who propounded pH scale?
a. Sorenson b. Arheneous
c. Arnon d. Stout

362. Which of the following is a Lewis acid?
a. $AlCl_3$ b. $SnCl_4$
c. $FeCl_3$ d. All

363. Which of the following solvent is/are amphoteric in nature?
a. Water b. Alcohol
c. Acetylene d. Both a and b

364. Which of the following solvents is/are protophillic solvent?
a. HF b. H_2O
c. Alcohol d. All

365. Which of the following is an aprotic solvent?
a. HF b. Benzene
c. H_2O d. Alcohol

366. What is/are the properties of buffer solution?
a. It has a definite pH
b. Its pH does not alter
c. Both a and b
d. None

367. Which of the following solvents is/are organic solvent?
a. Alcohol b. Acetone
c. Benzene d. Ethyl alcohol
e. All the above

368. Which of the following is/are commonly used as reference electrode in pH determination?
a. Calomel electrode
b. Silver-silver chloride electrode
c. Both a and b
d. None

369. Which of the following can also be used as electrodes for respective ions?
a. Cu b. Pb
c. Cd d. Hg
e. All

370. Which of the following is not suitable for making electrodes?
a. Fe b. Ni
c. Co d. Cr
e. All the above

371. In non-aqueous solvent system, glass electrodes is suitable for which of the alcoholic solvents?
a. Methanol b. Ethanol
c. Butanol d. All

372. For a solvent medium of glacial acetic acid, which electrode is best?
a. Chloronil b. Glass
c. Cd d. Ag

373. In strongly basic solvents, which electrode is suitable?
a. Antimony electrode
b. Cadmium electrode
c. Silver electrode
d. Glass electrode

Answers					
	359. e	362. d	365. b	368. c	371. d
	360. a	363. d	366. c	369. e	372. a
	361. a	364. a	367. e	370. e	373. a

374. For redox reactions, which is a suitable electrode?
a. Inert metal electrode
b. Antimony electrode
c. Chloronil electrode
d. Butanol electrode

375. Which of the following can serve as inert metal electrodes?
a. Au b. Pt
c. Both a and b d. None

376. Which of the following is/are (an) examples of a titration curve?
a. A strong acid and a strong base
b. A weak acid and a weak base
c. A weak polybasic acid with a strong base
d. All the above

377. For measuring the intensity of radiant energy, commonly used photosensitive cells are of which type?
a. High vacuum b. Gas filled
c. Both a and b d. None

378. Which of the following is/are responsible for rendering monochromatic light in flame photometer?
a. Collimating mirror b. Burner
c. Atomizer d. All

379. The main limitation of flame photometer is
a. Low energy b. Low accuracy
c. Both a and b d. None

380. Atomizer role in flame photometer is to
a. Introduce the liquid into flame
b. Bring flame at a stable form
c. Bring flame into reproducible rate
d. All the above

381. The optical system of flame photometer makes the light
a. Monochromatic b. Multichromatic
c. Both a and b d. None

382. Which of the following is/are measurable below 1 ppm?
a. Ca b. Mg
c. Na and K d. All

383. Which of the following is measurable below 1-10 ppm?
a. Al and B
b. Cd and Co
c. Both a and b
d. Zn, Au and Bi

384. Which of the following is measurable below > 10 ppm?
a. Zn, Bi and Au
b. Fe, Mn, Zn and Cu
c. Mo and B
d. All

385. EDL sensitivity is higher than hallow cathode lamp because
a. Lower detection limit
b. Higher detection limit
c. Both a and b
d. None

386. Chromatographic separations are carried out by which property (ies) of the substances?
a. Solubility b. Adsorption
c. Volatility d. All

387. In every chromatographic separation, which of the following is/are the phases?
a. Stationary b. Mobile
c. Intermediate d. Both a and b

Answers					
	374. a	377. c	380. d	383. c	386. d
	375. c	378. a	381. a	384. a	387. d
	376. d	379. a	382. d	385. a	

388. Partition chromatography deals with
a. Moving liquid phase and stationary phase liquid on support
b. Both the solid phases
c. Both the gaseous phases
d. All the above

389. Adsorption chromatography deals with
a. Moving liquid phase and stationary phase solid on support
b. Both the solid phases
c. Both the gaseous phases
d. All the above

390. Most widely used ion exchange resin consists of
a. Sulphonated polysteryne polymers
b. Polyethylene
c. PVC
d. None

391. What is a dermal solution?
a. 1 mole of substance dissolved in 10kg of the solvent
b. 1 mole of substance dissolved in 1L of the solvent
c. 1 mole of substance dissolved in 10L of the solvent
d. 1 mole of substance dissolved in 1000g of the solvent

392. If pH reading is zero for any suspension, what is its H^+ ions concentration in mol/L?
a. 1 b. 2
c. 3 d. 4

393. Indicators have
a. Similar colour in acid and alkaline medium
b. Dissimilar colour in acid and alkaline medium
c. Both a and b
d. None of the above

394. Phenolphthalein becomes _____ at pH 8.2.
a. Colourless b. Red
c. Pink d. Black

395. In acid soils, which of the following methods is/are used for the analysis of available phosphorus?
a. Troug b. Morgan
c. Bray and Kurtz d. All

396. Citric acid method of phosphorus extraction was given by
a. Troug b. Dyer
c. Morgan d. Bray and Kurtz

397. Diagram for the classification of irrigation water was suggested by
a. Wilcox b. Richards
c. Thorne d. Stout

398. Which of the following colour reactions is/are utilized for the test of proteins?
a. Xanthoproteic reaction
b. Millen's reactions
c. Biuret reaction
d. Glyoxalic reaction
e. All the above

399. Fehling solution is used for testing the
a. Reducing sugars
b. Non-reducing sugars
c. Both a and b
d. None

400. Which of the following reagents is/are used to separate soluble protein from non-soluble protein?
a. Stutzer's reagent b. Brick's reagent
c. Bray's reagent d. All

Answers					
	388. a	391. d	394. a	397. a	400. a
	389. a	392. a	395. d	398. e	
	390. a	393. b	396. b	399. c	

401. What is the factor used to get free protein from the weight of nitrogen?
a. 6.0 b. 6.2
c. 6.25 d. All

402. Which of the following is/are (an) example(s) for reducing sugars?
a. Glucose b. Fructose
c. Lactose d. All

403. Total solids in sugar is determined by
a. Brix reading b. volumetrically
c. Spectrophotometrically
d. All

404. Sucrose content can be estimated by
a. Volumetrically
b. Potentiometrically
c. Both a and b d. None

405. Copper fungicides include
a. Bordeaux mixture
b. Burgundy mixture
c. Both a and b d. None

406. Organic fungicides are
a. Organic mercureals
b. Chloroquinones
c. Dithiocarbamates d. All

407. What is the ratio of $CuSO_4$, lime and water in Bordeaux mixture fungicide?
a. 4 : 4 : 500 b. 4 : 4 : 50
c. 4 : 40 : 500 d. 4 : 40 : 50

408. Which of the following methods is/are used for the analysis of essential oils?
a. Specific gravity method
b. Refractive index method
c. Optical rotation method
d. All

409. Colour of the soil samples are measured by
a. Leaf colour chart
b. Munsell colour chart
c. Both a and b d. None

410. Hue notations in Munsell colour chart are denoted by
a. Upper right hand corner of the card
b. Lower right hand corner of the card
c. Both a and b
d. None of the above

411. The colour becomes _____ when we move form the bottom to the top of the card.
a. Darker b. Lighter
c. Yellow d. Red

412. Soil colour varies due to
a. Humus content b. Redox potential
c. Mineralogical composition
d. All

413. The colour of the red and yellow soils found in tropical regions is due to _____ and _____, respectively.
a. Humus and titanium oxides
b. Humus and iron oxides
c. Haematite and Limonite
d. All

414. The black colour found in black cotton soils is due to
a. Humus b. Magnetite
c. Titanium oxides d. All

415. Iron, in a reducing environment of soil, imparts
a. Greenish colour
b. Reddish colour
c. Brownish colour
d. Yellowish colour

Answers					
	401. c	404. c	407. a	410. a	413. c
	402. d	405. c	408. d	411. b	414. d
	403. a	406. d	409. b	412. d	415. a

416. Coarse textured soils are
a. Light coloured b. Dark coloured
c. Both a and b d. None

417. If a soil is with high content of fulvic acid, then its colour will be
a. Yellow b. Red
c. Black d. Green

418. If a soil is with high content of humic acid, then its colour will be
a. Yellow b. Brown
c. Black d. Green

419. Under warm climatic conditions, the soils tend to develop
a. Yellowish tinge b. Reddish tinge
c. Greenish tinge d. All

420. Surface soils have
a. Darker shade b. Lighter shade
c. Reddish tinge d. Bluish tinge

421. A2 horizons of podzols are _____ in colour.
a. Ashy grey b. Reddish grey
c. Bluish grey d. None

422. Accumulation of $CaCO_3$ and $CaSO_4.2H_2O$ imparts _____ colour to the soils.
a. Greyish white b. Bluish white
c. Reddish white d. All

423. Soil texture influences
a. Cohesion b. Adhesion
c. Plasticity d. All

424. Soil texture assessed by feel method is done by
a. Ball formation
b. Ribbon formation
c. Staining
d. All

425. If a soil feels very gritty and also no ribbon and stains are formed by feel method of textural determination, then the texture is
a. Sand b. Loam
c. Clay d. Silt

426. Agricultural Index can be used to compare the relative value of different limestones for neutralization of soil acidity and it is given as
a. Agricultural Index = (Neutralizing value × Fineness rating) ÷ 100
b. Agricultural Index = Neutralizing value/ Fineness rating
c. Agricultural Index = Fineness rating/ Neutralizing value
d. Agricultural Index = (Neutralizing value × Fineness rating) × 100

427. Rate of application of limestone is given by the relationship as
a. Rate of application of limestone= Limestone application rate from soil test × (75 ÷ Agricultural Index of limestone)
b. Rate of application of limestone= Limestone application rate from soil test × (75 × Agricultural Index of limestone)
c. Rate of application of limestone= Limestone application rate from soil test × (100x Agricultural Index of limestone)
d. Rate of application of limestone= Limestone application rate from soil test × (175 ÷ Agricultural Index of limestone)

Answers				
	416. a	419. b	422. a	425. a
	417. a	420. a	423. d	426. a
	418. b	421. a	424. d	427. a

428. If limestone requirement by soil test is 9 t/ha, and the Agricultural Index is 90, then how much lime should be applied?
a. 10 t/ha b. 8 t/ha
c. 7.5 t/ha d. 5 t/ha

429. What one should know when buying lime?
a. Soil Analysis
b. Liming Materials
c. Cost Comparison
d. All the above

430. What is/are the following factors should be considered for lime application?
a. Soil analysis (pH, soil structure etc.)
b. Target pH
c. Liming material to be used (Neutralizing value, sizing, composition)
d. Cost comparison
e. All the above

431. The Usanovich definition of an acid–base is
a. The reactivity of an acid in terms of its ability to accept a pair of electrons from a base, defined as an electron-pair donor.
b. To donate protons (H^+) to another compound, called a base, in a chemical reaction.
c. To accept protons (H^+) to another compound, called a acid, in a chemical reaction.
d. An acid as anything that accepts negative species or donates positive ones, and a base as the reverse

432. Losses of lime occur as a result of
a. Leaching b. Cropping
c. Fertilizing d. Pollution

433. Plants make the soil more acid by
a. Organic and inorganic acids formed during decomposition of crop residues (acid forming)
b. Plants remove calcium and magnesium from the soil (acid forming)
c. Deep tillage may bring acid subsoil into the root zone (acid forming)
d. Plants release hydrogen ions (H+) to the soil (acid forming)
e. All the above

434. Lime quality is controlled by which factor?
a. Neutralizing value
b. Fineness
c. Reactivity
d. All the above

435. Agricultural lime is used to correct acidity and provide the right conditions in which plants and aquatic life can develop. It has which of the following major influence?
a. Plant development
b. Efficient use of fertilizers
c. Bacterial activity in the soil
d. Animal health
e. All the above

436. Agricultural lime is used to correct acidity and provide the right conditions in which plants and aquatic life can develop. It has which of the following major influence?
a. Water quality in rivers and streams
b. Development of woodland areas
c. Soil structure
d. Efficient use of herbicides
e. All the above

Answers			
	428. c	431. d	434. d
	429. d	432. a	435. e
	430. e	433. e	436. e

437. Good soil management requires which of the following 'golden' basics?
a. Adequate drainage to prevent waterlogging
b. The correct level of compaction for root anchorage and the movement of air
c. The correct pH level to allow the plant to grow and utilize optimally the available soil nutrients
d. All the above

438. Suitability of instrumental measurements depend on
a. Nature of analysis,
b. Type of heavy metals
c. Level of determination
d. Nature of samples
e. All the above

439. The number of atoms in a flame in a particular excited energy state *(n *)* and the number of atoms in the ground or unexcited state *(n)* are related by the following familiar Boltzman relationship
a. $n^*/n = A \exp(-\Delta E/KT)$
b. $n^*/n = A \exp(-\Delta EK/T)$
c. $n^*/n = A \exp(-\Delta ExKT)$
d. 4. $n^*/n = A\ K \exp(-\Delta E/T)$

440. n^*/n values for most elements in flames of about 3,000°K are in the range of
a. 10^{-10} to 10^{-4} range
b. $10^{-5}$to 10^{-4} range
c. 10^{-10} to 10^{-5} range
d. 10^{-1} to 10^{-2} range

441. The components of Atomic Absorption Spectrophotometer are
a. A light source that emits resonance line radiation
b. A sampling cell, usually a flame, into which the sample is fed as an aerosol
c. A monochromator that is used to isolate the absorbing resonance line from other non-absorbing lines
d. All the above

442. The components of Atomic Absorption Spectrophotometer Instrument are
a. A detector that measures the amount of absorption
b. Electronic amplification of the absorption signal;
c. A readout system that normally is a strip chart recorder, a digital display, a meter, or a printer
d. All the above

443. Principle of operation in Atomic Absorption Spectrophotometer instruments is
a. The sample aerosol is aspirated
b. Mixed with the gases before combustion
c. During combustion, the element is reduced to the atomic state and then can absorb radiation
d. Absorption of radiation is directly proportional to no. of atoms present in ground state
e. All the above

444. Types of Atomic Absorption Instrument are
a. Single-beam
b. Double- beam
c. Dual-channel double-beam
d. Double-beam sequential multielement
e. All the above

Answers			
	437. d	440. a	443. e
	438. e	441. d	444. e
	439. a	442. d	

445. Double beam Atomic Absorption Spectrophotometer instrument compensates for which of the following features?
a. Changes in lamp intensity
b. Variations in electronic noise
c. Detector sensitivity
d. All the above

446. Non-flame Atomic absorption spectrophotometer is very useful when
a. Sample size is very restricted
b. Lowest detection limit is needed
c. Both a and b
d. None of the above

447. Which of the following is the principle of Atomic Absorption Spectrophotometer - Graphite Furnace?
a. Pipetting the sample into the HGA
b. Sample is dried at 110°C to remove the water.
c. The temperature is raised to some value at which no atomization of the element in question occurs but where as much as possible of organics or salts are volatized
d. The temperature is raised sufficiently to atomize the element of interest. Typically this is between 2,100 and 2,900°C.
e. All the above

448. What is/are the advantages of ICP-AES?
a. Multielement analysis capability
b. Large dynamic linear range
c. Reduction of matrix interferences
d. Improved detection limits for refractory elements and
e. Enhancement of productivity
f. All the above

449. Which of the following is/are the principles of ICP-OES?
a. Sample constituents are vapourized → atomized → excitation of atoms or ions.
b. The excited atoms or ions will emit their specific line spectra.
c. The intensities of these lines depend on the concentrations of their respective elements in the sample
d. Emitted spectra are analyzed by suitable detector
e. All the above

450. Major components of ICP-OES are
a. Sample introduction system and Nebulizer
b. Plasma generation assembly
c. RF generator and Detector
d. Both a and c
e. All the above

451. Method of measurement of ICP-OES is
a. Simultaneous
b. Sequential
c. Both a and b
d. None of the above

452. Viewing of plasma of ICP-OES is
a. Axial view b. Radial view
c. Both a and b d. None

453. Detector of ICP-OES is
a. Photomultiplier tube
b. Solid state detector
c. Both a and b
d. None of the above

Answers			
	445. d	448. f	451. c
	446. c	449. e	452. c
	447. e	450. e	453. c

454. Which of the following facts is/are true in comparison of AAS with ICP-AES?
a. Furnace AA detection limits are generally better
b. Detection limits for Group I elements (e.g. Na, K) are generally better by flame AAS than by ICP
c. Detection limits for refractory elements (e.g. B, Ti, V, Al) are better by ICP than by flame AAS
d. Non metals such as phosphorus, sulfur, nitrogen, carbon, and the halogens (e.g. I, Cl, Br) can only be determined by ICP
e. All of the above

455. Which of the following facts is/are true in comparison of Atomic Absorption Spectrophotometer with ICP-AES?
a. Sequential ICP becomes faster than AAS
b. Approximately 6 elements/ sample for routine analysis is possible in ICP
c. Both a and b
d. None of the above

456. Which of the following facts is/are true in comparison of Atomic Absorption Spectrophotometer with ICP-AES?
a. Flame AAS cannot be left completely unattended for safety reasons
b. An ICP-ES instrument or graphite furnace AA can be left to run overnight as no combustible gases are involved
c. Both a and b
d. None of the above

457. Which of the following facts is/are true in comparison of Atomic Absorption Spectrophotometer with ICP-AES?
a. In ICP: Cu can be measured from 0.002 ppm to over 200 ppm
b. In AAS: Cu can be measured from 0.02 ppm to over 20 ppm
c. Both a and b
d. None of the above

458. Which of the following facts is/are true in comparison of Atomic Absorption Spectrophotometer with ICP-AES?
a. In AAS, Chemical interferences are high
b. ICP-OES is almost free from chemical interferences due to the high temperatures reached in a plasma
c. Both a and b
d. None of the above

459. Which of the following facts is/are true in comparison of Atomic Absorption Spectrophotometer with ICP-AES?
a. Minimum Spectral interferences in AAS
b. In ICP-OES, greater possibility of spectral interference
c. In sequential ICP, can be overcome by selecting a different wavelength with similar detection limits
d. All the above

460. Which of the following facts is/are true in comparison of Atomic Absorption Spectrophotometer with ICP-AES?
a. Recalibration is required in case of long duration analysis in case of AAS
b. In ICP, long-term precision is quite high
c. Both a and b
d. None of the above

Answers			
	454. e	457. c	460. c
	455. c	458. c	
	456. c	459. d	

461. Anodes used in Anodic Stripping Voltammetry is
- a. Indicator electrode
- b. Reference electrode (Ag/AgCl/KCl)
- c. Auxiliary electrode (Pt)
- d. All the above

462. Lewis definition of an acid is
- a. The reactivity of an acid in terms of its ability to accept a pair of electrons from a base, defined as an electron-pair donor
- b. To donate protons (H^+) to another compound, called a base, in a chemical reaction
- c. To accept protons (H^+) to another compound, called a acid, in a chemical reaction
- d. None of the above

463. What is/are the Advantages in Anodic Stripping Voltammetry?
- a. Low cost of instrument
- b. Very low operating cost
- c. Speciation is possible
- d. Multielement determination is possible
- e. Sub-ppb determination is also possible
- f. All the above

464. What is/are the disadvantages in Anodic Stripping Voltammetry?
- a. Very slow determination
- b. Chemical conditions are very important
- c. Sometimes chemical conditions do not permit determination
- d. Metals must be in the ionic condition
- e. All the above

465. High Pressure Liquid Chromatography (HPLC) involves which of the following steps
- a. Separation of metal species
- b. Formation colored complex
- c. Determination through absorbance detector
- d. All the above

466. What is/are the basic types of HPLC instrument systems which are available?
- a. Isocratic
- b. Gradient
- c. Both a and b
- d. None of the above

467. Which of the following is/are the type of detector being used in HPLC?
- a. Absorbance detector
- b. Electrochemical detector
- c. Conductivity detector
- d. All the above

468. What is/are the components required in HPLC?
- a. A gradient / isocratic pump
- b. A pre-column CG5A (Dionex)
- c. An analytical column CS5A (Dionex)
- d. A UV-VIS detector (530 nm)
- e. All the above

469. The type of instrument in a laboratory is decided by which of the following factors?
- a. Number of samples/week
- b. Type of sample (Water/effluent, soil, compost, etc.)
- c. How many elements for each sample
- d. What elements
- e. All the above

Answers			
	461. d	464. e	467. d
	462. a	465. d	468. e
	463. f	466. c	469. e

470. The type of instrument in a laboratory is decided by which of the following factors?
- a. What are typical sample volume
- b. What concentration range for the element in the samples
- c. What expertise is required for the operator
- d. Cost of the Instrument
- e. Running cost
- f. All the above

471. Reliable soil test results and recommendations depend upon
- a. Proper Soil and Plant Sampling
- b. Sample Processing Procedures
- c. Proper Soil Analysis Techniques
- d. Sound Fertilizer Recommendation Guidelines
- e. All the above

472. A soil testing programme has which of the following phases?
- a. Collection of soil samples,
- b. Chemical analysis of soil samples,
- c. Calibration and interpretation of the results of chemical analysis
- d. Nutrient/Fertilizer Recommendation
- e. All the above

473. Which of the following is correct for sampling for home vegetable gardens?
- a. Should be sampled the top 6 to 12" of soil, preferably in October or November
- b. Do not include compost or manure in the sample
- c. Should be fertilized in early spring before planting and sidedress with more fertilizer later in the season as needed
- d. All the above

474. Which of the following is correct for sampling for tree fruits?
- a. Should be sampled the top 12 to 18 inches of soil
- b. Samples should be taken from dripline area under branch tips (or closer to trunk for newly planted trees)
- c. Should be fertilized in February, according to soil test results
- d. All the above

475. Which of the following is/are the general principles which should be strictly followed to make soil sampling correct?
- a. A series of cores taken according to some systematic grid layout of the area of equal diameter and comparable depth should be composited
- b. Separate soil cores should be analyzed or replicate sets of composites made to determine statistical significance of results on the final composite
- c. The number of cores to be composited will depend on the viability of the soil the degree of accuracy desired, the desired, the particular element or elements to be determined
- d. All the above

476. Which of the following is/are the general principles which should be strictly followed to make soil sampling correct?
- a. Cultivated soils are generally more variable than virgin soils, and acidic/saline are extremely variable
- b. Separate composites samples representing different segments of the soil profile or root zone should be taken
- c. Contamination from soil surface materials (Crop residues, manures, fertilizers, etc) should be avoided, also contamination of one soil depth
- d. All the above

Answers			
	470. f	473. d	476. d
	471. e	474. d	
	472. e	475. d	

477. Which of the following is/are the general principles which should be strictly followed to make soil sampling correct?
a. Chemical preservation of solids is not generally recommended
b. Samples should be cooled and protected from sunlight to minimize any potential reaction
c. Both a and b
d. None of the above

478. Which of the following is/are the general principles which should be strictly followed to make plant sampling correct?
a. To diagnose or confirm diagnosis of visible symptoms
b. To identify hidden hunger
c. To locate areas of incipient deficiencies
d. All the above

479. Which of the following is/are the general principles which should be strictly followed to make plant sampling correct?
a. To indicate whether applied has entered the plant
b. To indicate interactions or antagonisms among nutrients
c. To aid the understanding of internal plant functioning
d. To suggest additional test to identify the trouble
e. All the above

480. Which of the following is the demerit of foliar nutrient spray?
a. Excessive vegetative growth
b. Reduce reproductive growth
c. Delay ripening
d. All the above

481. The middle size ball can represent the size of which soil particle
a. Sand b. Silt
c. Clay d. All the above

482. The smallest size particle can be of
a. Sand b. Silt
c. Clay d. All the above

483. Particles greater than 2.0 mm are called as
a. Sand b. Silt
c. Clay d. Gravel

484. Plant analysis interpretation systems involve which of the following methods?
a. Critical level
b. Sufficiency range
c. DRIS (Diagnostic and recommendation integrated system)
d. PASS
e. All the above

485. If fertilizer recommendation has been given as 0 then the soil test value of the nutrient must be
a. High b. Very high
c. Medium d. Low
e. Very low

486. If fertilizer recommendation has been given as ½ or ¼ of the recommended dose then the soil test value of the nutrient must be
a. High b. Very high
c. Medium d. Low
e. Very low

487. If fertilizer recommendation has been given as optimum of the recommended dose then the soil test value of the nutrient must be
a. High b. Very high
c. Medium d. Low
e. Very low

Answers				
	477. c	480. d	483. d	486. a
	478. d	481. b	484. e	487. c
	479. e	482. c	485. b	

488. If fertilizer recommendation has been given as full plus 10% extra of the recommended dose then the soil test value of the nutrient must be
a. High b. Very high
c. Medium d. Low
e. Very low

489. Which of the following is a brief key to N diagnosis?
a. Chlorosis starting from leaf tips
b. Necrosis on leaf margins
c. Chlorosis mainly between veins (which remain green)
d. Brownish, greyish, whitish spots (e.g. on cereals)
e. Reddish colour on green leaves or stem

490. Which of the following is a brief key to K diagnosis?
a. Chlorosis starting from leaf tips
b. Necrosis on leaf margins
c. Chlorosis mainly between veins (which remain green)
d. Brownish, greyish, whitish spots (e.g. on cereals)
e. Reddish colour on green leaves or stem

491. Which of the following is a brief key to Mg diagnosis?
a. Chlorosis starting from leaf tips
b. Necrosis on leaf margins
c. Chlorosis mainly between veins (which remain green)
d. Brownish, greyish, whitish spots (e.g. on cereals)
e. Reddish colour on green leaves or stem

492. Which of the following is a brief key to Mn diagnosis?
a. Chlorosis starting from leaf tips
b. Necrosis on leaf margins
c. Chlorosis mainly between veins (which remain green)
d. Brownish, greyish, whitish spots (e.g. on cereals)
e. Reddish colour on green leaves or stem

493. Which of the following is a brief key to P diagnosis?
a. Chlorosis starting from leaf tips
b. Necrosis on leaf margins
c. Chlorosis mainly between veins (which remain green)
d. Brownish, greyish, whitish spots (e.g. on cereals)
e. Reddish colour on green leaves or stem

494. Which of the following is a brief key to S diagnosis?
a. Mottled yellow-green leaves with yellowish veins
b. Mottled yellow-green leaves with green veins
c. Brownish black spots (e.g. on legumes, potatoes)
d. Youngest leaf has white tip
e. Youngest leaf is brownish or dead (e.g. on beet)

495. Which of the following is a brief key to Fe diagnosis?
a. Mottled yellow-green leaves with yellowish veins
b. Mottled yellow-green leaves with green veins
c. Brownish black spots (e.g. on legumes, potatoes)
d. Youngest leaf has white tip
e. Youngest leaf is brownish or dead (e.g. on beet)

Answers			
	488. e	491. c	494. a
	489. a	492. d	495. b
	490. b	493. e	

496. Which of the following is a brief key to Mn diagnosis?
a. Mottled yellow-green leaves with yellowish veins
b. Mottled yellow-green leaves with green veins
c. Brownish black spots (e.g. on legumes, potatoes)
d. Youngest leaf has white tip
e. Youngest leaf is brownish or dead (e.g. on beet)

497. Which of the following is a brief key to Cu diagnosis?
a. Mottled yellow-green leaves with yellowish veins
b. Mottled yellow-green leaves with green veins
c. Brownish black spots (e.g. on legumes, potatoes)
d. Youngest leaf has white tip
e. Youngest leaf is brownish or dead (e.g. on beet)

498. Which of the following is a brief key to B diagnosis?
a. Mottled yellow-green leaves with yellowish veins
b. Mottled yellow-green leaves with green veins
c. Brownish black spots (e.g. on legumes, potatoes)
d. Youngest leaf has white tip
e. Youngest leaf is brownish or dead (e.g. on beet)

499. Which of the following is a checklist before applying fertilizer?
a. Are other agronomic factors satisfactory?
b. Are basic requirements of soil fertility fulfilled?
c. Which nutrients need not be considered in this particular soil?
d. All the above

500. Which of the following is a checklist before applying fertilizer?
a. Which nutrients need not be considered every year?
b. What amounts of fertilizer P and K are needed at sowing time?
c. What kind and amount of N fertilizer is needed, and when?
d. All the above

501. Which of the following is a reason for decline in response of crops to nutrient management?
a. Wide nutrient gap between nutrient demand and supply
b. High nutrient turn over in soil-plant system coupled with low and imbalanced fertilizer use
c. Emerging deficiencies of secondary and micronutrients
d. All the above

502. Which of the following is a reason for decline in response of crops to nutrient management?
a. Insufficient input of organic sources because of other competitive uses
b. Acidification and aluminum toxicity in acid soils
c. Salinity and alkalinity in soils
d. All the above

503. Balanced Nutrition implies
a. No deficiencies
b. No excesses
c. No antagonisms
d. No negative interactions
e. All the above

Answers			
	496. c	499. d	502. d
	497. d	500. d	503. e
	498. e	501. d	

504. When nutrient management is done by optimizing the benefits from all possible sources of plant nutrients then it is called
a. IPNS b. IPNSS
c. INM d. ISFM

505. When nutrient management is embedded with a philosophy with social, economic and technological components then it is called
a. IPNS b. IPNSS
c. INM d. ISFM

506. When in nutrient management mainly organic matter management has social, economic and political dimensions then it is called
a. IPNS b. IPNSS
c. INM d. ISFM

507. When in nutrient management takes into account all factors of soil and crop management including management of all other inputs such as water, agrochemicals etc. besides nutrients then it is called
a. IPNS b. IPNSS
c. INM d. ISFM

508. Which of the following is/are (an) influencing factor for fertilizer use efficiency?
a. Genotype b. Irrigation
c. Weather
d. Soil management e. All the above

509. Which of the following is/are (an) influencing factor for FYM use efficiency?
a. Composting b. Quality
c. Phasing among seasons
d. All the above

510. Which of the following is/are (an) influencing factor for crop residues use efficiency?
a. Composition
b. Quality
c. Interval between application and planting
d. All the above

511. Which of the following is/are (an) influencing factor for green manure use efficiency?
a. P application
b. Water availability
c. Economics
d. All the above

512. Which of the following is/are (an) influencing factor for rhizobium use efficiency?
a. Quality of inoculum
b. P application
c. Whether legume grown for fodder or seed
d. All the above

513. Which of the following is/are (an) influencing factor for azolla use efficiency?
a. Moisture b. Temperature
c. Incorporation d. All the above

514. The inside of the bulb in a pH meter is filled with an electrolyte of high buffer capacity which is of
a. 0.1N solution of HCl
b. 1 N HCl
c. 2 solution of HCl
d. Solution of HCl

515. The electrode of the pH meter consists of what element in contact with a solution of potassium chloride?
a. Hg b. Mg
c. Zn d. Ag

Answers				
	504. a	507. c	510. d	513. d
	505. b	508. e	511. d	514. a
	506. d	509. d	512. d	515. a

516. A pH meter actually behaves as a
a. Direct current amplifier
b. Indirect emf device
c. Both
d. None of the above

517. A pH meter can be which of the following types?
a. Potentiometric or slide type
b. Direct reading
c. Vacuum tube voltmeter
d. Balanced circuit e. All the above

518. The most delicate part of the pH meter is
a. Glass electrode
b. Calomel electrode
c. Meter dial d. Sockets

519. The quantitative law basic to colorimetric analysis is
a. Beer's law b. Lambert's law
c. Both a and b d. None

520. Log I_0 / It = k.C is the basic notation for Beer's law where 'It' denotes which of the following?
a. Intensity of incident radiation
b. Intensity of transmitted radiation
c. Concentration in solution
d. A constant

521. In the above equation 'Io' denotes which of the following?
a. Intensity of incident radiation
b. Intensity of transmitted radiation
c. Concentration in solution
d. A constant

522. In the above equation 'k' denotes which of the following?
a. Intensity of incident radiation
b. Intensity of transmitted radiation
c. Concentration in solution
d. A constant

523. Of the following, example(s) of emission spectra is/are
a. Continuous spectrum
b. Band spectrum
c. Line spectrum
d. All the above

524. Common sampling tools and accessories for water samples are
a. Clean plastic or glass bottles preferable of 500ml capacity
b. Cotton or nylon thread and Water table recorder
c. Glass marking pencils
d. All the above

525. What precautions should be taken for proper water sampling?
a. Water sample should not be collected in dirty, used and contaminated bottles. The container should be transparent and preferably new
b. Time interval between collection and analysis of the sample should be short in order to get reliable results
c. If delay is inevitable, water sample must be protected against bacterial growth either by adding 2-3 drops of pure toluene or by keeping it under refrigeration for the time required
d. All the above

526. Important anions for water quality point of view is/are
a. Chloride
b. Carbonate and bicarbonate
c. Sulphate and nitrate
d. All the above

Answers				
	516. a	519. c	522. d	525. d
	517. e	520. b	523. d	526. d
	518. a	521. a	524. d	

527. Which of the following is a conversion factor for equivalent weight and atomic mass?
a. Eq.wt. = Atomic mass/ Electrovalence
b. Eq.wt. = Atomic mass × Electro-valence
c. Both a and b
d. None of the above

528. Which of the following is a conversion factor for milliequivalent weight and equivalent weight?
a. m.eq. = eq.wt./1000
b. 2. m.eq. = eq.wt. × 1000
c. 3. m.eq. = 1000/eq.wt
d. All the above

529. Which of the following is a conversion factor for ppm and percentage?
a. % × 10,000 = ppm/100
b. % × 10,000 = ppm/200
c. % × 10,000 = ppm
d. None of the above

530. Which of the following is a conversion factor for ppm and percentage?
a. m.eq. wt. × eq.wt. = milli gram (mg)
b. m.eq. /lit. × eq.wt. = ppm
c. % × 10,000 = ppm
d. None of the above

531. Which of the following is a conversion factor for ppm from equivalent weight?
a. m.eq. /lit. × eq.wt. = ppm
b. ppm = eq. wt/lit × m. eq.
c. Both a and b
d. None of the above

532. What is acidification?
a. Process whereby soil becomes acid (pH < 7) because acid parent material is present or in regions with high rainfall, where soil leaching occurs
b. Process whereby primary soil particles (sand, silt, clay) are bound together, usually by natural forces and substances derived from root exudates and microbial activity
c. Both a and b
d. None of the above

533. Which of the following is/are vital to the development of an effective soil testing?
a. The method of extraction of available nutrients
b. The response to fertilizer in relation to the measured available nutrient
c. Both a and b
d. None of the above

534. When soil test report gives quantities in parts per million (ppm), what factor is used for converting calcium in ppm to obtain milliequivalent?
a. 200 b. 120
c. 390 d. 230
e. 90

535. When soil test report gives quantities in parts per million (ppm), what factor is used for converting magnesium in ppm to obtain milliequivalent?
a. 200 b. 120
c. 390 d. 230
e. 90

536. When soil test report gives quantities in parts per million (ppm), what factor is used for converting potassium in ppm to obtain milliequivalent?
a. 200 b. 120
c. 390 d. 230
e. 90

Answers				
	527. a	530. a	533. c	536. c
	528. a	531. a	534. a	
	529. c	532. a	535. b	

537. When soil test report gives quantities in parts per million (ppm), what factor is used for converting sodium in ppm to obtain milliequivalent?
a. 200 b. 120
c. 390 d. 230
e. 90

538. When soil test report gives quantities in parts per million (ppm), what factor is used for converting aluminium in ppm to obtain milliequivalent?
a. 200 b. 120
c. 390 d. 230
e. 90

539. Preferred level of arsenic in soil is
a. < 20 b. < 1
c. < 35 d. > 10

540. Preferred level of cadmium in soil is
a. < 20 b. < 1
c. < 35 d. > 10

541. Preferred level of lead in soil is
a. < 20 b. < 1
c. < 35 d. > 10

542. Preferred level of mercury in soil is
a. < 20 b. < 1
c. < 35 d. > 10

543. When collecting soil samples which of the following is/are true?
a. Condition of the soil surface
b. Depth of the topsoil
c. Structure of the soil
d. Penetration of plant roots
e. All the above

544. Organic matter contributes to a number of the environmental interaction functions of soil
a. As a carbon store
b. It contributes to aggregate stability
c. Contributes to the water holding capacity of the soil
d. Contributes to the ability of soil to adsorb and degrade pollutants
e. All the above

545. Substances that support metabolism are
a. Minerals b. Vitamins
c. Water d. All the above

546. Litmus is a
a. Water-soluble dye
b. Extracted from certain lichens
c. Absorbed on to filter paper
d. All the above

547. Litmus test can be
a. Literal b. Metaphorical
c. Both d. None

548. Litmus is a
a. The resulting piece of paper becomes a pH indicator
b. Used to test the pH
c. Used to test materials for acidity
d. All of the above

549. Blue litmus paper turns what under acidic conditions?
a. Red b. Blue
c. Yellow d. Green

550. Red litmus paper turns what under basic conditions?
a. Red b. Blue
c. Yellow d. Green

551. The colour change in a litmus test occurring over the pH range of _____ at 25°C.
a. 4.5-8.3 b. 1-5
c. 7-14 d. None

Answers					
	537. d	540. b	543. e	546. d	549. a
	538. e	541. c	544. e	547. c	550. b
	539. a	542. d	545. d	548. d	551. a

552. The active ingredient of Litmus is called
a. Erythrolitmin b. Dimodium
c. Folin d. Ferroin

553. An organic compound is any member of a large class of chemical compounds whose molecules contain carbon, with exception of
a. Fats b. Proteins
c. Carbohydrates d. Carbides

554. An organic compound is any member of a large class of chemical compounds whose molecules contain carbon, with exception of
a. Fats b. Proteins
c. Carbohydrates d. Carbonates

555. An organic compound is any member of a large class of chemical compounds whose molecules contain carbon, with exception of
a. Fats b. Proteins
c. Carbohydrates d. Carbides

556. All organic systems share common goals and practices as
a. No use of synthetic fertilizers or pesticides, and no GMOs
b. Protection of the soil (from erosion, nutrient depletion, structural breakdown)
c. Promotion of biodiversity (e.g. growing a variety of crops rather than a single crop)
d. No drugs (e.g. antibiotics, hormones), and access to outdoor grazing, for livestock and poultry
e. All the above

557. Within organic farming framework, farmers develop their own organic production system, determined by which of the following factors?
a. Climate
b. Crop selection
c. Local regulations
d. Preferences of the individual farmer
e. All the above

558. The first scientific definition of acidity was proposed by
a. Antoine Lavoisier. b. Arheneous
c. Lewis d. Bronsted

559. The first modern definition of acids and bases was given by
a. Antoine Lavoisier b. Arrhenius
c. Lewis d. Brownsted

560. An Arheneous acid, when dissociated in water, typically yields
a. Positively-charged hydronium ion
b. A complementary negative ion.
c. Both a and b
d. None of the above

561. An Arheneous acid, when dissociated in water, typically yields
a. Charged hydroxide ion
b. A complementary positive ion
c. Both a and b
d. None of the above

562. The protonic (Brønsted-Lowry) definition of an acid's ability is
a. To donate protons (H^+) to another compound, called a base, in a chemical reaction
b. To accept protons (H^+) to another compound, called a acid, in a chemical reaction
c. Both a and b
d. None of the above

Answers				
	552. a	555. d	558. a	561. c
	553. d	556. e	559. b	562. a
	554. d	557. e	560. c	

563. In Bronsted-Lowry acid-base reactions, if X and Y are two species, the equilibrium is given as
a. $HX + Y^- \leftrightarrow HY + X^-$ then which of the following will be an acid
b. HX
c. HY
d. Both HX and HY are Bronsted-Lowry acids
e. None of the above

564. In Bronsted-Lowry acid-base reactions, if X and Y are two species, the equilibrium is given as
a. $HX + Y^- \leftrightarrow HY + X^-$ then which of the following will be a base
b. Y^-
c. X^-
d. Both X^- and Y^- are Bronsted-Lowry bases
e. None of the above

565. If the reaction in question above runs mostly to the left, then
a. HY is the stronger acid
b. X^- the stronger base
c. Both a and b
d. None of the above

566. If the reaction runs mostly to the right, then
a. Then HX is the stronger acid
b. Y^- the stronger base
c. Both a and b
d. None of the above

567. Acids and bases in the Brønsted-Lowry system occur in conjugate pairs; in the reaction, $HX \rightarrow H^+ + X^-$, then which of the following is a conjugate acid?
a. H^+ conjugate acid of the base X^-
b. X^- conjugate acid of the base X^-
c. HX is called the conjugate acid of the base X^-
d. All the above

568. Acids and bases in the Brønsted-Lowry system occur in conjugate pairs; in the reaction, $HX \rightarrow H^+ + X^-$, then which of the following is a conjugate base?
a. H^+ conjugate base of the base X^-
b. X^- conjugate base of the base X^-
c. X^- is called the conjugate base of the acid HX
d. All the above

569. Success of Atomic Absorption Spectrophotometer results from which of the following facts?
a. Operation is simple
b. Standardization is easy and straight forward
c. Detection limits are more
d. All the above

570. In which year Atomic Absorption Spectrophotometer was first made operational and popular?
a. 1960's b. 1970's
c. 1980's d. 1990's

571. In the equation given below

$(M + h\nu^o) \rightarrow M^* \rightarrow ((M + h\nu^o))$ .....

$(M + h\nu^o)$ signifies
a. Emission b. Absorption
c. Both a and b d. None

572. In the equation given below

$(M + h\nu^o) \rightarrow M^* \rightarrow ((M + h\nu^o))$ .....

$((M + h\nu^o))$ signifies
a. Emission b. Absorption
c. Both a and b d. None

Answers				
	563. c	566. c	569. d	572. a
	564. c	567. c	570. a	
	565. c	568. c	571. b	

573. In general there are how many types of Atomic Absorption Spectrophotometer?
a. 1 b. 2
c. 3 d. 4

574. Which of the following is/are the types of Atomic Absorption Spectrophotometer?
a. Single beam
b. Double beam
c. Dual channel double beam
d. Double beam sequential multielement
e. All the above

575. A double beam AAS is preferred over a single beam AAS because of
a. Better change in sample intensity
b. Better variations in electronic Norse
c. Detector sensitivity
d. All the above

576. Air acetylene gas used in AAS is used for the elements that
a. Form refractory compounds
b. Do not form refractory compounds
c. Relatively low ionization potential
d. All the above

577. Which of the following elements are not detected by Atomic Absorption Spectrophotometer?
a. Rare earth metals b. Alkali metal
c. Microelements d. All

578. Reagents in chemical laboratories comes as
a. AR b. CP
c. USP d. All the above
e. None of the above

579. Strength of laboratory supplied HCl is
a. 11 N b. 36 N
c. 10 N d. 9 N

580. Strength of laboratory supplied H_2SO_4 is
a. 11 N b. 36 N
c. 10 N d. 9 N

581. Strength of laboratory supplied HNO_3 is
a. 11 N b. 36 N
c. 10 N d. 9 N

582. Strength of laboratory supplied $HClO_4$ is
a. 11 N b. 36 N
c. 10 N d. 9 N

583. Approximate specific gravity of HCl in 11N strength is
a. 1.19 b. 1.84
c. 1.42 d. 1.51

584. Approximate specific gravity of H_2SO_4 in 11N strength is
a. 1.19 b. 1.84
c. 1.42 d. 1.51

585. Approximate specific gravity of HNO_3 in 11N strength is
a. 1.19 b. 1.84
c. 1.42 d. 1.51

586. Approximate specific gravity of $HClO_4$ in 11N strength is
a. 1.19 b. 1.84
c. 1.42 d. 1.51

587. Aqua regia and oxidant is prepared by mixing
a. 3 : 1 of HCl and HNO_3
b. 1 : 3 HCl and HNO_3
c. 3 : 1 of HNO_3 and HCl
d. None of the above

588. Besides filter papers which of the following can be used as filter acids?
a. Alundum powder b. Olite
c. Mineral filter acid d. All the above
e. None of the above

Answers						
	573. b	576. d	579. a	582. d	585. c	588. d
	574. e	577. a	580. b	583. a	586. d	
	575. d	578. d	581. c	584. b	587. a	

589. Which of the following can be a good replacement of mortars and pestles?
a. Mullite b. Synthetic
c. Both d. None

590. Which of the following is used as notation for mesh openings in sieves?
a. mm per opening = 16/meshes/inch
b. mm per opening = meshes/inch/16
c. 0.63 mm
d. 0.16 mm

591. Per cent total pore space is given by which of the following formula?
a. 100 – Bulk density/Particle density × 100
b. % Total pore space × Volume of soil 100
c. Volume of total pore space – Volume of capillary pore space
d. Volume of air filled pore space at Field capacity × 100/Volume of soil

592. Volume of total pore space is given by which of the following formula?
a. 100 – Bulk density/Particle density × 100
b. % Total pore space × Volume of soil/ 100
c. Volume of total pore space – Volume of capillary pore space
d. Volume of air filled pore space at Field capacity × 100/Volume of soil

593. Volume of air filled pore space at field capacity is given by which of the following formula?
a. 100 – Bulk density/Particle density × 100
b. % Total pore space × Volume of soil 100
c. Volume of total pore space – Volume of capillary pore space
d. Volume of air filled pore space at Field capacity × 100/Volume of soil

594. Air capacity of soil is given by which of the following formula?
a. 100 – Bulk density/Particle density × 100
b. % Total pore space × Volume of soil/ 100
c. Volume of total pore space – Volume of capillary pore space
d. Volume of air filled pore space at Field capacity × 100/Volume of soil

595. Sample size of compost for complete chemical, physical and biological analysis includes
a. 1 kg b. 2.5 kg
c. 5 kg d. 10 kg

596. Within how much period compost develops gradient in moisture, aeration etc.?
a. 1 days b. 2 days
c. 3 days d. 4 days

597. Which of the following is a critical criterion for optimum composting?
a. Size b. Bulkiness
c. Moisture d. Aeration

598. Which of the following is the optimum moisture content for compost?
a. 10 – 20% b. 30 – 40%
c. 50 – 60% d. 70 – 80%

599. The moisture content for well decomposed compost should not exceed_____.
a. 10% b. 25%
c. 50% d. 80%

Answers				
	589. c	592. b	595. b	598. c
	590. a	593. c	596. b	599. b
	591. a	594. d	597. c	

600. Particle size of well decomposed compost should be
a. < 2 mm b. < 3 mm
c. < 4 mm d. > 5 mm

601. Which of the following color denotes complete maturity?
a. Black b. White
c. Yellow d. Red

602. What is the impact of C/N ratio >20 of a compost on plant growth and seed germination?
a. Negative b. Position
c. Both a and b d. None

603. Respiration intensity measures compost maturity
a. Directly b. Indirectly
c. Not measure areas d. None

604. Which is a correct temperature variation of compost preparation?
a. Mesophillic < Thermophillic < Cooling < Maturity
b. Mesophillic < Cooling < Thermophillic < Maturity
c. Maturity < Mesophillic < Thermophillic < Cooling
d. Thermophillic < Mesophillic < Cooling < Maturity

605. Which of the following is a cellulose decomposer?
a. *Paecilomyces* b. *Bacillus*
c. *Azotobacter* d. All

606. Which of the following is a P solubilizer?
a. *Paecilomyces* b. *Bacillus*
c. *Azotobacter* d. All

607. Which of the following is a free living N_2 fixer?
a. *Paecilomyces* b. *Bacillus*
c. *Azotobacter* d. All

608. Addition of bio-inoculums to the composting maturity index
a. Improves decomposition
b. Slows decomposition
c. Fastens rapid decomposition
d. None of the above

609. For vegetables soluble salts content of matured composts should be
a. < 5 dS/m^{-1} b. > 5 dS/m
c. > 10 dS/m d. > 15 dS/m

610. For plantation crops soluble salts content of matured composts should be
a. < 1 b. < 2
c. < 3 d. None

611. "Two cooks method" of composting is also known as
a. Barkley method
b. Windrow method
c. Beccari method
d. Indore method

612. In India mostly composting is finished in
a. 2 – 3 month b. 3 – 4 month
c. 5 – 6 month d. 1 year

613. Which of the following is a popular method of composting in India?
a. ADCO b. Indore
c. NADEP d. Bangalore
e. All the above

614. ADCO process of composting was introduced by
a. Hutchinson and Richards
b. Wiley
c. Howard
d. Richard

Answers					
	600. c	603. b	606. b	609. a	612. b
	601. a	604. a	607. c	610. c	613. e
	602. a	605. a	608. a	611. a	614. a

615. If liming materials have passing of 20–60 mesh than its efficiency is
a. 100% b. 20%
c. 60% d. 10%

616. Super phosphates are added in compost
a. To fortify the P content
b. As a preservative
c. Both a and b
d. None of the above

617. Who introduced the Indore Method of compost preparation?
a. Hutchinson b. Wiley
c. Howard d. Richard

618. Bangalore process of composting was introduced by
a. Acharya b. Howard
c. Huticliensa d. Wong

619. Bangalore process of composting is a
a. Aerobic method
b. Anaerobic method
c. Both a and b
d. None of the above

620. Earthworm casts contain how many times more NPK than ordinary composts?
a. 1 – 2 b. 3 – 4
c. 5 – 10 d. 15 – 20

621. Epigeic earthworms
a. Make burrows in soil
b. Do not make burrow in soil
c. Are subsoil dwellers
d. Are found in soil

622. Endogeic earthworms
a. Make burrows in soil
b. Do not make burrow in soil
c. Are subsoil dwellers
d. Are found in soil

623. Mesogeic earthworms
a. Make burrows in soil
b. Do not make burrow in soil
c. Are subsoil dwellers
d. Are found in soil

624. How much percentage of moisture is maintained in vermicomposting?
a. 10 – 20 % b. 30 – 40%
c. 50 – 60% d. 80 – 90%

625. How much temperature is maintained in vermicomposting?
a. 20° C b. 22 – 24° C
c. 28 – 32° C d. > 35° C

626. Amount of organic N fractions is generally highest in
a. Surface soils
b. Sub-surface soils
c. Both
d. None of the above

627. Of the following which is/are the organic stabilizing agents?
a. Transient b. Temporary
c. Persistent d. All

628. Transient organic stabilizing agents are chiefly due to
a. Microbial products
b. Plant derived products
c. Both
d. None of the above

629. Temporary organic stabilizing agents are chiefly due to
a. Microbial products
b. Plant derived products
c. Fungal extension
d. Humic materials

630. Lime can act as
a. Binding agent b. Aggregating agent
c. Neutralizing agent d. All

Answers						
	615. c	618. a	621. a	624. c	627. d	630. d
	616. c	619. b	622. c	625. c	628. c	
	617. c	620. c	623. d	626. a	629. c	

631. Persistent binding agents are due to
a. Microbial products
b. Plant derived products
c. Fungal extension
d. Humic materials

632. Lowest hierarchical order of aggregation models in soil consists of size varying from
a. < 2 mm diameter
b. < 250 mm diameter
c. > 250 mm diameter
d. None of the above

633. Binding agents in soils often determine
a. Age
b. Size
c. Stability of aggregates
d. All

634. Liming factor for binding in soil is
a. 1 – 3 b. 2 – 5
c. 3 – 6 d. 4 – 9

635. Which of the following crop responds highly to lime application?
a. Pigeonpea b. Soybean
c. Cotton d. All the above
e. None of the above

636. Which of the following crop responds medium to lime application?
a. Gram b. Lentil
c. Peas d. All the above
e. None of the above

637. Which of the following crop responds low to lime application?
a. Millets b. Paddy
c. Mustard d. All the above
e. None of the above

638. Gypsum requirement method was given by
a. Bower and Huss
b. Richard *et al.*
c. Both
d. None of the above

639. Total sulphur estimation in soils method was given by
a. Johnson and Nishita
b. Bardsley and Lancaster
c. Chesnin and Yien
d. Williams

640. Reserve sulphur estimation in soils method was given by
a. Johnson and Nishita
b. Bardsley and Lancaster
c. Chesnin and Yien
d. Williams

641. Soluble and adsorbed sulphur estimation in soils method was given by
a. Johnson and Nishita
b. Bardsley and Lancaster
c. Chesnin and Yien
d. Williams

642. The sulphur status of soil in ppm as extracted by 0.15% $CaCl_2$ is interpreted very low when the sulphur content is
a. 0 – 5 ppm
b. 5 – 10 ppm
c. 10 – 15 ppm
d. 15 – 20 ppm
e. 20 – 25 ppm

643. The sulphur status of soil in ppm as extracted by 0.15% $CaCl_2$ is interpreted low when the sulphur content is
a. 0 – 5 ppm b. 5 – 10 ppm
c. 10 – 15 ppm d. 15 – 20 ppm
e. 20 – 25 ppm

Answers					
	631. d	634. a	637. d	640. b	643. b
	632. a	635. d	638. c	641. c	
	633. d	636. d	639. a	642. a	

644. The sulphur status of soil in ppm as extracted by 0.15% $CaCl_2$ is interpreted medium when the sulphur content is
a. 0 – 5 ppm b. 5 – 10 ppm
c. 10 – 15 ppm d. 15 – 20 ppm
e. 20 – 25 ppm

645. The sulphur status of soil in ppm as extracted by 0.15% $CaCl_2$ is interpreted high when the sulphur content is
a. 0 – 5 ppm b. 5 – 10 ppm
c. 10 – 15 ppm d. 15 – 20 ppm
e. 20 – 25 ppm

646. The sulphur status of soil in ppm as extracted by 0.15% $CaCl_2$ is interpreted very high when the sulphur content is
a. 0 – 5 ppm b. 5 – 10 ppm
c. 10 – 15 ppm d. 15 – 20 ppm
e. 20 – 25 ppm

647. Which of the following can be used to stabilize the turbidity in sulphur determination?
a. Gelatin b. Gum Arabic
c. Gum acacia d. All

648. Which of the following can be used to stabilize the turbidity in sulphur determination?
a. Tween 80
b. Polyvinyl alcohol
c. Orbital
d. All

649. In which type of soils adsorbed sulphur will be more?
a. Acid soils
b. Arid soils
c. Neutral pH soils
d. None

650. 0.5 M $NaHCO_3$ extracts mainly which form of sulphur?
a. Organic b. Inorganic
c. Available d. Total

651. 0.15% $CaCl_2$ extracts mainly which form of sulphur?
a. Organic b. Inorganic
c. Available d. Total

652. 0.01 M $Ca(H_2PO_4)_2$ extracts mainly which form of sulphur?
a. Organic b. Inorganic
c. Available d. Total

653. Water extracts mainly which form of sulphur?
a. Organic b. Inorganic
c. Available d. Total

654. Morgan's solution extracts mainly which form of sulphur?
a. Organic b. Inorganic
c. Available d. Total

655. Diphenyl thiocarbozene is also known as
a. Mureoxide b. Dithiozone
c. Ferroin d. Mohr's salt

656. Who advocated the use of redox indicator Diphenylamine in organic carbon estimation?
a. Simacov b. Wilcox
c. Richards d. Bray

657. The total N of a soil can be a
a. Immediate fertility indicator
b. Potential fertility indicator
c. Mineralizing fertility indicator
d. Active fertility indicator

Answers					
	644. c	647. d	650. b	653. c	656. a
	645. d	648. d	651. c	654. c	657. b
	646. e	649. a	652. b	655. b	

658. The mineralizable N status of soil can save as
a. Immediate fertility indicator
b. Potential fertility indicator
c. Mineralizing fertility indicator
d. Active fertility indicator

659. For NO_3^- analysis
a. Plant test is a better indicator than soil analysis
b. Soil test is a better indicator than plant analysis
c. Both the tests is a better indicator than plant analysis
d. Water test is a better indicator than both plants soil

660. The intensity of molybdenum blue colour is influence by
a. Temperature b. Shaking speed
c. Both a and b d. None

661. In the molybdenum blue colour analysis, interferences of which ion is a common feature?
a. As b. Si
c. Ge d. B
e. All the above

662. The molybdenum blue complex is sensitive to
a. Acidity
b. Concentration of molybdate
c. Concentration of reductant
d. All

663. NH_4OAc is commonly used to extract exchangeable K in soil because
a. It's ionic diameter is same as K^+
b. It enters into interstitial structure
c. Both a and b
d. None of the above

664. To reduce loss of organic materials in NaOAc extraction of K, which of the following electrolyte is used?
a. Isopropyl alcohol b. Ethyl alcohol
c. Methyl alcohol d. None

665. Who gave the method of lime requirement?
a. Schofield b. Woodruff
c. Pratt and Blair d. None

666. Who has given the method of lime requirement ?
a. Hunter b. Bergmann
c. AOAC d. All the above
e. None of the above

667. Who advocated the use of $BaCl_2$–TEA buffer for equilibration of soil in exchangeable H + Al determination?
a. Mehlich b. Rich
c. Woodruff d. Pratt and Blair

668. Who advocated the use of Ca-acetate–TEA buffer for equilibration of soil in exchangeable H + Al determination?
a. Mehlich b. Rich
c. Woodruff d. Pratt and Blair

669. Who advocated the use of Ca-acetate–P–nitrophenol buffer for equilibration of soil in exchangeable H + Al determination?
a. Mehlich b. Rich
c. Woodruff d. Pratt and Blair

670. Who advocated the use of Ca-acetate–p–nitrophenol–TEA buffer for equilibration of soil in exchangeable H + Al determination?
a. Mehlich b. Rich
c. Woodruff d. Pratt and Blair

Answers					
	658. d	661. e	664. a	667. a	670. d
	659. c	662. d	665. d	668. b	
	660. c	663. a	666. d	669. c	

671. The minimum standards for liming material to be in a powdered state for field application is
   a. 70% pass through 3 – 10 mesh sieve
   b. 20% pass through 3 – 10 mesh sieve
   c. 50% pass through 3 – 10 mesh sieve
   d. 60% pass through 3 – 10 mesh sieve

672. If liming materials have passing of 80–100 mesh than its efficiency is
   a. 100% b. 60%
   c. 20% d. 10%

Answers 671. a
672. a

14

Soil Informatics

QUESTIONS :

1. The precision farming data base generally includes which of the following?
   a. Crop characteristics like, stage of the crop, crop health, nutrient requirement, etc.
   b. Detailed soil layer with physical and chemical properties, depth, texture, nutrient status, salinity
   c. Toxicity, soil temperature, productivity potential, etc.
   d. All the above

2. Precision Agriculture" is an advanced e-agriculture application. It makes use of which of the following major components of technology?
   a. Geographical Information Systems (GIS) for analysis and management of spatial data and mapping
   b. Remote Sensing (RS) to identify
   c. Global Positioning Systems (GPS) to locate and define spatial features or activities that contributes to the quality of site-specific practices
   d. Variable Rate Technology (VRT) allowing targeted, site-specific input applications
   e. Yield monitoring for recording crop productivity as an historical database for crop management
   f. All the above

3. Which of the following is/are the application of computer technology?
   a. Prioritization of macro/micro watersheds for implementation and impact assessment of watershed through GIS and Remote Sensing (projects at national, state, district, taluka and levels. Projects already being carried out under DST)
   b. Forecasting of outbreak of pests and diseases based on soil water status and plant stress indicators in important crops such as rice, wheat, sugarcane, cotton, chilli, , pigeon pea, tea etc.
   c. Development of decision support system for precise management of resources at farm level at least in commercial / fruit / flower crops to begin with
   d. All the above

4. Which of the following is/are the application of computer technology?
   a. Soil mapping at cadastral scale using high resolution spatial, spectral and radiometric resolutions
   b. Quantification of soil loss
   c. Detection of water logging due to rising ground water table
   d. All the above

5. Which of the following is/are the application of computer technology?
   a. Delineation of salt-affected soils in black soil and sandy regions
   b. Soil moisture estimation and mapping using micro wave/optical/thermal remote sensing techniques in surface and root zone depth
   c. Land surface temperature estimation using thermal and microwave remote sensing techniques
   d. All the above

Answers 1. d 2. f 3. d 4. d 5. d

5a. Which of the following is/are the application of computer technology?
   a. Hyper spectral studies on soils to establish quantitative relationship between spectral reflectance and soil properties
   b. Development of digital techniques for a variety of applications using GIS techniques for e.g., soil suitability to crops, land capability classification and land irrigability assessment etc.
   c. Yield models by integration of biophysical simulation and regional level crop models
   d. All the above

6. Which of the following is/are the application of computer technology?
   a. Land information system
   b. Market intelligent
   c. Pest management system
   d. All the above

7. Which of the following can be a suitable area for computer application?
   a. Identification of crops and estimation of area and production of short duration crops grown in fragmented land holdings
   b. Forecasting of droughts/floods
   c. Detection of crop stress due to nutrients, pests and diseases and quantification of their effects on crop yield
   d. Automation of land evaluation procedures for a variety of applications using GIS techniques
   e. All the above

8. Which of the following can be a suitable area for computer application?
   a. Information on sub-surface soil horizons
   b. Extending precision farming database to smaller farm size and/or diverse crops/cropping systems
   c. Developing decision support systems for management of biotic and abiotic stresses at the farm level
   d. More accurate yield models
   e. All the above

9. Which of the following can be a suitable area for computer application?
   a. Estimation of depth of water in reservoirs and quality assessment of ground water
   b. Better than 1m contours for watershed development plan at the micro level
   c. Use of remote sensing and precision farming technologies in intercropping/ multiple cropping situations
   d. Identifying ways and means of reducing the cost of RS, GIS and precision farming technologies and time gap in collection, interpretation and dissemination of data to enable their usage on a large scale
   e. All the above

10. Which of the following can be a suitable area for computer application?
   a. Convincing evidence to prove the utility and economic viability of these technologies so as to mobilize support for R and D work
   b. Human resource development to hasten the process of large scale use of unexplained and cutting edge technologies that have tremendous scope and potential
   c. Both a and b
   d. None of the above

Answers 5a. d 6. d 7. d 8. e 9. e 10. c

11. Information technology which is one of the most promising technologies of the present era, can be utilized for this very purpose using which of the following?
    a. Information support systems
    b. Decision support systems
    c. Expert support systems
    d. All the above

12. Which of the following can be a suitable area for computer application?
    a. The crop forecasting, input management command
    b. Watershed management
    c. Land and water resources development
    d. All the above

13. Which of the following can be a suitable area for computer application?
    a. Drinking water potential mapping
    b. Precision management natural disaster management
    c. Fishery management
    d. Hill area development and post harvest management
    e. All the above

14. The growers/land users urgently need information about the
    a. Soil attribute space: Soil fertility data
    b. Soil functions: Soil affects crop production factor, also affecting thereby many alternative land use systems
    c. Soil land use distribution: The georeferenced occurrence of the soils/ lands can be inventorized and disseminated to various land users
    d. Soil-Factor relationships: Soil genetics can forecast future processes of soils induced by local and global changes of systems
    e. All the above

15. The SIS has to support following which of the following principles?
    a. Identification of data and methods
    b. Data selection, querying and data evaluation
    c. Disposition of results including display and documentation
    d. All the above

16. Soil Information Systems are needed to
    a. Establish the potentials and limitations of different kinds of soils for crop production
    b. Keep track of different forms of soil degradation problems like acidification, jhuming, erosions, pollutions etc.
    c. To establish the circumstances which lead different land use systems, soil and land use productivity can be maintained or improved and the situations leading to a particular kind of practices these are degraded
    d. To serve as a basis of transfer of technology and
    e. To aid in decision making level.
    f. All the above

17. To provide the necessary data for improved mapping, modeling and monitoring of changes of world soil and terrain resources. Which of the following SIS is used?
    a. SOTER b. HUMSOTER
    c. LASOTER d. RAMSOTER

18. 'HunSOTER' describes which country's soil information system?
    a. Hungary b. Poland
    c. USA d. England

Answers					
	11. d	14. e	17. a		
	12. d	15. d	18. a		
	13. e	16. f			

19. 'ROMSOTER-200' describes which country's soil information system?
    a. Hungary b. Poland
    c. USA d. Romania

20. 'LASOTER' describes which country's soil information system?
    a. Hungry b. Latin America
    c. USA d. Romania

21. 'FISBOBGR' describes which country's soil information system?
    a. Germany b. Latin America
    c. USA d. Romania

22. 'NIBIS' describes which country's soil information system?
    a. Germany b. Latin America
    c. USA d. Romania

23 'HESBIS' describes which country's soil information system?
    a. Germany b. Latin America
    c. USA d. Romania

24. 'SOPIC' describes which country's soil information system?
    a. Germany b. Latin America
    c. USA d. Romania

25. 'PUGIS' describes which country's soil information system?
    a. Germany
    b. Czech Republic
    c. USA
    d. Romania

26. 'NIJOS' describes which country's soil information system?
    a. Germany
    b. Czech Republic
    c. Norway
    d. Romania

27. 'ESPLAN' describes which country's soil information system?
    a. Germany
    b. Czech Republic
    c. Norway
    d. Italy

28. 'Land IS' describes which country's soil information system?
    a. Germany b. UK
    c. Norway d. Italy

29. 'LIS' describes which country's soil information system?
    a. Germany b. UK
    c. Norway d. Greece

30. 'ISRIC' describes which country's soil information system?
    a. The Netherlands b. UK
    c. Norway d. Greece

31. 'ILWIS' describes which country's soil information system?
    a. The Netherlands b. UK
    c. Norway d. Greece

32. 'RSLIS' describes which country's soil information system?
    a. The Netherlands b. Romania
    c. Norway d. Greece

33. 'NASIS' describes which country's soil information system?
    a. The Netherlands b. Romania
    c. USA d. Greece

34. 'CRIES' describes which country's soil information system?
    a. The Netherlands b. Romania
    c. USA d. Greece

Answers									
	19. d	22. a	25. b	28. b	31. a	34. a			
	20. b	23. a	26. c	29. b	32. a				
	21. a	24. a	27. d	30. a	33. c				

35. 'ARS' describes which country's soil information system?
    a. Australia b. Romania
    c. USA d. Greece

36. 'UMSIS' describes which country's soil information system?
    a. Australia b. Romania
    c. China d. Greece

37. 'PLANTAGRO' describes which country's soil information system?
    a. Australia b. Thailand
    c. China d. Greece

38. 'NRIS' describes which country's soil information system?
    a. India b. Thailand
    c. China d. Greece

39. Some of the other applications of SIS can be
    a. Assessment of soil and land productivity potential and constraints
    b. Assessment of soil quality
    c. Soil and land use planning
    d. Use of automated land evaluation System
    e. All the above

40. Some of the other applications of SIS can be
    a. Soil and Land irrigability and water management
    b. Use of Soil Database in Watershed Management
    c. Estimation of pedotransfer functions from SIS
    d. Physical rating index, Soil Physical Constraints and Soil Management Recommendations
    e. All the above

41. Some of the other applications of SIS can be
    a. Tillage rating of soils and developing Tillage Guide
    b. Root zone Capacity mapping
    c. Integrated nutrient management
    d. Neural network approach to monitor heavy metal contamination
    e. All the above

42. Future strategies for development of Soil and Land information systems and its application is/are
    a. Build up of national Soil and Terrain Resources Database
    b. Building up of Soil database at State/ District/Block level for making a national network
    c. Requirement of database processing, evaluation and interpretation
    d. Establishment of Long term Monitoring Plots
    e. All the above

43. Future strategies for Development of Soil and Land information systems and its application is/are
    a. Launching of a website
    b. Use of Fuzzy rules and GIS in soil prediction
    c. Linking of digital soil maps and databases to simulation models
    d. Challenges of local soil management
    e. All the above

Answers			
	35. a	38. a	41. e
	36. c	39. e	42. e
	37. b	40. e	43. e

44. Soil Information Systems are needed to
    a. Establish the potentials and limitations of different kinds of soils for crop production
    b. Keep track of different forms of soil degradation problems like acidification, jhumings, erosions, pollutions etc.
    c. To establish the circumstances which lead different land use systems, soil and land use productivity can be maintained or improved and the situations leading to a particular kind of practices these are degraded
    d. All the above

45. Soil Information Systems are needed to
    a. To serve as a basis of transfer of technology
    b. To aid in decision making level
    c. Both a and b
    d. None of the above

46. CRES (Crop Environment Resource Synthesis) has developed DSSIFER model for
    a. Fertilizer recommendation
    b. Maize
    c. Groundnut d. Wheat

47. Geographical information systems (GIS) is a process to
    a. Input b. Store
    c. Retrieve d. Analyze
    e. Display geographic data
    f. All the above

48. Why robotics is used in agriculture?
    a. Require intelligence and quick decisions
    b. Increasing Market for high quality products
    c. Both a and b d. All the above

49. Biological objects' characteristics in relation to robotics
    a. Physical – shape, size, mass, texture
    b. Dynamic – Friction (for gripping the plants, animals etc.)
    c. Optical – reflectance (weeds, flowers with honey, male insects' identification etc.)
    d. Sonic- vibration (differentiation of watery and tissue objects)
    e. Breathing activity of harvested objects
    f. All the above

50. Agricultural imaging is
    a. Selective harvesting
    b. Machine guidance
    c. Plant identification
    d. Plant health assessment
    e. All the above

51. The precision farming data base generally includes which of the following?
    a. Microclimate data (seasonal and daily) about the canopy temperature, wind direction and speed, humidity etc.
    b. Surface and sub surface drainage conditions
    c. Irrigation facilities, water availability, and other planning inputs of interest
    d. All the above

52. Decision support systems are basically
    a. Interactive computerized tools under user control that help in making decisions
    b. Have analytical capabilities (graphical and modeling)
    c. Allow combining computer input and output with judgment to produce meaningful information
    d. Are custom fit
    e. All the above

Answers			
	44. d	47. f	50. e
	45. c	48. c	51. e
	46. c	49. e	52. e

53. Objectives of decision support systems is/ are
    a. Insights to key issues and problems in decision type information systems
    b. Understand the level in decision hierarchy
    c. Know the different solution approaches
    d. All the above

54. DSS are required in agriculture because of which of the following?
    a. Right decisions are important from both economic and environmental points of view
    b. There is uncertainty in weather and markets
    c. Decision making is complex
    d. Available information is incomplete
    e. All the above

55. Who needs a DSS?
    a. Farmers
    b. Extension advisers
    c. Development departments
    d. Scientists
    e. All the above

56. Who needs a DSS?
    a. Planners
    b. Consultants
    c. Insurance companies
    d. Industry
    e. All the above

57. What type of decisions is required for making DSS?
    a. Selection of crops and cropping systems
    b. Crop management
    c. Variety
    d. Irrigation
    e. All the above

58. What type of decisions is required for making DSS?
    a. Fertilizer b. Pest control
    c. Natural resource management
    d. All

59. What type of decisions is required for making DSS?
    a. Farm management
    b. Watershed/command area/regional management
    c. Land use planning
    d. All the above

60. What are the characteristics of these decisions?
    a. Objective/Structured
    b. Subjective/Unstructured
    c. Both a and b
    d. None of the above

61. BASIC acronym stands for
    a. Beginner's All-purpose Symbolic Instruction Code
    b. Begin all simple coding
    c. Begin assemble simulate instruct code
    d. None of the above

62. BASIC computer program uses which of the following?
    a. Words b. Symbols
    c. Numbers d. All the above

63. Kinds of computer languages, include which of the following?
    a. Pascal b. C++
    c. FORTRAN d. COBOL
    e. BASIC f. All the above

64. Older versions of DOS (pre-5.0) came with a version of BASIC is called as
    a. GW-BASIC b. MW-BASIC
    c. CW-BASIC d. GM-BASIC

Answers							
	53. d	56. e	59. d	62. d
	54. e	57. d	60. c	63. f
	55. e	58. d	61. a	64. a

65. Newer versions of DOS come with
    a. QBasic b. G-BASIC
    c. M-BASIC d. C-BASIC

66. User interface objects in a computer programme include which of the following?
    a. Buttons b. Menus
    c. Text boxes d. All the above

67. ICT means
    a. Information and communication technology
    b. Information for computer transfer
    c. Intelligent computing technology
    d. All the above

68. Computer network examples includes
    a. LAN b. WAN
    c. MAN d. All the above

69. A modem is required when connectivity is through
    a. Telephone b. Cable
    c. Leased line d. All the above

70. Netscape Navigator, Internet Explorer and Lynx are
    a. Browser software
    b. Internet account
    c. Modem
    d. None of the above

71. Which of the following is a search engine?
    a. google b. yahoo.com
    c. msn.com d. All the above

72. Boolean logical operators are
    a. AND b. OR
    c. NOT d. All the above

73. Ikisan is an initiative of which organization?
    a. ITC
    b. Nagarjuna group
    c. Chambal group
    d. None of the above

74. Village Knowledge centre is an initiative of which organization?
    a. MSSRF
    b. Tata social welfare
    c. ITC
    d. None of the above

75. Who invented the first calculating machine?
    a. Abacus
    b. Bebetus
    c. Babbage
    d. None of the above

76. The permanent memory of a computer is stored in
    a. ROM
    b. RAM
    c. Both a and b
    d. None of the above

77. The first system software to run on a computer was
    a. DOS
    b. Macintosh
    c. Windows
    d. None of the above

78. Monitor of a computer can be a
    a. Monologue
    b. Digital
    c. Both a and b
    d. None of the above

79. Basic component of a computer network include
    a. Modems b. VSAT
    c. Routers d. Hubs
    e. All the above

Answers							
	65. a	68. d	71. d	74. a	77. a
	66. d	69. d	72. d	75. a	78. c
	67. a	70. a	73. b	76. a	79. e

80. Page maker is a
a. Text processing software
b. Graphics software
c. Both a and b
d. None the above

81. A database management (DBMS) package software is
a. FOXPRO b. ORACLE
c. REFLEX d. MS-ACCESS
e. All the above

82. Which of the following spreadsheets can also be used as a data storage, retrieval and manipulation package?
a. Lotus-1-2-3 b. QUATROPRO
c. MULTIPLAN d. MS EXCELL
e. All the above

83. Which of the following is a statistical software package?
a. MSTATC b. MATLAB
c. MINITAB d. SAS
e. All the above

84. Transmission media for a network may be of which type?
a. Baseband signalling
b. Broadband signalling
c. Both a and b
d. None of the above

85. Which of the following is a network type example?
a. Peer to peer b. Hierarchical
c. Both a and b d. None

86. Every internet email has at least how many parts?
a. One b. Two
c. Three d. None

87. The domain name in an internet email is
a. Mail server address
b. Different organizations
c. Both a and b
d. None of the above

88. Archie is a search program that will look through different
a. Files b. Data
c. Both a and b d. None

89. Veronica is a
a. Gopher tool b. Ftp tool
c. Both a and b d. None

90. Basic component of database activities includes
a. Database management system
b. Database administrator
c. Both a and b
d. None of the above

91. Which of the following was the first computer?
a. ENIAC b. Univac
c. Both a and b d. None

92. The smallest data element in a database management system is
a. Field
b. Data element
c. File
d. None of the above

93. Functions of the a database administrator includes
a. Creation of the database
b. Performance optimization
c. Data protection, authorization
d. All the above

Answers					
80. a	83. e	86. c	89. a	92. a	
81. e	84. c	87. a	90. c	93. d	
82. e	85. c	88. a	91. a		

94. Which of the following is a major database CDROM in agriculture?
a. CABCD b. ASFA
c. VETCD d. RURAL
e. All the above

95. SPAR1 is a statistical package developed at
a. IARI b. IASRI
c. ISI d. None of these

96. The first generation computers used which of the following technology?
a. Thermionic valve
b. Transistor technology
c. Microprocessor based technology
d. Chip technology

97. Contemporary computing is based on which of the following technology?
a. Thermionic valve
b. Transistor technology
c. Microprocessor based technology
d. Chip technology

98. Which of the following is a type of computer virus?
a. Boot sector b. File infector
c. Trojan horse d. File destroyer
e. All the above

99. Which of the following is a GIS package?
a. ARCINFO b. PAMAP
c. MAPINFO d. GRASS
e. All the above

100. Which of the following is a programme for creating the mail message in email?
a. Eudora b. Pine
c. Window d. Telix
e. All the above

101. Which of the following is an effective email transfer agent?
a. SMTP b. POP
c. IMAP d. UUCP
e. All the above

102. DSSAT (Decision Support System for Agrotechnology Transfer) was developed by
a. IBSNAT b. NRSA
c. ARS d. None of these

103. CRES (Crop Environment Resource Synthesis) has developed CERES model for
a. Rice b. Maize
c. Sorghum d. All the above

104. CRES (Crop Environment Resource Synthesis) has developed PNUTGRO model for
a. Rice b. Maize
c. Groundnut d. Wheat

105. CRES (Crop Environment Resource Synthesis) has developed SOYGRO model for
a. Rice b. Soybean
c. Groundnut d. Wheat

Answers				
94. e	97. d	100. e	103. d	
95. b	98. e	101. e	104. c	
96. a	99. e	102. a	105. b	

15

Books & Authors

Questions :

1. The book 'Biofertilizers in Agriculture' was written by
   a. Stevenson
   b. Rich and Kunze
   c. Hillel
   d. Subba Rao
2. The book 'Clay Mineralogy' was written by
   a. Marshall b. Grim
   c. Burges and Raw d. Oswall
3. The book 'Principle of Soil Chemistry' was written by
   a. K.H.Tan b. Kononova
   c. Adams d. Russel
4. The book 'Soil Condition and Plant Growth' was written by
   a. K.H.Tan b. Kononova
   c. Adams d. Russel
5. The book 'Biochemistry of Soil' was written by
   a. Stevension
   b. Rich and Kunze
   c. Hillel
   d. Subba Rao
6. The book 'Soil Biology' was written by
   a. Marshall b. Grim
   c. Burges and Raw d. Oswall
7. The book 'Soil Acidity and Liming' was written by
   a. K.H.Tan b. Kononova
   c. Adams d. Russel
8. The book 'Soil Organic Matter' was written by
   a. K.H.Tan b. Kononova
   c. Adams d. Russel
9. The book 'Soil Fertility in India' was written by
   a. J.S. Kanwar b. Yawalkar
   c. Agarwal d. Black
10. The book 'Physical Chemistry and Mineralogy of Soil' was written by
    a. Marshall b. Bear
    c. Black d. Alexander
11. The book 'Chemistry of Soil' was written by
    a. Marshall b. Bear
    c. Black d. Alexander
12. The book 'Soil Clay Mineralogy' was written by
    a. Stevenson
    b. Rich and Kunze
    c. Hillel
    d. Subba Rao
13. The book 'Soil Microorganisms and Plant Growth' was written by
    a. Stevenson
    b. Rich and Kunze
    c. Hillel
    d. Subba Rao
14. The book 'Soil Physics' was written by
    a. Oswall b. Hillel
    c. J.S. Kanwar d. Stevenson
15. The book 'Fundamental of Soil Physics' was written by
    a. Oswall b. Hillel
    c. J.S. Kanwar d. Stevenson

Answers										
	1. d	4. d	7. c	10. a	13. d
	2. b	5. a	8. b	11. b	14. a
	3. a	6. c	9. c	12. b	15. b

16. The book 'Soil Plant Relationship' was written by
    a. Marshall b. Bear
    c. Black d. Alexander

17. The book 'Soil Fertility-Theory and Practices' was written by
    a. J.S. Kanwar b. Yawalkar
    c. Agarwal d. Black

18. The book 'Biochemistry of Soil' was written by
    a. Oswall b. Hillel
    c. J.S. Kanwar d. Stevension

19. The book 'Manures and Fertilizers' was written by
    a. J.S. Kanwar b. Yawalkar
    c. Agarwal d. Black

20. The book 'Soil Physics' was written by
    a. Baver and Gardner
    b. Ahmad
    c. Ayers
    d. Bargava

21. The book 'Salt Affected Soils of India' was written by
    a. Baver and Gardner
    b. Ahmad
    c. Ayers
    d. Bargava

22. The book 'Soil Erosion and Its Control' was written by
    a. Baver and Gardner
    b. Ahmad
    c. Ayers
    d. Bargava

23. The book 'Soil Physics' was written by
    a. B.P. Gildyal and R.P. Tripathi
    b. A.N. Puri
    c. R.A. Singh
    d. S.P. Dakshinamoorthy

24. The book 'Soil and Their Physics and Chemistry' was written by
    a. B.P. Gildyal and R.P. Tripathi
    b. A.N. Puri
    c. R.A. Singh
    d. S.P. Dakshinamoorthy

25. The book 'Soil Physical Analysis' was written by
    a. B.P. Gildyal and R.P. Tripathi
    b. A.N. Puri
    c. R.A. Singh
    d. S.P. Dakshinamoorthy

26. The journal 'Soil Science Society of America Journal' is published from which of the following country?
    a. America
    b. The Netherlands
    c Australia
    d. England

27. The journal 'Plant and Soil' is published from which of the following country?
    a. America
    b. The Netherlands
    c Australia
    d. England

28. The journal 'Canadian Journal of Soil Science' is published from which of the following country?
    a. Canada
    b. The Netherlands
    c. Germany
    d. England

Answers					
	16. c	19. b	22. b	25. c	28. a
	17. a	20. a	23. a	26. a	
	18. d	21. d	24. b	27. b	

29. The journal 'The Indian Journal of Agricultural Sciences' is published from which of the following country?
    a. England b. India
    c. Canada d. Australia

30. The journal 'Australian Journal of Soil Science' is published from which of the following country?
    a. Canada b. Australia
    c. Germany d. England

31. The journal 'European Journal of Soil Science' is published from which of the following country?
    a. Canada
    b. The Netherlands
    c. Germany
    d. England

Answers		
	29. b	
	30. b	
	31. d	

16

Remote Sensing In Agriculture

QUESTIONS :

1. Which of the following was the first Indian experimental satellite ?
   a. Aryabhat b. Apple
   c. IRS-1A d. Resourcesat
2. Which of the following sensors was/were used in IRS-1C ?
   a. PAN b. LISS
   c. WiFS d. All
3. Which of the following satellite is the most recent one ?
   a. IRS-1D b. IRS-P2
   c. Oceansat-1 d. Risat
4. Which of the following band of LISS camera of IRS-1A/B satellite is used for chlorophyll absorption ?
   a. Band 1 b. Band 2
   c. Band 3 d. Band 1 and 3
5. Spatial resolution of Cartosat-2 satellite is
   a. nearly 1 m b. 5.8 m
   c. 188 m d. 32 m
6. Which of the following band is categorized for visible wavelength in Multi Spectral Scanner ?
   a. 1 b. 2
   c. 3 d. 4
7. What is the distance of sun-synchronous satellite from the earth surface ?
   a. 600 - 1000 km b. 1000 - 2000 km
   c. 2000 - 3000 km d. 36000 km
8. Which of the following resolution describes (the capability of identifying nearly kept two object) ?
   a. Spatial b. Temporal
   c. Radiometric d. Spectral
9. NDVI stand for
   a. Normalized Difference Vegetation Index
   b. Nadir View
   c. Net Drought Vegetation Index
   d. National Drought and Vegetation Institute
10. NDVI can be estimated by the manipulation of which of the following band
    a. Red b. Near Infrared
    c. Both d. None
11. If spatial resolution is smaller, what will be the resolving power of the sensor
    a. Greater b. Smaller
    c. Same d. None
12. Which of the following resolution best describe (sensitivity of the sensor to incoming radiance) ?
    a. Spatial b. Temporal
    c. Radiometric d. Spectral
13. Which of the following resolution best describe "the acquisition data has been recorded on 4 dates" ?
    a. Spatial b. Temporal
    c. Radiometric d. Spectral
14. The minimum distance between two objects that can be distinguish by continuous different wavelength range is referred as
    a. Spatial b. Temporal
    c. Radiometric d. Spectral
15. Quantitative measurement of the properties of an object at one or several wavelength interval is called as
    a. Spectral signature
    b. Spectral reflectance
    c. Spectral region
    d. Spectral response

Answers														
	1.	b	4.	d	7.	a	10.	c	13.	b
	2.	d	5.	a	8.	a	11.	a	14.	d
	3.	d	6.	d	9.	a	12.	c	15.	a

16. Microwave band is more useful in case of
a. Cloud b. Dust
c. Haze d. All

17. Which of the following radiation is used in passive remote sensor ?
a. Sun b. Vapour light
c. Flash light d. All

18. IRS - 1C/1D PAN spatial resolution is
a. 5.8 m b. 24 m
c. 188 m d. 30 m

19. PAN camera of IRS 1C/1D provide which of the following type of image
a. Coloured
b. Blue and red
c. Blue and green
d. Black and white

20. Repeatitivity of IRS- 1C/1D satellite is
a. 16 days b. 24 days
c. 3 days d. 1 hour

21. In which of the following condition reflectance % will be maximum
a. Dry soil b. Wet soil
c. ploughed soil d. Water bodies

22. What could be the reflectance % if the farmer is applying FYM in their field ?
a. Increased
b. Decreased
c. No effect
d. First increases then decreases

23. The pixels of the band in the sensor which is converted into digital form is referred as
a. Digital band b. Digital sensor
c. Digital map d. Digital number

24. Satellite image showing red colour indicates
a. Fire b. Forest
c. Ocean d. Ice cap

25. Satellite image showing white colour indicates
a. Sand b. Ice cap
c. Saline soil d. All

26. Which of the following kind of wave is related to atmospheric window ?
a. Long wave b. Short wave
c. Both d. None

27. Remote sensing satellite is known as
a. polar satellite
b. Sun - synchronous satellite
c. Both
d. None

28. Which of the following wavelength is normally used in remote sensing ?
a. Visible b. Near infrared
c. Both d. None

29. Which of the following band is used in near-infrared ?
a. 0.4 - 0.7 nm b. 0.7 - 1.3 nm
c. 1.3 - 3.0 nm d. 3.0 - 100 nm

30. Ratio Vegetation Index can be calculated by
a. Red/Near Infrared
b. Near Infrared/Red
c. Near Infrared – Red
d. Red - Infrared

31. LISS stands for
a. Linear Imaging Self Scanner
b. Lime Imaging Scanning System
c. Length Imaging Scanning System
d. None

32. WiFS stands for
a. Wide Field Scanner
b. Wield Field Scanner
c. Both
d. None

Answers											
	16.	d	19.	a	22.	b	25.	d	28.	c	31.	a
	17.	a	20.	b	23.	d	26.	a	29.	b	32.	a
	18.	a	21.	a	24.	b	27.	c	30.	a		

33. Essentially remote sensing has how many component
a. Signal b. Sensor
c. Sensing d. All

34. FWHM stands for
a. Full Width at Half Maxima
b. Full and Wide Hazy Monitoring
c. Fertilizer Widely and Hormones Monitoring
d. None

35. Which of the following is a type of signal used in remote sensing ?
a. Acaustic signal
b. Particulate signal
c. Electromagnetic signal
d. All

36. Which of the following is medium resolution satellite ?
a. SPOT 1-3 b. CBERS
c. IRS 1C/1D d. All

37. Which of the following is high resolution satellite ?
a. COSMOS b. EROS
c. ICONOS d. All

38. Which of the following medium resolution satellite has highest number of bands ?
a. LANDSAT-7 b. IRS 1C/1D
c. IRS 1A d. Apple

39. Cartosat satellites is largely meant for
a. Mapping
b. Disaster management
c. Information Technology
d. Atmospheric information

40. Which of the following spectral rays is used for mapping of radioactive material
a. Gamma b. UV
c. Visible d. Infrared

41. Which of the following spectral rays is used for presence of hydrogen and helium in atmosphere ?
a. Gamma b. UV
c. Visible d. Infrared

42. Which of the following spectral rays is used for vegetation properties ?
a. Gamma b. UV
c. Visible d. None

43. The infrared thermometer contain which of the following component
a. Filter b. Detector
c. Read out d. all

44. A range of wavelength of electromagnetic radiation is known as
a. Band b. Sensor
c. Plateform d. Resolution

45. Alters data to correspond with true ground or image space in a known coordinate system is known as
a. Geometric correction
b. Geodatic correction
c. Thematic correction
d. Spatial correction

46. A raster module in the Arc/ infoGIS package is known as
a. Pixel b. Grid
c. Digital number d. None

47. To verify the correctness of remote sensing data by field studies is known as
a. False colour composit
b. Grid
c. Ground truth
d. Pixel value

Answers											
	33.	d	36.	d	39.	a	42.	c	45.	a	
	34.	a	37.	d	40.	a	43.	d	46.	b	
	35.	d	38.	a	41.	b	44.	a	47.	c	

48. An interpolation technique for obtaining statistically unbiased estimates of surface elevations from a set of control points
a. Interpolation b. Kriging
c. Label d. Precision

49. The part of the drawn map explaining the meaning of symbols used to code the depicted geographical elements is known as
a. Layer b. Label
c. Legend d. None

50. A two-dimentional graphic representation of the earth's surface that displays spatial relationships among features
a. Grid b. Interpolation
c. Map d. Plateform

51. Irregular variation, usually short range that cannot be easily explained or associated with major mapped features or processes is referred as
a. Krigging b. Noise
c. Output d. Theme

52. Quantum detectors are of how many types
a. Photoemmisive
b. Photoconductive
c. Photovoltaic
d. All

53. Natural gamme rays has a wavelength of
a. 30 μm b. 0.03 μm
c. 0.00003 μm d. None

54. Artificial gamme rays has a wavelength of
a. 30 μm b. 0.03 μm
c. 0.00003 μm d. None

55. Cosmic gamme rays has a wavelength of
a. 30 μm b. 0.03 μm
c. 0.00003 μm d. None

56. An increase in soil moisture will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

57. An increase in sand content will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

58. An increase in types of clay will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

59. An increase in Lime stone will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

60. An increase in igneous rock will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

61. An increase in organic matter will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

Answers										
	48.	b	51.	b	54.	b	57.	a	60.	b
	49.	c	52.	d	55.	c	58.	b	61.	b
	50.	c	53.	a	56.	b	59.	a		

62. An increase in iron oxide will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

63. An increase in salinity will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

64. An increase in soil colour will result in rapid
a. Increase in reflectence
b. Decrease in reflectence
c. No effect in reflectence
d. None

65. The ratio which is a sensitive indicator of green biomass is given by
a. NIR/IR b. NDVI
c. Both d. None

66. Maximum absorption of chlorophyll a is denoted by which of the following wavelength range
a. 430 and 662 nm b. 450 and 470 nm
c. 480- and 540 nm d. 610 and 640 nm

67. Maximum absorption of carotenoids is denoted by which of the following wavelength range
a. 430 and 662 nm b. 450 and 470 nm
c. 480- and 540 nm d. 610 and 640 nm

68. Maximum absorption of xynthophyll is denoted by which of the following wavelength range
a. 430 and 662 nm b. 450 and 470 nm
c. 480- and 540 nm d. 610 and 640 nm

69. Maximum absorption of phycocyanin is denoted by which of the following wavelength range
a. 430 and 662 nm
b. 450 and 470 nm
c. 480- and 540 nm
d. 610 and 640 nm

70. Passive microwave energy can be emmited by the atmosphere by which of the following way
a. Reflection from the surface
b. Emission from the surface
c. Transmission from the surface
d. All

71. Passive microwave sensors are characterised by
a. Low spatial resolution
b. High spatial resolution
c. Both
d. None

72. Application of passive microwave remote sensing includes
a. Meteorology b. Hydrology
c. Oceanography d. All

73. Target interaction of microwave remote sensing is affected by which of the following
a. Surface roughness
b. Radar viewing
c. moisture content
d. All

74. The image data which is acquired from remote sensing system are stored in which kind of format
a. Band sequential
b. Band interleaved by line
c. Band interleaved by line
d. All

Answers										
	62.	b	65.	c	68.	c	71.	a	74.	d
	63.	a	66.	a	69.	d	72.	d		
	64.	c	67.	b	70.	d	73.	d		

75. The point on the ground vertically beneath the respective centre of the camera lens is known as
a. NADIR b. Zenith
c. Both d. None

76. The smallest discrete element which make up a raster image is referred as
a. Digital number b. pixel
c. Noise d. Point

77. To find specific information in a database is referred as
a. Projection b. Node
c. Query d. Registration

78. The scanned area of cathode ray tube is referred as
a. Raster b. Vector
c. Both d. None.

79. Remote sensing is aquiring knowledge from a distant place by what actual touch with object
a. With b. Without
c. Both d. None

80. Manipulations and functions that operate on rater object on cell by cell is
a. Raster data b. Raster algebra
c. Query d. Point

81. An Interpollating polynomial for a set of coordinate points used to fit a curve that connects the points is
a. Spline b. Slope
c. Scale d. Theme

82. The ratio or fraction between the size of an object on a map and its size in the real world is
a. Map b. Resolution
c. Slope d. Scale

83. Processes to convert analogue information from maps, photographs or overlays into a digital format usable by a computer is
a. Scanning b. Resolution
c. Topple d. Topography

84. A map related to a single topic theme or subject of discourse is also called as
a. Thematic map b. Contour map
c. Soil map d. None

85. A reference to the valus of surface height in a digital elevation/terrain model at a particular X,Y location is referred as
a. X-value b. Y-value
c. Z-value d. all

86. GIS function in cartography is to
a. Data acquisition b. Mapping
c. Display d. All

87. GIS function in remote sensing is to
a. Data acquisition b. Mapping
c. Display d. All

88. GIS function in statistics is to
a. Data base b. Mapping
c. Display d. All

89. GIS function in survey is to
a. Data acquisition b. Mapping
c. Both d. None

90. GIS function in Geography is to
a. Spatial analysis b. Mapping
c. Display d. All

91. Who was the first person who presented a world atlas ?
a. Ptolemy b. I Newton
c. Gerhard Mercator d. A. Penck

Answers												
	75.	a	78.	a	81.	a	84.	a	87.	d	90.	d
	76.	b	79.	b	82.	d	85.	c	88.	d	91.	a
	77.	c	80.	b	83.	a	86.	d	89.	c		

92. Who was the first person who presented a Globe ?
a. Ptolemy b. I Newton
c. Gerhard Mercator d. A. Penck

93. Who was the first person who presented that the earth is flattened at the poles ?
a. Ptolemy b. I Newton
c. Gerhard Mercator d. A. Penck

94. Point data are depicted on images with
a. Graphical science b. Continuous line
c. Both d. None

95. Line data are depicted on images with
a. Graphical science b. Continuous line
c. Both d. None

96. position of view point on a map projection system can be a
a. Gnomonic b. Stereographic
c. Orthographic d. All

97. Position of a tangent surface on a map projection system can be a
a. polar b. Eque distant
c. Oblique d. All

98. The most common raster data format are
a. Tiff b. Gif
c. JPEG d. All

99. Precision is more in
a. Vector data structure
b. Raster data structure
c. Both
d. None

100. Which of the following data structure can best describe topology ?
a. Vector data structure
b. Raster data structure
c. Both
d. None

101. Which of the following data structure can best describe update
a. Vector data structure
b. Raster data structure
c. Both
d. None

102. Which of the following data structure can best describe coordinate transformation ?
a. Vector data structure
b. Raster data structure
c. Both
d. None

103. Which of the following data structure can best describe simulation modelling ?
a. Vector data structure
b. Raster data structure
c. Both
d. None

104. Which of the following data structure can best describe graphic update ?
a. Vector data structure
b. Raster data structure
c. Both
d. None

105. Which of the following data structure can best describe data structure ?
a. Vector data structure
b. Raster data structure
c. Both
d. None

106. Which of the following equipment is the best choice for analog map kind of data source ?
a. Digitizer b. Stereo plotter
c. Image zoom scope d. GPS

Answers												
	92.	c	95.	b	98.	d	101.	b	104.	b		
	93.	b	96.	d	99.	a	102.	b	105.	a		
	94.	a	97.	d	100.	a	103.	a	106.	a		

107. Which of the following equipment is the best choice for aerial photographs kind of data source
a. Digitizer b. Stereo plotter
c. Image zoom scope d. GPS

108. Which of the following equipment is the best choice for satellite imagery kind of data source
a. Digitizer b. Stereo plotter
c. Image zoom scope d. GPS

109. Which of the following equipment is the best choice for ground survey kind of data source
a. Digitizer b. Stereo plotter
c. Image zoom scope d. GPS

110. Which of the following scanner is having very high resolution ?
a. Mechanical scanner
b. Video camera
c. CCD camera
d. None

111. Which of the following scanner is having low resolution ?
a. Mechanical scanner
b. Video camera
c. CCD camera
d. None

112. Which of the following scanner is having medium resolution ?
a. Mechanical scanner
b. Video camera
c. CCD camera
d. None

Answers		
	107. b	110. a
	108. c	111. b
	109. d	112. c

17

Soil Ecology

QUESTIONS :

1. The variety of organisms occurring in a particular place or habitat; often called local diversity is also known as
   a. Alpha Diversity b. Alterne
   c. Amensalism d. Anaerobic

2. Control method of solid wastes could be
   a. by recycling
   b. by burning the wastes and utilization of heat
   c. composting for manures and bio gas
   d. All

3. Which of the following material is easily degradable?
   a. plastics b. papers
   c. polythenes d. nylons

4. Which of the following term(s) indicate "a system of organisms and environment"
   a. biogeocoenosis b. geobiocoenosis
   c. biocoenosis d. all

5. The basic sampling method(s) employed in dealing with populations of motile organisms is/are
   a. total counts from areas of known size
   b. mark and recapture procedures
   c. removal sampling
   d. All

6. Which of the following gas is considered as greenhouse gas
   a. Methane b. Ethane
   c. Propane d. Butane

7. Which of the following gas contributing maximum in climate for green house effect
   a. Nitrous oxide b. CFC
   c. Carbon dioxide d. None

8. International convention on 'Earth Summit" was held at
   a. Washington b. New Delhi
   c. London d. Reo

9. Due to climatic change in recent years, sea levels
   a. Increased b. Decreased
   c. Constant d. Irregular

10. In Indian cities, which of the following toxic waste is maximum
    a. Liquid waste b. Solid waste
    c. Both are equal d. Vary

11. Noise pollution can be minimized by
    a. sound absorbers in auditorium
    b. Jet planes
    c. ear plugs in factories
    d. All

12. Sonic boom is expressed in the unit
    a. Mach b. dB
    c. meter/sec d. Hz

13. In complex natural commodities, organisms whose food is obtained from plants by the same number of steps are said to belong to the same trophic level. Thus, green plants occupy which of the following trophic level for producer level
    a. First b. Second
    c. Third d. Fourth

14. Which of the following terrestrial ecosystem(s) is/are named after the types of organism and habitat conditions
    a. Grassland ecosystem
    b. Forest ecosystem
    c. Desert ecosystem
    d. All

Answers												
	1.	a	4.	c	7.	a	10.	c	13.	b
	2.	d	5.	d	8.	d	11.	a	14.	d
	3.	b	6.	a	9.	a	12.	c		

15. The word "ecology" derived from which word
    a. Greek b. French
    c. Arabic d. Indian

16. Which of the following is mixed in petrol as an antiknock agent
    a. Silicon b. Aluminium
    c. Lead d. Iron

17. Which of the following component(s) able to fix light energy and manufacture food from simple inorganic substances
    a. Autotrophic b. Hetrotrophic
    c. Both d. None

18. From structural point of view of ecosystem, the autotrophic organisms, largely the green plants means
    a. Abiotic substance
    b. Producer
    c. Consumer
    d. Decomposer

19. In deep water systems the autotrophs are microscopic floating plants called
    a. Aquatrophs b. Hetrotrophs
    c. Phytoplankton d. None

20. The producer-consumer arrangement is one kind of structure called
    a. Trophic b. Biochemical
    c. Species d. None

21. The amount of abiotic materials such as phosphorus, nitrogen etc., that are present at any given time can be considered as the
    a. Chemical state
    b. Standing state
    c. Biomass state
    d. Fertilizer state

22. Which of the following ecosystem is very complex
    a. Pond b. Grassland
    c. Coral reef d. Desert

23. Which of the following gas is considered as greenhouse gas
    a. Methane b. Ethane
    c. Propane d. Butane

24. Which of the following gas contributing maximum in climate for green house effect
    a. Nitrous oxide b. CFC
    c. Carbon dioxide d. None

25. Which of the following material is easily degradable?
    a. plastics b. papers
    c. polythenes d. nylons

26. Lead is mixed in petrol as an antiknock agent. (T/F)

27. Ecology derived from Greek root *oikos* meaning house. (T/F)

28. An autotrophic component able to fix light energy and manufacture food from simple inorganic substances. (T/F)

29. Hetrotrophic components means self-nourishing. (T/F)

30. The largest and most uniform aquatic ecosystem is marine ecosystem. (T/F)

31. Ecosystem is a functional system which, in balanced condition, is self-sufficient and self-regulated. (T/F)

32. The quantity of biological material in a given area or volume of space in an ecosystem is termed standing crop. (T/F)

Answers												
	15.	b	18.	b	21.	a	24.	a	27.	True	30.	True
	16.	c	19.	c	22.	b	25.	b	28.	True	31.	True
	17.	a	20.	a	23.	a	26.	True	29.	False	32.	True

33. The cumulative energy contents utilized by primary producers are always smaller as compared to energy utilization by successive trophic levels over a period of time in a given area. (T/F)

34. In complex natural communities, organisms whose food is obtained from plants by the same number of steps are said to belong to the tertiary trophic level. (T/F)

35. The shorter the food chain or the nearer the organism, the lower the available food energy. (T/F)

36. Inorganic chemicals do not increase pollution. (T/F)

37. There is a self regulatory mechanism in ecosystems of *chicks and balances*. This is called homeostasis. (T/F)

38. El Nino refers that wet areas becoming ..... and dry areas becoming .....

39. In noise pollution, sound waves left behind motor boats on water surface is known as ..... and is expressed in the unit .....

40. The central theme of ecosystem concept is a continuous interaction between plants, ... and their ..... To produce and exchange materials.

41. Ecosystem term was first proposed by ..... in the year .....

42. The organism which do not produce their own food and depend upon others for food is known as ..... Whereas those who produce their own food is known as .....

43. There are certain types of close biotic interrelationships among biotic components of the ecosystem and they are termed as commensalisms, ... and .....

44. ..... is mixed in petrol as an antiknock agent which affect ..... to the human health.

45. Sounds beyond 80dB can be regarded as ..... and Bag filter and cyclone collectors are devices to filter industrial fumes to control air pollution.

46. In a terrestrial ecosystem, the organism consuming living plant material is termed as ..... where as ..... consuming living animals or parts of living animals.

47. In vertical distribution of temperature above the earth, temperature ..... in troposphere where as ..... in stratosphere.

48. In general, dry air has ..... % nitrogen, ... % oxygen and about 1% other gases.

49. Thermal power plants using coal as the energy source, give rise to ..... , ... and soil pollution over a very large areas from the source to the generation point and beyond.

Answers

33. False
34. False
35. False
36. False
37. True
38. Wetter; Drier
39. Sonic booms; Mach
40. Animals; Environment
41. Tansely; 1935
42. Heterotrophs; Autotrophs
43. Mutualism; Symbiosis
44. Lead; Badly/ adversely
45. air pollution; air pollution
46. Herbivorous; Carnivorous
47. Decreases; Increases
48. 79; 20
49. Air; Water

50. Sounds beyond 80dB can be regarded as pollution. (T/F)

51. In complex natural communities, organisms whose food is obtained from plants by the same number of steps are said to belong to the same trophic level. (T/F)

52. The shorter the food chain or the nearer the organism, the lower the available food energy. (T/F)

53. There is a self regulatory mechanism in ecosystems of *chicks and balances*. This is called homeostasis. (T/F)

54. Movement of water from sea/ocean to land through cloud or surface/underground run in the form of solid, liquid and vapour phase is hydrological cycle. (T/F)

55. Restriction on the use of biodegradable chemicals reduces pollution. (T/F)

56. Bag filter and cyclone collectors are devices to filter industrial fumes for air pollution control. (T/F)

57. Silicon is mixed in petrol as an antiknock agent. (T/F)

58. Inorganic chemicals do not increase pollution. (T/F)

59. The word "ecology" derived from the *Greek* root. (T/F)

60. Ecology is the structure and function of nature. (T/F)

61. An autotrophic component able to fix light energy and manufacture food from simple organic substances. (T/F)

62. ..... is the study of interrelationships between organisms (plants, animals, arthropods, microbes) and their environment. However, a Community of different organisms interdependent on each other together with their non-living environment, which is relatively self-contained in terms of energy flow, and is distinct from neighboring communities is known as .....

63. The term *ecosystem* was first proposed by ..... in the year .....

64. The transfer of food energy from the source in plants through a series of organisms with repeated stages of eating and being eaten is known as ..... However, interlocking pattern of feeding relationships in a community is known as .....

65. In a terrestrial ecosystem, the organism consuming living plant material is termed as ..... where as ..... consuming living animals or parts of living animals.

66. After a period of long time (for example, >1000 years), sea level ..... and temperature .....

67. In vertical distribution of temperature above the earth, temperature ..... in troposphere where as ..... in stratosphere.

Answers

50. T
51. T
52. F
53. T
54. T
55. F
56. T
57. F
58. F
59. T
60. T
61. F
62. Ecology; Ecosystem,
63. Tansely; 1935,
64. Food chain; Food Web,
65. Herbivorous; Carnivorous
66. Rises; Increases
67. Decreases; Increases

68. In general, dry air has ..... % nitrogen, ... % oxygen and about 1% other gases.

69. The chief air pollutants are ....., ..., certain hydrocarbon and particulate matters.

70. in size, oceans form ..... ecosystem where as ponds form ..... ecosystem.

71. ..... in the year ..... was first to give an energy flow diagram through different trophic levels in Cedar Bog Lake of Minnesota.

72. Thermal power plants using coal as the energy source, give rise to ....., ... and soil pollution over a very large areas from the source to the generation point and beyond.

73. Small particles, usually less than 1 micron present in air are referred as ..... whereas the solid particles larger than 1 micron is called .....

74. The geologic process in which inorganic materials carried downstream are deposited in stream beds, flood plains and other water bodies resulting in a rise in elevation
a. Aggradation
b. Allelopathy
c. Alliance
d. Allochthonous

75. The negative influence of plants, other than micro-organisms, upon each other, arising from the products of their metabolism or chemical inhibitors
a. Aggradation
b. Allelopathy
c. Alliance
d. Allochthonous

76. The unit of next higher rank than association in the Braun-Blanquet classification of plant communities.
a. Aggradation b. Allelopathy
c. Alliance d. Allochthonous

77. Exogenous. Food organisms, organic matter and nutrients orginating outside or transported inot an aquatic system. Usually refers to organic material of terrestrial origin, but could include windblown deposition, that carried by animals, etc. Said of organic matter entering a stream, lake, or ocean, but derived from an adjacent terrestrial system. Also used for accumulation of drifted vegetation.
a. Aggradation b. Allelopathy
c. Alliance d. Allochthonous

78. The pit and mound formed as a result of tree uprooting and its attendant displacement of soil
a. Cradle knoll b. Dystrophic
c. Ecotone d. Fen

79. Habitats low in nutrients and toxic
a. Cradle knoll b. Dystrophic
c. Ecotone d. Fen

80. Low-lying peat land partly covered with water fed by relatively fast moving, nutrient-rich water. Water usually neutral to basic and rich in calcium. The peat is mainly made by decaying sedges and rushes
a. Cradle knoll b. Dystrophic
c. Ecotone d. Fen

Answers
68. 79; 20
69. CO; SO_2
70. Large/ big; Small
71. Linderman; 1942
72. Air; Water
73. Aerosol; Dust,
Wetter
Drier; Sonic booms; Mach
74. a
75. b
76. c
77. d
78. a
79. b
80. c

81. The transition zone between two adjoining communities
a. Cradle knoll b. Dystrophic
c. Ecotone d. Fen

82. A group of species that exploit the same class of functional resources in a similar way
a. Guild
b. Hemicryptophyte
c. K-selection
d. Keystone predator

83. A land plant whose shoots die back to ground level at the beginning of the unfavorable season, leaving the perennating resting buds at the soil surface
a. Guild
b. Hemicryptophyte
c. K-selection
d. Keystone predator

84. Selection of life-history traits that promote an ability to make a large proportionate contribution to a population which stays close to its carrying capacity
a. Guild
b. Hemicryptophyte
c. K-selection
d. Keystone predator

85. A predator that increases the diversity of a system by selective predation or competitively superior species
a. Guild
b. Hemicryptophyte
c. K-selection
d. Keystone predator

86. A plant inhabiting hills and mountains.
a. Orophyte b. Peneplain
c. Psammophyte d. Pyrophyte

87. A nearly flat, land surface, particularly one formed by erosion - plantation.
a. Orophyte b. Peneplain
c. Psammophyte d. Pyrophyte

88. A plant growing in sands or sandy soils
a. Orophyte b. Peneplain
c. Psammophyte d. Pyrophyte

89. A species that is adapted to survive severe fires
a. Orophyte b. Peneplain
c. Psammophyte d. Pyrophyte

90. Selection of life-history traits which promote an ability to multiply rapidly in numbers
a. R-selection b. Ramet
c. Ruderal d. Sclerophyte

91. An individual member of a clone, as an offshoot of a plant reproducing by stolons
a. R-selection b. Ramet
c. Ruderal d. Sclerophyte

92. A plant that grows on wasteland, old fields, waysides
a. R-selection b. Ramet
c. Ruderal d. Sclerophyte

93. A plant with thick, hard leaves—generally small, evergreen and xerophytic.
a. R-selection b. Ramet
c. Ruderal d. Sclerophyte

Answers
81. d
82. a
83. b
84. c
85. d
86. a
87. b
88. c
89. d
90. a
91. b
92. c
93. d

18

Memory Based

JRF

Question Paper

QUESTIONS :

1. The number of electrons which each sub-shell can occupy is
   a. $2n$ b. $2n^2$
   c. $2(l+1)$ d. $2(2l+1)$

2. The clue for the existence of the particles in the nucleus of an atom was given by
   a. Discharge tube experiment
   b. X-ray analysis
   c. Positive ray analysis
   d. Alpha ray scattering experiment

3. In which of the following n/p ratio is greater than one ?
   a. Na^+ b. Mg^{2+}
   c. O^{2-} d. Al^{3+}

4. Transition of an electron from M level to K level results in
   a. Absorption spectra
   b. Emission spectra
   c. X-ray spectra
   d. Continuous spectra

5. Which of the following represents the electronic configuration of a noble gas ?
   a. 2, 8, 1 b. 2, 8, 7
   c. 2, 6, 8 d. 2, 8, 6
   e. 2, 8, 8

6. Negative ions are formed from neutral atoms by gain of
   a. Positrons b. Neutrons
   c. Protons d. Electrons

7. An oxygen atom contains
   a. 8 neutrons and 8 protons
   b. 8 protons and two neutrons
   c. 8 protons and 16 electrons
   d. 8 protons and 8 electrons
   e. 16 protons and 8 electrons

8. An element X has mass number 32 and an atomic number 16. The symbol of its ion is
   a. X^+ b. X^{+2}
   c. X^{-1} d. X^{-2}
   e. Cannot form an ion

9. The electron is identical with
   a. A hydrogen atom
   b. A positron
   c. An α-ray particle
   d. β-ray particle
   e. Air gap particle

10. "The principle that no two electrons can have all the four quantum number is identical" was enunciated by
    a. Davy b. Rutherford
    c. Pauli d. Einstein
    e. Seaborg

11. For a hydrogen atom $E_n = -13.6/n^2$ Ev/ atom. Therefore minimum energy that an atom of hydrogen in the ground state can absorb is
    a. 13.6 eV b. 10.2 eV
    c. 3.4 eV d. 1.5 Ev

12. Natural radioactivity was discovered by
    a. Rutherford
    b. Henri Becquerel
    c. Madame Curie
    d. Schmidt

13. The half life of radium is 1600 years. After how much time it will remain 25% of the present ?
    a. 8000 years b. 1600 years
    c. 3200 years d. 4800 years

14. The emission of beta rays produces an
    a. Isotope b. Isobar
    c. Isotone d. All of these

Answers

1.	b	4.	b	7.	d	10.	c	13.	c
2.	d	5.	e	8.	d	11.	a	14.	b
3.	c	6.	d	9.	d	12.	b		

15. Atomic number and atomic mass of Uranium is 92 and 238. During the course of radioactive disintegration it loses 5 α–particles and 4 β–particles. The atomic number and atomic weight of the new element will be
a. At. no.= 90, at. wt.= 233
b. At. no.= 86, at. wt.= 218
c. At. no.= 82, at. wt.= 218
d. At. no.= 88, at. wt.= 228

16. A beta ray change results in the production of
a. An isotope b. An isobar
c. An allotrope d. An isomer

17. $_{17}Cl^{35}$ and $_{17}Cl^{37}$ are
a. Isotopes b. Isomers
c. Isotones d. Isobars

18. The group displacement law was given by
a. Bohr b. Rutherford
c. Soddy d. Einstein
e. de Broglie

19. A device used for the measurement of radioactivity is a
a. Mass spectrometer
b. Cyclotron
c. Nuclear reactor
d. G. M. counter

20. Which of the following is a radioactive inert gas ?
a. Ne b. Ar
c. Rn d. Xe

21. The temperature at which real gas obeys the ideal gas laws over a wide range of pressure is
a. Critical temperature
b. Boyle temperature
c. Inversion temperature
d. Reduced temperature

22. In the equation of state of an ideal gas PV = nRT, the value of the universal gas constant would depend only on
a. The nature of the gas
b. The temperature of the gas
c. The pressure of the gas
d. The units of measurement

23. Hydrogen diffuses five times as rapidly as another gas X. The molecular weight of X should be
a. 19 b. 25
c. 50 d. 100
e. 5

24. The oxide of an element possesses the formula M_2O_3. If the equivalent weight of the metal is 6, then atomic weight of the metal will be
a. 6 b. 12
c. 18 d. 24

25. One equivalent of copper is deposited on the cathode when the quantum of electricity passed through the solution is
a. One kilowatt b. 9650 coulomb
c. 96000 coulomb d. 96500 coulomb

26. In a reaction if ΔH is negative, then
a. Heat is absorbed
b. Heat is liberated
c. Heat change is zero
d. None

27. The heat content of a system is called
a. Enthalpy b. Entropy
c. Free energy d. Internal energy

Answers								
	15. b	18. c	21. b	24. c	27. a			
	16. b	19. d	22. d	25. d				
	17. a	20. c	23. c	26. b				

28. In the following reaction, $2SO_2$ (g) + O_2 (g) = $2SO_3$ (g) + Q Cals., the yield of SO_2 is favoured by
a. Increasing both pressure and temperature
b. Increasing pressure and decreasing temperature
c. Decreasing pressure and increasing temperature
d. Decreasing both temperature and pressure

29. The unit of rate constant of a zero order reaction is
a. Lit sec^{-1} b. Lit mol^{-1} sec^{-1}
c. Lit^{-1} mol sec^{-1} d. Mol sec^{-1}

30. The pH of a solution is defined by the expression
a. log $[H^+]$ b. $-\log 1/[H^+]$
c. log $1/[H^+]$ d. $1/\log [H^+]$

31. Which of the following is correct ?
a. pH + pOH = 14
b. pH × pOH = 14
c. pH – pOH = 14
d. pH/pOH = 14

32. Which of the following elements is kept in water ?
a. Carbon b. Sodium
c. White phosphorus d. Chlorine

33. The most electronegative element in the periodic table is
a. Chlorine b. Sodium
c. Cesium d. Fluorine

34. Compared to the first ionization potential of an atom the second is
a. The same b. Greater
c. Smaller d. Negligible

35. Variable valence is shown by
a. Metallic elements
b. Normal elements
c. Transitional elements
d. Non-metallic elements

36. In the synthesis of NH_3 by Haber's process, increase in pressure at equilibrium
a. Increases the yield of NH_3
b. Reduces the yield of ammonia
c. Has no effect on the yield of NH_3
d. Converts the reactants and products into liquids

37. The catalyst used in the manufacture of NH_3 by Haber's process is
a. Mg b. Pt
c. Fe d. Mo

38. The migration of colloidal piratical particles under the influence of electric field is known as
a. Electrophoresis
b. Dialysis
c. Electroosmosis
d. Electrodialysis

39. Scattering of light by colloidal particles is called
a. Brownian movement
b. Tyndall effect
c. Electrophoresis
d. Electroosmosis

40. What is the size of fine clay particles in USDA classification of soil texture ?
a. < 2 mm b. < 0.2 mm
c. < 0.02 mm d. < 0.002 mm

41. What is the unit of viscosity ?
a. cm sec^{-1} b. g cm^{-3}
c. g sec cm^{-1} d. cm sec^{-2}

Answers								
	28. b	31. a	34. b	37. a	40. d			
	29. c	32. d	35. c	38. a	41. c			
	30. b	33. d	36. a	39. b				

42. Of the following, which is/are the primary soil particles ?
a. Clay b. Silt
c. Sand d. All

43. Volume wetness = Mass wetness ×
a. Bulk density b. Particle density
c. Weight of soil d. Pore space

44. What is the depth of plough layer of soil ?
a. 0 – 10 cm b. 0 – 15 cm
c. 0 – 20 cm d. 0 – 25 cm

45. Element essential for the flocculation of soil particles is
a. Sodium b. Potassium
c. Calcium d. Magnesium

46. Increase in zeta potential of soil particles leads to
a. Flocculation b. Deflocculation
c. Aggregation d. Both a and b
e. Both a and c

47. The physical condition of soil in relation to plant growth is called as
a. Soil tilth b. Tillage
c. Coherence d. Adherence

48. Which of the following fertilizers improve soil structure ?
a. Nitrogenous fertilizers
b. Phosphatic fertilizers
c. Potassic fertilizers
d. Sulphate fertilizers

49. 1 bar =
a. 100 kPa b. 106 kPa
c. 103 Pa d. 10^3 dynes cm^{-2}

50. Total head drop ($\Delta H/L$) per unit distance in the soil water column is called as
a. Flux
b. Flux density
c. Hydraulic gradient
d. Hydraulic conductivity

51. What is the unit of hydraulic conductivity?
a. cm sec^{-2} b. m sec^{-1}
c. cm sec^{-1} d. m sec^{-2}

52. What is the unit of surface tension ?
a. dynes cm^{-1} b. cm sec^{-1}
c. g cm^{-3} d. Poise

53. The potential results from adsorptive and capillary forces of the soil matrix acting on soil water is called as
a. Gravitational potential
b. Matric potential
c. Osmotic potential
d. Solute potential

54. 1 Joule =
a. 10^5 ergs b. 10^6 ergs
c. 10^7 ergs d. 10^9 ergs

55. What is the soil water potential at field capacity ?
a. 10-33 kPa b. 33 kPa
c. 1500 kPa d. 33-1500 kPa

56. In the field, tensiometer can be used to measure soil water suction up to
a. 0.75 bars b. 0.85 bars
c. 0.95 bars d. 1.0 bar

57. What is the percentage of carbon dioxide in soil air ?
a. 0.03 b. 0.003
c. 0.3 d. 3

58. More than 90 per cent of gaseous exchange in soil takes place by
a. Mass flow b. Diffusion
c. Partial diffusion d. All

Answers																	
	42.	d	45.	c	48.	c	51.	c	54.	c	57.	c
	43.	a	46.	b	49.	a	52.	a	55.	b	58.	b
	44.	b	47.	a	50.	c	53.	b	56.	b		

59. Thermal conductivity follows the order of
a. Peat > Clay > Loam > Sand
b. Sand > Loam > Clay > Peat
c. Loam > Peat > Clay > Sand
d. Peat > Loam > Clay > Sand

60. The dominant spectral colour in Munsell colour chart indicates
a. Hue b. Value
c. Chroma d. All

61. Diffusion of gases under the concentration gradient takes place by
a. Mass flow b. Diffusion
c. Root interception d. All

62. The equation, $V = \sqrt{2gz}$ is called as
a. Reynold's equation
b. Torricelli's equation
c. Poiseuille's equation
d. Furier's equation

63. What is the unit of Oxygen Diffusion Rate (ODR) ?
a. g/cm^2/min b. cm/g/min
c. min/cm/g d. None

64. Per cent solid space is soil is expressed by
a. Bulk density/Particle density × 100
b. Particle density/Bulk density × 100
c. (Particle density/Bulk density) × 100
d. (Bulk density – Particle density) × 100

65. Water tightly held in thin films around soil particles is
a. Hygroscopic water
b. Gravitational water
c. Capillary water
d. Heavy water

66. Rocks formed from igneous rocks by the influence of high pressure and temperature are called as
a. Metamorphic rocks
b. Primary rocks
c. Sedimentary rocks
d. All

67. The book "Benchmark soils of India" was written by
a. Syers *et al.*
b. Murthy *et al.*
c. Storie and Ricquier
d. Sys and Verheye

68. Black soils of India are locally called as
a. Regurs b. Bhata
c. Matarsi d. Dorsa

69. Slickensides and gilgai-microrelief are found in
a. Mollisols b. Histosols
c. Vertisols d. Spodosols

70. Map scale used in reconnaissance soil survey
a. 1 : 8000 b. 1 : 4000
c. 1 : 15000 d. 1 : 50000

71. Honey-comb structure is diagnostic feature of
a. Red soils b. Laterite soils
c. Lateritic soils d. Both b and c

72. Ionic radius of silicon
a. 1.32 Å b. 0.42 Å
c. 1.58 Å d. 1.18 Å

73. Stratification is the most common feature of
a. Igneous rocks
b. Sedimentary rocks
c. Metamorphic rocks
d. All

Answers																	
	59.	b	62.	b	65.	a	68.	a	71.	c
	60.	a	63.	a	66.	c	69.	c	72.	b
	61.	b	64.	a	67.	b	70.	c	73.	b

74. The equation, S = f (cl, b, r, p, t....) was first formulated by
a. Dokuchaiev b. Jenny
c. Hilgard d. Whitney

75. Active soil forming factors are
a. Parent material
b. Relief or Topography
c. Time
d. Climate and vegetation
e. All

76. Total area of soil degraded by different degradation types is
a. 185.8 mha b. 187.8 mha
c. 180.8 mha d. 183.8 mha

77. Which of the following is easily weatherable mineral ?
a. Olivine b. Hornblende
c. Augite d. Biotite

78. What is the basal spacing of montmorillonite ?
a. 10 Å b. 10.25 Å
c. 7.2 Å d. 14 Å

79. Muscovite is a _____ clay mineral.
a. 2 : 1 dioctahedral
b. 2 :1 trioctahedral
c. 1 :1 trioctahedral
d. 2 : 1 : 1 dioctahedral

80. What is the CEC of kaolinite (cmol(p+) kg^{-1}) ?
a. 30 – 40 b. 3 – 15
c. 18 – 22 d. 57 – 64

81. What is the percentage of organic carbon in organic matter ?
a. 48 b. 58
c. 78 d. 68

82. What is the C: N ratio of Indian soils ?
a. 30–32 : 1 b. 100 : 1
c. 20–22 : 1 d. 10–12 : 1

83. What is the SI unit of cation exchange capacity ?
a. meq/100g b. cmol(p+)/kg
c. mmho/100g d. All

84. In per cent base saturation, [BS (%)= S/T × 100], S denotes
a. Total cations
b. Basic cations
c. Total anions
d. Total cations and anions

85. The pH was given by
a. Sorensen
b. Schofield
c. White and Beckett
d. Thomas Way

86. Release of K^+ ions from mica leads to the formation of
a. Illite b. Vermiculite
c. Montmorillonite d. Chlorite

87. One angstrom (1 Å) is equal to
a. 0.1 nm b. 0.01 nm
c. 1.0 nm d. 10 nm

88. The term humic acid was given by
a. Oden b. Miescher
c. Berzelius d. Mulder

89. Fulvic acid is soluble in
a. Acid and Alkali
b. Acid and Alcohol
c. Alkali and Alcohol
d. Water
e. All

Answers																			
	74.	b	77.	a	80.	b	83.	b	86.	a	89.	a							
	75.	d	78.	d	81.	b	84.	b	87.	a									
	76.	b	79.	a	82.	d	85.	a	88.	c									

90. The equation, pH – ½ pCa = Constant, is called as
a. Lime potential
b. Phosphate potential
c. Potassium potential
d. None

91. On the basis of Bronsted-Lowry concept, acid is one which
a. Donates protons
b. Donates hydrogen
c. Accepts protons
d. Accepts hydrogen

92. Osmotic pressure = EC × _____.
a. 0.26 b. 0.36
c. 0.46 d. 0.56

93. Due to submergence
a. The pH of acid soil is increased
b. The pH of alkali soil decreased
c. The pH of alkali soil increased
d. The pH of acid soil decreased
e. Both a and b

94. Soil pH is a measure of the
a. Hydrogen ion concentration
b. Aluminum ion concentration
c. The percent base saturation
d. Both a and b

95. The total number of essential nutrient elements required for plant growth is
a. 16 b. 17
c. 20 d. 21

96. The form(s) of phosphorous absorbed by plants is/are
a. HPO_4^{3-} b. $H_2PO_4^-$
c. HPO_4^{2-} d. Both a and b
e. All

97. Which nutrient element is involved in energy transformation ?
a. Molybdenum b. Zinc
c. Sulphate d. Phosphorous

98. What is the optimum pH for the availability of most of the plant nutrients ?
a. 5.0 – 6.0 b. 6.0 – 7.0
c. 6.5 – 7.5 d. 6.0 – 8.0

99. The Law of Minimum was given by
a. Juston von Liebig
b. Spillman
c. Mitcherlich
d. Thomas Way

100. First permanent manurial experiment in India was started at
a. Coimbatore b. Kanpur
c. Pusa (Bihar) d. All

101. Which of the following is an example for edible oil cake ?
a. Caster cake b. Karanji cake
c. Mahua cake d. Mustard cake

102. Which fertilizer is added to prevent nitrogen losses during the decomposition of organic matter ?
a. Rock phosphate
b. Single super phosphate
c. Muriate of potash
d. Lime

103. What is the C:N ratio of organic matter?
a. 8 : 1 b. 10 : 1
c. 20 : 1 d. 15 : 1

104. The first unstable compound produced by the hydrolysis of urea is
a. Ammonium carbamate
b. Ammonium carbamate
c. Ammonium
d. Nitrate

Answers																			
	90.	a	93.	e	96.	d	99.	a	102.	b									
	91.	a	94.	a	97.	d	100.	b	103.	b									
	92.	b	95.	b	98.	c	101.	d	104.	a									

105. _____ is also called as Nitro-lime or Nitro-chalk.
a. Ammonium nitrate
b. Calcium ammoinium nitrate
c. Ammonium sulphate
d. Ammonium chloride

106. Nitrogen percentage in calcium ammonium nitrate (CAN) is _____.
a. 20.6 b. 46.0
c. 25.0 d. 26.0

107. _____ is an example for explosive fertilizer.
a. Ammonium chloride
b. Ammonium sulphate
c. Ammonium nitrate
d. CAN

108. Which is a slow release nitrogenous fertilizer?
a. Oxamide b. N-serve
c. AM d. ST

109. One Baule unit for nitrogen is
a. 250 lbs b. 241 lbs
c. 148 lbs d. 223 lbs

110. Examples of natural chelates are
a. Citric acid and oxalic acid
b. EDTA and DTPA
c. Citric acid, oxalic acid and HEDTA
d. EDTA, DTPA and HEDTA

111. Osmotic pressure = EC × _____.
a. 0.26 b. 0.36
c. 0.46 d. 0.56

112. The method used to measure a nutrient concentration in soil at equilibrium with the same in soil solution is
a. E-value b. A-value
c. L-value d. All

113. Individual fungal filaments are called
a. Hyphae b. Mycelium
c. Pseudopodia d. Flagella

114. Mycorrhizae is a symbiotic association between
a. Bacteria and plant roots
b. Fungi and bacteria
c. Two species of fungi
d. Fungi and roots of higher plants

115. Aflatoxin is a mycotoxin produced by
a. *Bacillus polymyxa*
b. *Aspergillus awamorii*
c. *Pseudomonas striata*
d. *Aspergillus flavus*

116. Bacteria from root nodules of legume was isolated for the first time by
a. J.B. Bousingault
b. M.W. Beijerink
c. Robert Koch
d. Louis Pasteur

117. Penicillin was discovered by
a. Robert Koch
b. Alexander Fleming
c. Waksman
d. Winogradsky

118. The precursor of Indole Acetic Acid is
a. Allophane
b. Tryptophane
c. Ethylene
d. None of the above

119. Which of the followings plays a role in ripening of fruits?
a. Auxin
b. Cytokinin
c. Ethylene
d. None of the above

Answers					
	105. b	108. a	111. b	114. d	117. b
	106. c	109. d	112. a	115. d	118. b
	107. c	110. a	113. a	116. b	119. c

120. The anaerobic breakdown of protein rich materials is termed
a. Putrefaction b. Denitrification
c. Depolymerization d. None of these

121. Which of the following diseases is caused by nitrate pollution?
a. Haemophilia
b. Methemoglobinemia
c. Itai - Itai
d. None of the above

122. Denitrification may also be termed as
a. Nitrate assimilation
b. Nitrate respiration
c. Denitrification
d. All the above

123. The most common contaminant of rhizobium isolated from legume root nodule is
a. *Agrobacterium*
b. *Azotobacter*
c. *Azospirillum*
d. None of the above

124. BGA was discovered as a nitrogen fixer in paddy field by
a. P.K. Dey
b. Beijerink
c. Fred
d. None of the above

125. *Rhizobium meliloti* causes nodulation in
a. Sweat clover (melilotis)
b. Alfalfa (Medicago)
c. Fenugreek (Trigonella)
d. All the above

126. Who is the 'Father of field experiment'?
a. M.W. Beijerink
b. J. B . Bousingault
c. C. Theoder de Saucer
d. Arnon and Stout

127. What is the temperature range of mesophiles?
a. < 10 °C b. 10 – 20 °C
c. 20 – 40 °C d. > 40 °C

128. What is the optimum pH for nitrification?
a. 5.5 – 6.5 b. 6.5 – 7.5
c. 7.5 – 8.5 d. 5.0 – 7.0

129. Which of the following is an aquatic fern?
a. Azolla b. Anabaena
c. BGA d. Both a and b

130. Earthworm casts are rich in nutrients and _____.
a. Bacteria b. Fungi
c. Viruses d. All

131. Soil viruses are
a. Obligate parasites
b. Facultative parasites
c. Saprophytes
d. Both a and b

132. *Agaricus bisporus* is the scientific name of
a. White button mushroom
b. Paddy straw mushroom
c. Oyster mushroom
d. None

133. Scattering of detached soil particles by the impact of rain drops is called
a. Splash erosion b. Sheet erosion
c. Gully erosion d. Ravines

134. Run-off and soil loss can be calculated by
a. Ramser's formula
b. Chepil equation
c. Chepil and Woodruff equation
d. All

Answers					
	120. a	123. a	126. b	129. a	132. a
	121. b	124. a	127. c	130. a	133. a
	122. b	125. d	128. b	131. a	134. a

135. In Universal soil loss equation, A = RKLSCP, K denotes
a. Soil conservation practices
b. Soil roughness
c. Soil erodability
d. Rainfall factor

136. Size range of soil particles in saltation type of wind erosion is
a. Less than 0.05 mm
b. 0.5 – 1.0 mm
c. 0.5 – 2.0 mm
d. 0.05 – 0.5 mm

137. Wind erosion is calculated by
a. Ramser's formula
b. Chepil equation
c. Chepil and Woodruff equation
d. All

138. Total number of land capability classes in the land capability classification scheme is
a. Six b. Seven
c. Eight d. Nine

139. If the gullies are deep up to 3m and width is not greater than 18m wherein side slopes vary this comes under which class of gully erosion ?
a. Very small
b. Small
c. Medium
d. Deep and narrow

140. If the gullies are deep > 9m and width is variable and slopes mostly steep or even vertical with intricate and active branch gullies, then it is called as
a. Very small
b. Small
c. Medium
d. Deep and narrow

141. K^+/NH_4^+ fixation is more in
a. Montmorillonite b. Illite
c. Vermiculite d. Muscovite

142. The permissible maximum biuret content of urea produced in India is
a. 0.5% b. 1.0%
c. 1.5% d. 2.0%

143. The conversion factor to convert % P to % P_2O_5 is
a. 1.29 b. 2.90
c. 2.29 d. 0.4

144. Fixation of phosphate is more in
a. Acid soils b. Neutral soils
c. Submerged soils d. None

145. The formula for potassium meta phosphate is
a. $K_4P_2O_7$ b. KH_2PO_4
c. KPO_3 d. K_2HPO_4

146. Which microorganism is responsible for nitrification or nitrite to nitrate ?
a. Nitrosomonas
b. Nitrobacter
c. Clostridium
d. Nitrosococcus

147. Which fertilizer contains nutrients other than primary nutrients ?
a. Diammonium phosphate
b. Urea
c. Ammonium sulphate
d. Ammonium nitrate

148. What is the acid equivalent of 100 kg of ammonium sulphate nitrate ?
a. 60 kg $CaCO_3$ b. 80 kg $CaCO_3$
c. 94 kg $CaCO_3$ d. 110 kg $CaCO_3$

Answers					
	135. c	138. c	141. c	144. a	147. c
	136. d	139. a	142. c	145. c	148. d
	137. c	140. d	143. c	146. b	

149. Which fertilizer is physiologically neutral ?
a. Calcium ammonium nitrate
b. Ammonium sulphate nitrate
c. Ammonium nitrate
d. Ammonium chloride

150. For water logged rice cultivation, the fertilizer that may be avoided is
a. NH_4Cl b. $CO(NH_4)_2$
c. $NaNO_3$ d. $(NH_4)_2SO_4$

151. Range of total nitrogen content in Indian soil is _____.
a. 0.05 - 3.5% b. 0.1 - 1.0%
c. 0.02 - 0.15% d. 0.02 - 2.5%

152. Single super phosphate is best suitable for
a. Neutral and alkaline soils
b. Neutral and acid soils
c. Acid and alkaline soils
d. Neutral soils only

153. Mineralization of soil nitrogen occurs when C : N ratio of organic matter is
a. < 20 : 1 b. 20 – 30 : 1
c. > 30 : 1 d. > 300 : 1

154. What is the desired ratio of NPK India?
a. 2 : 1 : 1 b. 3 : 2 : 1
c. 4 : 2 : 1 d. 4 : 2 : 2

155. Percentage of citrate P_2O_5 in rock phosphate is
a. 25 – 35 % b. 5 – 17 %
c. 22 – 26 % d. 12 – 18 %

156. KCl. $MgCl_2.6\ H_2O$ is the chemical composition of
a. Langbeinite b. Carnalite
c. Sylvite d. Sylvinite

157. Who discovered the essentiality of iron to plants ?
a. Gris
b. C. Sprengel
c. A.L. Sommer and C.P. Lipman
d. Theodore de Saussure

158. _____ increases the vigour and disease resistance to plants.
a. N b. K
c. S d. Ca and Mg

159. Which nutrient is essential for stomatal regulations in plants ?
a. Ca b. Mg
c. K d. Mo

160. What is the percentage of major nutrients in well rotted FYM ?
a. 0.5 % N, 0.2 % P_2O_5, 0.5 % K_2O
b. 0.5 % N, 0.2 % P, 0.5 % K
c. 0.3 % N, 0.1% P2O5, 0.3% K
d. 0.3% N, 0.1 % P, 0.3% K

161. Biofertilizers are applied as
a. Seed treatment
b. Seedling root dip
c. Soil treatment
d. All

162. The pollutants of soil and water from phosphate fertilizer industries are
a. Uranium b. Fluoride
c. Cadmium d. All

163. A primary standard should be
a. In a stage of high purity
b. Should not be hygroscopic
c. Efflorescent
d. Should be stable in solid as well as solution
e. All

Answers					
	149. a	152. a	155. b	158. b	161. d
	150. c	153. a	156. b	159. c	162. d
	151. d	154. c	157. a	160. a	163. e

164. What is known by Blue Vitriol ?
a. $Cu\ SO_4.\ 5H_2O$
b. $Fe\ SO_4.\ 7H_2O$
c. $Mg\ SO_4.\ 7H_2O$
d. $Ca\ SO_4.\ ½\ H_2O$

165. What is known by quick lime ?
a. KNO_3 b. $NaHCO_3$
c. NaCl d. CaO

166. Total hardness of water sample contains only
a. Ca^{2+} b. Mg^{2+}
c. K^+ d. Both a and b

167. Unit of electrical conductivity (EC) is/are
a. Micro mhos /cm
b. Milli mhos/cm
c. dS/m
d. All

168. For a good water sample, the SAR value must be
a. < 10 b. < 20
c. < 5 d. < 1

169. The water is not safe to use if RAC value of the water exceeds
a. 2.25 meq/L b. 2.5 meq/L
c. 2.0 meq/L d. 5.0 meq/L

170. In tobacco KNO_3 improves
a. Burning quality
b. Earthly flavour
c. Both a and b
d. None

171. Which of the following is Nessler's reagent ?
a. I_4HgK_2
b. $HgOHg\ (NH_2)I$
c. KOH
d. None

172. Infiltration rate of water in soil is affected by
a. Soil type
b. Soil structure
c. Initial soil water level
d. All

173. Suppose a soil is sandy, what is the value of bulk density above which it will restrict root growth ?
a. 1.6 g/cc b. 1.7 g/cc
c. 1.8 g/cc d. 1.5 g/cc

174. Pesticides include
a. Herbicides b. Insecticides
c. Fungicides d. All

175. Triazine herbicides include
a. Atrazine b. Limozine
c. Cyannizine d. All

176. Carbamate fungicides include
a. Carboryl, Methomyl and Carbofuron
b. Carbedazim, Benomyl and Thiophanate
c. Phorate, Chlorpyrifos and Isophos
d. All the above

177. Organophosphates includes
a. Carboryl, Methomyl and Carbofuron
b. Carbedazim, Benomyl and Thiophanate
c. Phorate, Chlorpyrifos and Isophos
d. All the above

178. Carbamate based insecticides include
a. Carboryl, Methomyl and Carbofuron
b. Carbedazim, Benomyl and Thiophanate
c. Phorate, Chlorpyrifos and Isophos
d. All the above

Answers					
	164. a	167. d	170. a	173. c	176. b
	165. d	168. a	171. a	174. d	177. c
	166. d	169. a	172. d	175. d	178. a

179. Nematicides include
a. D-D
b. Metham-sodium
c. Methyl bromide
d. All

180. If soil A is having higher buffering capacity than soil B, then
a. Soil A will require less lime than soil B for pH
b. Soil A will require more lime than soil B for pH
c. Both the soil will require same amount of lime
d. None of the above

181. Variable pH change of a soil is
a. pH dependent
b. pH independent
c. Both a and b
d. None

182. Variable charge of a soil is due to
a. Organic colloids b. 1 : 1 minerals
c. Both a and b d. All

183. The proportion of nutrient in the soil reserve is called as
a. Quantity factor b. Intensity factor
c. Both a and b d. None

184. The index tissue for sampling sugarbeet is
a. Recently matured leaf
b. Youngest matured leaf blade
c. 3rd leaf from top
d. Petioles of recently matured leaf

185. Which of the following is a Lewis acid ?
a. $AlCl_3$ b. $SnCl_4$
c. $FeCl_3$ d. All

186. Which of the following is/are (an) example(s) for reducing sugars ?
a. Glucose b. Fructose
c. Lactose d. All

187. If fertilizer recommendation has been given as 0 then the soil test value of the nutrient must be
a. High b. Very high
c. Medium d. Low
e. Very low

188. Which of the following is a brief key to Fe diagnosis ?
a. Mottled yellow-green leaves with yellowish veins
b. Mottled yellow-green leaves with green veins
c. Brownish black spots (e.g. on legumes, potatoes)
d. Youngest leaf has white tip
e. Youngest leaf is brownish or dead (e.g. on beet)

189. The electrode of the pH meter consists of what element in contact with a solution of potassium chloride ?
a. Hg b. Mg
c. Zn d. Ag

190. Which of the following is a conversion factor for ppm and percentage ?
a. % × 10,000 = ppm/100
b. % × 10,000 = ppm/200
c. % × 10,000 = ppm
d. None

191. The book 'Principle of Soil Chemistry' was written by
a. K.H.Tan b. Kononova
c. Adams d. Russel

Answers					
	179. d	182. c	185. d	188. b	191. a
	180. d	183. b	186. d	189. a	
	181. a	184. d	187. b	190. c	

192. The book 'Soil condition and plant growth' was written by
a. K.H.Tan b. Kononova
c. Adams d. Russel

193. The book 'Soil fertility in India' was written by
a. J.S.Kanwar b. Yawalkar
c. Agarwal d. Black

194. The book 'Soil physics' was written by
a. Oswall b. Hillel
c. J.S. Kanwar d. Stevenson

195. The smallest volume of soil that can be recognized as a soil individual is called as
a. Pedon b. Polypedon
c. Soil profile d. Soil horizon

196. Soil horizons A, B and C (A+B+C) are collectively called as
a. Pedon b. Soil profile
c. Soil regolith d. Soil solum

197. Which of the following soil classification is followed in India ?
a. USSR soil classification
b. USDA soil classification
c. Marbut's soil classification
d. Coffey's soil classification

198. What is the percentage of base saturation in mollic epipedon ?
a. More than 50 %
b. More than 35 %
c. Less than 35 %
d. Less than 50 %

199. Of the following, which is an example of basic igneous rock ?
a. Basalt b. Granite
c. Gabbro d. Syenite

200. Of the following, which is an example of sedimentary rock ?
a. Granite b. Quartzite
c. Sandstone d. Slate

Answers

192. d	195. a	198. b
193. c	196. c	199. a
194. a	197. b	200. c

19

Memory Based ARS/SRF Questions

QUESTIONS :

1. The dominant spectral colour in Munsell colour chart indicates
   a. Hue b. Value
   c. Chroma d. All

2. Relative purity or strength of spectral colour in Munsell colour chart indicates
   a. Hue b. Value
   c. Chroma d. All

3. What is the critical limit of Oxygen Diffusion Rate?
   a. 20×10^{-8} g / cm^2 / min
   b. 22.9×10^{-8}
   c. 3.9×10^{-8} d. 25×10^{-8}

4. With the increase in compactness and wetness of the soils, thermal conductivity will be
   a. Increased b. Decreased
   c. No change d. None

5. The pF scale was given by
   a. Sorenson b. Schofield
   c. Chepil and Woodruff
   d. White and Beckett

6. Soil compaction, increases the
   a. Bulk density
   b. Hydraulic conductivity
   c. Macrospores
   d. Water intake rate

7. Oxidation of organic carbon in soil sample can be obtained by treatment with
   a. 10% H_2O_2 b. 20% H_2O_2
   c. 30% H_2O_2 d. 50% H_2O_2

8. Which of the soil materials listed below is likely to have the smallest bulk density?
   a. Sand b. Silt loam
   c. Peat d. Sandy loam

9. Occurrence of quartz in high amounts makes a rock
   a. Acidic b. Basic
   c. Hard d. Soft

10. Formation of the soil is the result of
    a. Action of wind
    b. Chemical processes
    c. Bio-chemical processes
    d. Physical processes

11. Terai soils are generally deficient in
    a. Zn b. Cu
    c. Mn d. Fe

12. Alfisols are usually _____ in fertility and are used as either crop land or forest land or range land.
    a. High b. Medium
    c. Low d. Extremely low

13. Potassium and ammonium ions are having size to fit in the crystals units of
    a. Vermiculite
    b. Montmorillonite
    c. Kaolinite d. None

14. Ammonia is lost in significant quantities from
    a. Alkaline soils b. Acidic soils
    c. Saline soils d. None

15. The diameter of most erodible soil particles is
    a. 0.2 mm b. 0.1 mm
    c. 0.3 mm d. 0.4 mm

16. The colloidal surface area in the upper 15cm of a hectare of clay soil could be as high as km
    a. 700 b. 7000
    c. 70000 d. 700000

Answers																
	1.	a	4.	a	7.	c	10.	c	13.	a	16.	d				
	2.	c	5.	b	8.	c	11.	a	14.	a						
	3.	a	6.	a	9.	a	12.	a	15.	a						

17. Which of the following nutrients are energy exchangers?
    a. Hydrogen and oxygen
    b. Nitrogen and phosphorus
    c. Potassium and sodium
    d. All

18. Downward movement of food synthesized in leaves takes place through
    a. Xylem b. Phloem
    c. Both d. None

19. In acid soil rock phosphate should be applied
    a. At the time of sowing
    b. 5 days before sowing
    c. 15 days before sowing
    d. 30 days before sowing

20. Which of the following is the best method for applying phosphorus in soil?
    a. Broadcast
    b. Band placement
    c. Broadcast and soil incorporation
    d. None

21. Which of the following is a biofertilizer?
    a. FYM b. Compost
    c. Green manure d. BGA

22. BGA grows best in
    a. Upland rice b. Lowland rice
    c. Sorghum d. Jute

23. The book 'Biofertilizers in Agriculture' was written by
    a. Stevenson b. Rich & Kunze
    c. Hillel d. Subba Rao

24. Soils formed under the influence of climate and vegetation are grouped into
    a. Zonal soils b. Azonal soils
    c. Intrazonal soils d. None

25. The smallest volume of soil that can be recognized as a soil individual is called as
    a. Pedon b. Polypedon
    c. Soil profile d. Soil horizon

26. Soil horizons A, B and C (A+B+C) are collectively called as
    a. Pedon b. Soil profile
    c. Soil regolith d. Soil solum

27. Which of the following soil classification is followed in India?
    a. USSR soil classification
    b. USDA soil classification
    c. Marbut's soil classification
    d. Coffey's soil classification

28. What is the percentage of base saturation in mollic epipedon?
    a. More than 50 %
    b. More than 35 %
    c. Less than 35 %
    d. Less than 50 %

29. The epipedon that resembles mollic epipedon in all the features except in the limit of acid soluble phosphates or the length of period of moisture availability is
    a. Umbric epipedon
    b. Histic epipedon
    c. Anthropic epipedon
    d. Plaggen epipedon

30. Soil temperature regime that has a mean annual temperature higher than 0 °C, but lower than 8 °C is called as
    a. Pergillic b. Cryic
    c. Mesic d. Frigid

31. Soil order that has little or no evidence of development of pedogenic horizons is
    a. Aridisols b. Vertisols
    c. Entisols d. Inceptisols

Answers																
	17.	a	20.	b	23.	d	26.	c	29.	c						
	18.	b	21.	d	24.	a	27.	b	30.	b						
	19.	d	22.	b	25.	a	28.	a	31.	c						

32. Of the following, which is an example of basic igneous rock?
a. Basalt b. Granite
c. Gabbro d. Syenite

33. Of the following, which is an example of sedimentary rock?
a. Granite b. Quartzite
c. Sandstone d. Slate

34. Equivalent weight =
a. Molecular weight/ No. of electrons lost or gained
b. Atomic weight/ No of electrons lost or gained
c. Molecular weight / Valency
d. Atomic weight / Valency

35. Number of equivalents of a substances dissolved in 1 L of a solution is called as
a. Molarity b. Molality
c. Normality d. Formality

36. A measure of the effective concentration of a reactant or product in a chemical reaction is called as
a. Activity
b. Activity co-efficient
c. Ionic strength
d. None

37. Ion activity co-efficient is calculated by
a. Donan equation
b. Debye-Huckel equation
c. Henderson-Hasselbalch equation
d. Van't Hoff equation

38. If A, E, M and V are atomic weight, equivalent weight, molecular weight and valency, respectively, then the correct relationship is given by which of the following equation?
a. $A = E \times M$ b. $E = M \times V$
c. $M = E \times A$ d. $A = E \times V$

39. The normality of a solution of sodium hydroxide 100 ml of which contains 4 g sodium hydroxide is
a. 0.1 b. 1.0
c. 4.0 d. 0.4
e. 0.5

40. Lignin theory was proposed by
a. Waksman b. Stevenson
c. Kononova d. Jenny

41. Of the following humic substances, which is insoluble in both acid and alkali?
a. Humic acids b. Fulvic acids
c. Humin d. All

42. Of the following humic substances, which is having highest molecular weight?
a. Humic acids b. Fulvic acids
c. Humin d. All

43. What is the range of pH in pH scale?
a. 0 – 14 b. 1 – 14
c. – 14 to + 14 d. None

44. Soil Information Systems are needed to
a. To serve as a basis of transfer of technology
b. To aid in decision making level
c. Both a and b
d. None of the above

45. Geographical information systems (GIS) is a process to
a. Input b. Store
c. Retrieve d. Analyze
e. Display geographic data
f. All the above

Answers								
	32. a	35. c	38. -	41. c	44. c
	33. c	36. a	39. b	42. c	45. f
	34. c	37. b	40. a	43. a	

46. Ikisan is an initiative of which organization?
a. ITC
b. Nagarjuna group
c. Chambal group d. None

47. Solubility of Zn decreases by what orders of magnitude for each unit increase in pH?
a. 1 b. 2
c. 3 d. 4

48. Which of the following soils are prone to Zn Deficiency?
a. Sodic and saline soils
b. Peat soils
c. Soils with high available P and Si status
d. All the above

49. Fe deficiency in Mango is similar to which of the following?
a Se b. P
c. N d. Cl toxicity

50. Khaira disease in rice results due to the deficiency of
a. NH_4^+ b. P
c. Zn d. Ca

51. Which of the following is the critical symptom of boron deficiency in cauliflower?
a. Young curds developing small water-soaked areas
b. Turning brown, necrotic and decay
c. Leaf margins becoming chlorotic & curled
d. Petioles developing small blisters
e. All the above

52. Symptoms of tip burn in plants can be induced by
a. Pathogens b. Air pollution
c. Salinity d. Ca deficiency

53. Which of the following is used as microbial culture for compost making?
a. Cellulolytic fungal culture
b. Phosphotika
c. Azotobacter culture
d. All

54. Possible indicator(s) of changes in soil quality is/are
a. Soil fertility and nutrient balance
b. Soil physical conditions
c. Soil Organic Matter status
d. All the above

55. Of the following, what is/are the example(s) for physical degradation?
a. Crusting b. Hard pan
c. Poor physical condition
d. Waterlogging of foot hill lands
e. All the above

56. Chemical Oxygen Demand (COD) is a measure of
a. The total amount of oxygen, which is required to completely oxidize all of the organic matter in a water sample to carbon-di-oxide and water
b. The amount of oxygen required by microorganisms to decompose the organic matter in water sample under specific conditions
c. Both a and b
d. None of the above

57. "Heavy metals" are chemical elements with a specific gravity that is at
a. Least 5 times the specific gravity of water
b. Least 2 times the specific gravity of water
c. Least 3 times the specific gravity of water
d. Least 1 times the specific gravity of water

Answers								
	46. b	49. d	52. c	55. e
	47. b	50. c	53. d	56. a
	48. d	51. e	54. d	57. a

58. Soil function as
a. Chemical filter b. Biological filter
c. Both a and b d. None

59. A standard solution is one whose strength is
a. Known b. Unknown
c. Both a and b d. None

60. What is the specific conductivity of KCl solution at 25°C?
a. 1.4118 dS/m b. 14.118 dS/m
c. 0.14118 dS/m d. None

61. Buffer solution for pH measurements include
a. pH 4.0 b. pH 7.0
c. pH 9.2 d. All

62. Which is a Ca indicator?
a. Mureoxide b. EBT
c. Both a and b d. None

63. Devarda alloy is composed of
a. 50% Cu, 45% Al and 5% Zn
b. 50% Zn, 45% Al and 5% Cu
c. 50% Al, 45% Cu and 5% Zn
d. 50% Al, 45% Cu and 5% Zn

64. In tobacco KNO_3 improves
a. Burning quality b. Earthly flavour
c. Both a and b d. None

65. 1 meq of HCl is equal to _____ in nitrogen determination.
a. 1.4 mg of N b. 14 mg of N
c. 0.14 mg of N d. 140 mg of N

66. Which of the following is Nessler's reagent?
a. I_4HgK_2 b. $HgOHg(NH_2)I$
c. KOH d. None

67. Soil respiration test is an indicator of
a. Good soil b. Bad soil
c. Soil health d. All

68. Soil stability serves as a qualitative indicator of
a. Biological activity b. Energy flow
c. Nutrient cycling d. All

69. Pesticides include
a. Herbicides b. Insecticides
c. Fungicides d. All

70. Exchangeable acidity of a soil
a. Is a sum of total H^+ and Al^{3+} in the soil
b. Consists of monomeric Al or Fe
c. Is more when pH is < 5.5
d. All the above

71. When a soil is having smaller value of lime potential, its buffering capacity will be
a. More b. Less
c. Unity d. None

72. Higher the value of ARcK, the tendency for K supply is
a. Lower b. Higher
c. Same d. None

73. The total number of essential nutrient elements required for plant growth is
a. 16 b. 17
c. 20 d. 21

74. The form(s) of phosphorous absorbed by plants is/are
a. HPO_4^{3-} b. $H_2PO_4^-$
c. HPO_4^{2-} d. Both a and b
e. All the above

75. Of the following, which nutrient element(s) is/are essential for protein synthesis?
a. Nitrogen b. Phosphorous
c. Potassium d. Ca and Mg

Answers												
	58.	c	61.	d	64.	a	67.	d	70.	d	73.	b
	59.	a	62.	a	65.	b	68.	d	71.	a	74.	d
	60.	a	63.	a	66.	a	69.	d	72.	b	75.	a

76. The nutrient element(s) involved in stomatal regulation of cell is/are
a. Ca and Mg b. Nitrogen
c. Potassium d. Both a and c

77. Alkaline permanganate method is used for the estimation of
a. Total nitrogen
b. Available nitrogen
c. Nitrate nitrogen
d. Ammonical nitrogen

78. Available sulphur in soils can be extracted by
a. 1% NaCl b. $Ca(H_2PO_4)_2$
c. 0.15% $CaCl_2$ d. All

79. Nutrient mobility concept was given by
a. Cate and Nelson
b. Arnon and Stout
c. Larsen
d. Bray

80. Nitrogen is being continuously lost from the soil. In cultivated soils, the greatest loss is through
a. Leaching b. Crop removal
c. Grazing d. Erosion

81. In the leguminous plants, the nitrogen fixing enzymes are located in
a. Nodules of root b. Bacteria
c. Plant surface d. All

82. Which of the following micronutrient deficiency results in improper pollen development and pollen tube growth on the stigmatic surface of a flower?
a. Mn b. Zn
c. B d. Mo

83. Deflocculation of soil aggregates is caused by the presence of this element in excess is
a. Mg^{2+} b. Ca^{2+}
c. Na^+ d. K^+

84. Which of the following is more hazardous?
a. UV- rays b. ∝ rays
c. γ rays d. Infrared rays

85. Nitrogen fixing filamentous bacteria is
a. *Rhizobium sp* b. *Azotobacter*
c. *Frankia* d. *Pseudomonas*

86. The maximum water holding capacity is seen in
a. Clay soil b. Loamy soil
c. Peaty soil d. Silty soil

87. Which of the following is fine textured?
a. Clay loam b. Silt loam
c. Loamy sandy clay d. Loamy clay

88. Saltation is a type of
a. Water erosion
b. Wind erosion
c. Accumulation of salt in the sea
d. None of the above

89. NPK content of FYM is
a. 0.5-0.2-0.5 b. 0.2-0.6-0.8
c. 0.7-0.5-0.2 d. 0.5-0.5-0.5

90. Metamorphic rock is
a. Slate b. Shale
c. Granite d. Sandstone

91. The most productive soil of India is
a. Alluvial soil b. Laterite soil
c. Black soil d. Saline soil

92. Imporatant pulse crop of India is
a. Blackgram b. Greengram
c. Redgram d. Gram

Answers												
	76.	c	79.	d	82.	c	85.	a	88.	b	91.	a
	77.	b	80.	b	83.	c	86.	a	89.	a	92.	d
	78.	d	81.	d	84.	a	87.	d	90.	a		

93. Wheat mostly takes nitrogen in the form of
a. NO_2 b. NO_3
c. NH_4 d. N_2O

94. Optimum pH for fungus growth is
a. 3.8-5.6 b. 5.6-9.6
c. 7.0 d. 5-10

95. Agar agar is extracted from
a. Red algae b. Green algae
c. Blue green algae d. None

96. The stable product of dinitrogen reduction by *Rhizobium* is
a. NO_3 b. NO_2
c. NH_4 d. N_2O

97. By the uptake nitrogen activity the up took nitrogen is used up for
a. Production of reducing power
b. ATP generation
c. Both a and b
d. None of the above

98. Aerobic nitrogen fixing bacteria is
a. *Azospirillum* b. *Methanococus*
c. *Clostridium* d. *Azotobacter*

99. Methane content of biogas varies from
a. 50-60 % b. 40-45 %
c. 80-85 % d. 60-70 %

100. Rhizosphere term was coined by
a. Hiltner b. Ruiner
c. Picci d. Walksman

101. An positive interaction in which one organism either gets benefit nor harmed, this kind of interaction is known as
a. Neutralism b. Amensalism
c. Symbiosis d. Commensalism

102. The pH of the solution is 12, then the $[OH^-]$ ion concentration will be
a. 10^{12} b. 0.02
c. 0.0002 d. 10^{-12}

103. Which of these soils has high porosity?
a. Sandy soil b. Sandy loam
c. Loamy sand d. Clay loam

104. Water potential (ψ w) is made up of three components viz. ψ s (osmotic potential) ψ p (Turgor pressure potential) ø m (matric potential) when glycophytes is subjected to drought which one is first affected
a. ψ s b. ψ p
c. ψ m d. ψ w

105. Plant posses mechanism themselves to adapt for drought by
a. Increasing ψ s
b. Increasing ψ p
c. Decreasing ψ s
d. Decreasing ψ p

106. Young chlorate leaves develops small necrotic spot in sunflower is due to
a. Mg deficiency
b. K deficiency
c. Mn deficiency
d. *Alternaria soloni*

107. Water is universal solvent because of
a. High dielectric constant
b. Specific heat
c. High viscosity
d. All the properties that water have

108. Hydrogen oxidizing bacteria obtain energy for their metabolic growth by which of the following way
a. ATP generation during H_2 oxidation
b. Oxidation of H_2 to CHO
c. Absorbing CO_2, used as electron donor
d. None of the above

Answers								
	93. b	96. e	99. a	102. b	105. b	108. a		
	94. a	97. c	100. a	103. d	106. d			
	95. a	98. d	101. d	104. b	107. a			

109. H_2S serves as electron donor for
a. *Bacillus* b. *Deronia*
c. *Rhizobium* d. *Beggiatoa*

110. Methanomonas oxidize methane to CO_2 by using
a. Ribulose monophosphate path way
b. Serine path way
c. Ribulose dephosphate path way
d. Either a or c

111. Oxygen is toxic to nitrogenase because
a. Competitor for e-
b. Denatures disulphide bond
c. Reduces n fixation
d. both a and b

112. The following organism used in mine extraction
a. *Thiobacillus thiooxidans*
b. *Ferrobacillus* sp
c. *Bacillus* sp
d. *Agaricus* sp

113. Which of the following is a cold sterilization agent?
a. UV rays b. Ethylene oxide
c. Liquid nitrogen d. Mineral oil

114. Richest/Widely occurring enzyme in world is
a. Rubisco of photosynthesis
b. Urease of urea transformation
c. Nitrogenase for N fixation
d. All

115. The source of oxygen for denitrifying bacteria for metabolism is
a. Atmosphere
b. water
c. CO_2
d. Reduction of nitrates

116. Principle form of soil Nitrogen available to field crops is
a. NH4 b. N_2
c. NO_3^- d. NO_2

117. Tip hooking in cauliflower is due to deficiency of
a. Ca b. Boron
c. Mn d. Mg

118. State which uses highest fertilizer per acre is,
a. Punjab b. Andhra Pradesh
c. Karnataka d. M.P.

119. Which of the following elements is essential for nodulation?
a. Mn b. Ca
c. Co d. B

120. In leghaemoglobin, the globulin part is produced by
a. Bacteriods b. host plants
c. Both a and b d. None

121. Which of the following is the indicator of air pollution?
a. *E.coli* b. Lichens
c. Fungi d. Algae

122. Pahala blight of sugarcane is due to the deficiency of
a. Zn b. Mn
c. B d. Ca

123. Folicellosis in citrus is due to deficiency of
a. Ca b. Mg
c. P d. Zn

124. Calcium deficiency in apple causes
a. Bitter pit b. Bronzing
c. Hollow heart d. Tip burn

Answers								
	109. b	112. b	115. d	118. a	121. b	124. a		
	110. d	113. c	116. c	119. c	122. b			
	111. d	114. a	117. b	120. c	123. d			

125. Blossom end rot in tomato is due to deficiency of
a. Mn b. Zn
c. Ca d. Mg

126. The element present in the pollen prevents the bursting and helps in pollen germination
a. B b. Co
c. Ca d. Mn

127. First permanent manurial experiment in India was started at
a. Coimbatore b. Kanpur
c. Pusa (Bihar) d. All

128. Equivalent acidity of ammonium sulphate is
a. 80 b. 60
c. 100 d. 110

129. Fertilizer that supplies nitrogen in both ammonical and nitrate forms is _____.
a. Calcium ammonium nitrate (CAN)
b. Urea
c. Ammonium sulphate
d. Ammonium chloride

130. Which is a slow release nitrogenous fertilizer?
a. Oxamide b. N-serve
c. AM d. ST

131. Lime requirement is calculated by
a. Shoemaker et al
b. Schoonover
c. Chepil and Woodruff
d. White and Beckett

132. Examples of natural chelates are
a. Citric acid and oxalic
b. EDTA and DTPA
c. Citric acid and oxalic and HEDTA
d. EDTA, DTPA and HEDTA

133. Calicoles plants prefer
a. NO_3-N b. NH_4 – N
c. Both a and b d. None

134. The method used to measure a nutrient concentration in soil at equilibrium with the same in soil solution is
a. E-value b. A-value
c. L-value d. None

135. Organic wastes used for composting are generally
a. Poor in NPK b. High in NPK
c. Moderate in NPK d. None

136. Acid soluble phosphatic fertilizer is/are
a. Monocalcium phosphate
b. Dicalcium phosphate
c. Tricalcium phosphate
d. Bone meal and basic slag

137. Which organic residue has the greatest C.N ratio?
a. Pine straw b. Cow manure
c. Red clover d. Rice straw

138. Erosion created by the activities of man and sometimes by animals is called as
a. Natural geological erosion
b. Geologic erosion
c. Accelerated soil erosion
d. All

139. In north-eastern hill regions of India, shifting cultivation is also called as
a. Jhum cultivation
b. Jhuming cultivation
c. Both a and b d. None

140. Total number of land capability classes in the land capability classification scheme
a. Six b. Seven
c. Eight d. Nine

Answers						
	125. c	128. d	131. a	134. a	137. a	140. c
	126. a	129. a	132. a	135. a	138. c	
	127. b	130. a	133. a	136. c	139. c	

141. How can soil erosion be measured?
a. Visual
b. Physical
c. Chemical
d. Biological indicators
e. All the above

142. Splash and sheet erosion are also known as
a. S inter-rill erosion
b. Gully erosion
c. Both a and b
d. None of the above

143. Methods of land evaluation includes
a. Qualitative
b. Quantitative
c. Both a and b
d. None of the above

144. Vegetated windbreaks are also called as
a. Shelterbelts b. Tree belts
c. Watershed d. None of these

145. LCC (Land capability class) 1 is denoted by which colour?
a. Light green b. Yellow
c. Red d. Blue

146. Which of the following is not a primary pollutant?
a. SO_2 b. H_2SO_4
c. CO
d. Particulate matter

147. Which of the following metals is responsible for Itai itai disease in human beings?
a. Zn b. Hg
c. Cd d. Fe

148. Eutrophication of lake is caused mainly by
a. P b. K
c. Mg d. Na

149. Which of these is a secondary air pollutant?
a. CO b. NOx
c. PAN d. CO_2

150. Which of these has highest Ozone depleting potential?
a. CFC b. Halon
c. HFC d. Methyl Bromide

151. Which of the following is not a source of greenhouse gasses?
a. A wind turbine
b. A coal fired power plant
c. A sport utility vehicle
d. Fertilizer

152. Which of the following is not a proxy of past climate?
a. Sun spot b. Fossils
c. Tree ring d. Corals

153. Blue baby disease is caused by
a. Fluoride b. Lead
c. Nitrate d. Mercury

154. Dissolved O_2 of water is determined by
a. Walkley and Black method
b. Winkler's method
c. Gravimetric method
d. Colorimetric method

155. Which minerals are found in the run-off from agricultural land?
a. P and C b. N and P
c. Fe and Mn d. K and As

156. Main component of biogas is
a. CH_4 b. CO_2
c. SO_2 d. N_2O

157. Mycorrhizae help in the uptake of
a. Potassium b. Phosphorous
c. Nitrate d. Boron

Answers						
	141. e	144. a	147. c	150. b	153. a	156. a
	142. a	145. a	148. a	151. a	154. b	157. b
	143. c	146. b	149. c	152. a	155. b	

158. Mn toxicity occur in soils with pH
a. Below 4.0 b. Below 4.5
c. Below 5.0 d. Below 5.5

159. Which is the indicator used for the estimation of CO_3^{2-} in the soil?
a. Phenolphthalein b. Methyl orange
c. Methyl red d. Both a and b

160. Buffer solution for pH measurements include
a. pH 4.0 b. pH 7.0
c. pH 9.2 d. All

161. Na is estimated by flame photometer in a
a. Blue flame b. Green flame
c. White flame d. Black flame

162. The water is not safe to use if RAC value of the water exceeds
a. 2.25 meq/L b. 2.5 meq/L
c. 2.0 meq/L d. 5.0 meq/L

163. NO_3^- is
a. Mobile in plants
b. Immobile in plants
c. Mobile in roots and immobile in shoots
d. None of the above

164. Suppose a soil is clayey, what is the value of bulk density above which it will restrict root growth?
a. 1.1 g/cc b. 1.34 g/cc
c. 1.2 g/cc d. 1.47 g/cc

165. Ammonium oxalate is also called as
a. Calcon reagent b. Ferroin reagent
c. Grigg's reagent d. All

166. Which of the following technique is used for the soil fertility evaluation?
a. Soil testing
b. Plant tissue testing
c. Biological testing
d. All

167. Particle density is also called as
a. True density
b. Apparent specific gravity
c. Dry particle density
d. Both a and b
e. All the above

168. Which method is used for analyzing water in different fertilizers?
a. Oven-dry method
b. Vacuum desiccator
c. Karl Fisher titration method
d. Evaporation method
e. All the above

169. Devarda alloy converts
a. NO_3^- into NH_4^+
b. NH_3 into NO_3^-
c. NO_3^- into organic nitrogen
d. None

170. Who propounded pH scale?
a. Sorenson b. Arheneous
c. Arnon d. Stout

171. Which of the following is a Lewis acid?
a. $AlCl_3$ b. $SnCl_4$
c. $FeCl_3$ d. All

172. Which of the following solvent is/are amphoteric in nature?
a. Water b. Alcohol
c. Acetylene d. Both a and b

173. Which of the following solvents is/are protophillic solvent?
a. HF b. H_2O
c. Alcohol d. All

Answers						
	158. c	161. a	164. d	167. a	170. a	173. a
	159. a	162. a	165. c	168. e	171. d	
	160. d	163. a	166. d	169. a	172. d	

174. Phenolphthalein becomes _____ at pH 8.2.
a. Colourless b. Red
c. Pink d. Black

175. The number of atoms in a flame in a particular excited energy state *(n *)* and the number of atoms in the ground or unexcited state *(n)* are related by which of the following familiar boltzman relationship?
a. $n^*/n = A \exp(-\Delta E/KT)$
b. $n^*/n = A \exp(-\Delta EK/T)$
c. $n^*/n = A \exp(-\Delta ExKT)$
d. 4. $n^*/n = AK \exp(-\Delta E/T)$

176. If fertilizer recommendation has been given as 0 then the soil test value of the nutrient must be
a. High b. Very high
c. Medium d. Low
e. Very low

177. Balanced Nutrition implies
a. No deficiencies
b. No excesses
c. No antagonisms
d. No negative interactions
e. All the above

178. When nutrient management is done by optimizing the benefits from all possible sources of plant nutrients then it is called
a. IPNS b. IPNSS
c. INM d. ISFM

179. Which of the following is/are (an) influencing factor for fertilizer use efficiency?
a. Genotype b. Irrigation
c. Weather
d. Soil management e. All the above

180. The mesofauna in soil has the size range of
a. > 2 mm b. 2- 0.2 mm
c. < 0.2 mm d. None

181. The rhizosphere zone extends from root surface within
a. 1-2 mm b. 5-10 mm
c. 15-20 mm d. 50-100 mm

182. Which of the following groups of soil algae are prokaryotes?
a. Green algae
b. Blue-Green algae
c. Yellow green algae
d. Diatoms

183. Fungi are
a. Photoautotrophs
b. Chemoautotrophs
c. Heterotrophs
d. None of the above

184. Which of the following groups represent single celled fungi?
a. Molds b. Mushrooms
c. Yeasts d. None of these

185. Individual fungal filaments are called
a. Hyphae b. Mycellium
c. Pseudopodia d. Flagella

186. Aflatoxin is a mycotoxin produced by
a. *Bacillus polymyxa*
b. *Aspergillus awamorii*
c. *Pseudomonas striata*
d. *Aspergillus flavus*

187. Penicillin was discovered by
a. Robert Koch
b. Alexander Fleming
c. Waksman
d. Winogradsky

Answers						
	174. a	177. e	180. b	183. d	186. d	
	175. a	178. a	181. a	184. c	187. b	
	176. b	179. e	182. b	185. a		

188. Soil microorganisms were classified as autochthanous and Zymogenous by
a. Winogradsky
b. Dobereiner
c. Beijerinck
d. None of the above

189. Bacteria thriving well within a temperature range of 15 - 45°C are called
a. Thermophillic b. Psychrophillic
c. Mesophillic d. None of these

190. The bacteria *Nitrosomonas*, *Nitrobacter*, *Thiobacillus* and *Ferrobacillus* fall under
a. Heterotrophs
b. Photoautotrophs
c. Obligate chemoautotrophs
d. None of the above

191. The bacteria *thiobacillus* converts
a. Ammonia to nitrite
b. Inorganic sulphur to sulphate
c. Ferrous iron to Ferric iron
d. None of the above

192. The most common genera of actinomycetes in soil is
a. *Nocardia*
b. *Micromonospora*
c. *Actinomyces*
d. *Streptomyces*

193. The thermophillic actinomycetes genera most commonly occurring in compost heaps are
a. *Actinomyces* and *Nocardia*
b. *Actinoplanes* and *Micromonospora*
c. *Thermoactinomyces* and *Streptomyces*
d. None of the above

194. Which of the following is an example of ectotrophic mycorrhizal fungi?
a. Glomus b. Scutellospora
c. Acaulospora d. Boletus

195. Chlorophyceae and Cyanophyceae are families of soil _____.
a. Algae b. Fungi
c. Actinomycetes d. Myxomycetes

196. Which of the followings fixes nitrogen in a photoautotrophic manner?
a. *Arthrobacter*
b. *Rhodopseudomonas*
c. *Desulfovibrio*
d. *Methanobacterium*

197. Which of the followings fixes nitrogen while reducing sulphates?
a. *Arthrobacter*
b. *Rhodopseudomonas*
c. *Desulfovibrio*
d. *Methanobacterium*

198. The other protein fraction in nitrogenase besides the Fe-protein fraction is
a. S-protein fraction
b. P-protein fraction
c. Mn-protein fraction
d. Mo-Fe protein fraction

199. The Mo-Fe protein fraction of nitrogenase is also termed as
a. Mo-nitrogenase b. Fe-nitrogenase
c. Dinitrogenase d. None of these

200. The Fe-protein fraction of nitrogenase is also termed as
a. Fe-nitrogenase
b. Dinitrogenase
c. Dinitrogen oxidase
d. Dinitrogen reductase

Answers					
	188. a	191. b	194. d	197. c	200. d
	189. c	192. d	195. a	198. d	
	190. c	193. c	196. b	199. c	

20

IARI

Model Test Questions

QUESTIONS :

1. What is the relationship between pH and Eh ?
   a. Eh = pH/0.0591
   b. pH + Eh = 0.0591
   c. pH = Eh/0.0591
   d. Eh – 0.0591 = pH

2. Scale map used in detailed soil survey is
   a. 10000 b. 50000
   c. 100000 d. 1000000

3. Scale map used in reconnaissance soil survey is
   a. 10000 b. 50000
   c. 100000 d. 1000000

4. What is the pH of saline soils ?
   a. < 7.5 b. < 6.5
   c. < 9.5 d. < 8.5

5. What is the SiO_2/R_2O_3 ratio for laterite soil ?
   a. < 1.5 b. < 1.0
   c. > 1.5 d. < 2.0

6. What are the major minerals present in Oxisols ?
   a. Montmorillonite and Sesquioxide
   b. Kaolinite and Sesquioxide
   c. Kaolinite and Montmorillonite
   d. Vermiculite and Sesquioxide

7. What is the percentage of organic matter in Histosols ?
   a. > 25.0 b. < 25.0
   c. < 30.0 d. > 30.0

8. Kandic horizon is present in
   a. Oxisols b. Mollisols
   c. Histosols d. Vertisols

9. Negative ions are formed from neutral atoms by gain of
   a. Positrons b. Neutrons
   c. Protons d. Electrons

10. Ammonium sulphate nitrate is produced by the reaction of
    a. Nitric acid and sulphuric acid with NH_3
    b. Nitric acid with ammonium sulphate
    c. Sulphuric acid with ammonium sulphate
    d. Nitric acid and hydrochloric acid with NH_3

11. Mineralization of soil nitrogen occurs when C : N ratio of organic matter is
    a. < 20 : 1 b. 20 – 30 : 1
    c. > 30 : 1 d. > 300 : 1

12. Hen and Chicken of Grapes disease is caused by the deficiency of
    a. Molybdenum b. Boron
    c. Chlorine d. Manganese

13. Which fertilizer is physiologically neutral ?
    a. Calcium ammonium nitrate
    b. Ammonium sulphate nitrate
    c. Ammonium nitrate
    d. Ammonium chloride

14. C : N ratio of well decomposed compost is
    a. 100 : 1 b. 20 : 1
    c. 50 : 1 d. 10 : 1

15. Dominant clay mineral in semi-arid soils with favourable calcium and magnesium environment is
    a. Montmorillonite b. Vermiculite
    c. Muscovite d. Chlorite

16. Histic horizon is present in
    a. Histosols b. Mollisols
    c. Andisols d. Gellisols

Answers															
	1.	c	4.	d	7.	b	10.	a	13.	a	16.	a			
	2.	a	5.	d	8.	a	11.	a	14.	d					
	3.	b	6.	b	9.	d	12.	b	15.	a					

17. Soil order hierarchy is from _____ to _____.
    a. Entisols, Oxisols
    b. Inceptisols, Oxisols
    c. Entisols, Alfisols
    d. Inceptisols, Alfisols

18. The journal 'Soil Science' is published by
    a. The Netherlands b. America
    c. Australia d. Canada

19. What is the depth of plough layer of soil ?
    a. 0 – 10 cm b. 0 – 15 cm
    c. 0 – 20 cm d. 0 – 25 cm

20. Saline tolerant fruit crop is
    a. Mango b. Peach
    c. Date palm d. Plum

21. Which micronutrient causes lime-induced chlorosis ?
    a. Mn b. Cu
    c. Fe d. Zn

22. Swelling and shrinking is a morphological process in
    a. Red soils b. Black soils
    c. Laterite soils d. Lateritic soils

23. Soil texture is mainly influenced by
    a. Parent material b. Relief
    c. Climate d. Vegetation

24. Which micronutrient mainly influences the nitrogenase activity ?
    a. B b. Cu
    c. Mn d. Mo

25. Phosphogypsum contains _____ as an impurity.
    a. Chlorine b. Fluorine
    c. Cadmium d. All

26. Gypsic diagnostic subsurface horizon is found in
    a. Aridisols b. Vertisols
    c. Entisols d. Inceptisols

27. Increase in soil pH increase the availability of
    a. Mn b. Fe
    c. Mo d. Cu

28. In soil moisture determination, the temperature at which soil sample dried in oven is
    a. 105 °C b. 110 °C
    c. 120 °C d. 120 °C

29. Fire hazardous nitrogenous fertilizer is
    a. $(NH_4)_2SO_4$ b. NH_4Cl
    c. NH_4NO_3 d. Both a and c

30. Examples for Zn rich minerals are
    a. Smithsonite and Chalcopyrites
    b. Cuprite and Chalcopyrites
    c. Zn Sphalerite and Cuprite
    d. Smithsonite and Zn Sphalerite

31. Examples for Cu rich minerals are
    a. Smithsonite and Chalcopyrites
    b. Cuprite and Chalcopyrites
    c. Zn Sphalerite and Cuprite
    d. Smithsonite and Zn Sphalerite

32. Exfoliation occurs in which of the following rocks ?
    a. Granite b. Granodiorite
    c. Basalt d. Andesite

33. What is the major worldwide soil constrain ?
    a. Landslide
    b. Water inundation
    c. Soil erosion
    d. All

Answers															
	17.	a	20.	c	23.	a	26.	a	29.	c	32.	a			
	18.	a	21.	c	24.	d	27.	c	30.	d	33.	c			
	19.	b	22.	b	25.	b	28.	a	31.	d					

34. Which is/are the main mineral(s) in sand and silt fractions in soil ?
a. Feldspar b. Quartz
c. Mica d. All

35. Common P - fertilizer used in India is
a. Diammonium Phosphate
b. Single superphosphate
c. Rock phosphate
d. Triple superphosphate

36. Triacid method of plant sample is not used for the estimation of
a. N, P and K b. P and K
c. S only d. N and S

37. Permissible range of Residual Sodium Carbonate (RAC) in irrigation water
a. < 0.75 b. < 1.0
c. < 1.25 d. < 1.50

38. Cementation of soil particles may be caused by
a. Cations
b. Oxides of iron and aluminium
c. Anions
d. Humus substances
e. All the above

39. Driving force for unsaturated flow in soil is
a. Gravitational force
b. Matric suction
c. Osmotic suction
d. Solute potential

40. To be practical, a nitrification inhibitor should kill or inhibit_____.
a. *Nitrosomonas* b. *Nitrobacter*
c. Either a or b d. None

41. Humic acid precipitates at the pH
a. 5.0 b. 5.2
c. 4.8 d. 4.5

42. Itai Itai disease is caused by
a. Cd toxicity b. Pd toxity
c. Cd deficiency d. Pd deficiency

43. What is the SI unit of cation exchange capacity ?
a. meq/100g b. cmol(p+)/kg
c. mmho/100g d. All

44. Direct methods of soil structure characterization and evaluation include
a. Microscopic methods
b. Macroscopic methods
c. Wet and dry sieving methods
d. Both a and b
e. All the above

45. Fertilizer quality control organization is located in
a. Faridabad b. Delhi
c. Mumbai d. Chennai

46. Nutrient element required for disease and pest resistant in plants is
a. Nitrogen b. Potassium
c. Calcium d. Sulphur

47. What is the pH of 0.001M HCl ?
a. 3.3 b. 3.0
c. 4.3 d. 4.1

48. First Zn deficiency in India was reported by
a. Hegdey
b. Arnon and Stout
c. Nicholas
d. Y. L. Nene

49. Nutrient element that is present in methionine is
a. Nitrogen b. Magnesium
c. Sulphur d. Iron

Answers														
	34.	b	37.	c	40.	a	43.	b	46.	b	49.	c		
	35.	a	38.	e	41.	c	44.	d	47.	b				
	36.	d	39.	b	42.	a	45.	a	48.	d				

50. Bradyrhizobium is present in
a. Soybean nodules
b. Lentil nodules
c. Pea nodules
d. Both a and b
e. All the above

51. Co - ordination number of iron in Fe-Oxide
a. 6 b. 4
c. 8 d. 4

52. Range of redox potential at which NO_3^- reduction occurs
a. -220 to -240 mV
b. -280 to -220 mV
c. -220 to -260 mV
d. -260 to -280 mV

53. Range of redox potential at which Mn reduction occurs
a. -220 to -240 mV
b. -280 to -220 mV
c. -220 to -260 mV
d. -260 to -280 mV

54. In puddled soil, the soil particles are
a. Cohesive b. Massive
c. Non-cohesive d. Both a and b
e. All the above

55. Soil crust is formed by
a. Iron oxides
b. Aluminium oxides
c. Manganese oxides
d. All

56. Least hygroscopic fertilizer is
a. K_2SO_4 b. KCl
c. NH_4Cl d. $(NH_4)_2SO_4$

57. Cheapest source of phosphate fertilizer is
a. Single superphosphate
b. Triple superphosphate
c. Rock phosphate
d. Diammonium phosphate

58. Indicator used in the estimation organic carbon in soil by Walkley and Black method is
a. EBT b. Diphenylamine
c. Calcon d. Methyl orange

59. Chemical name of mureoxide is
a. Ammonium purpureate
b. Ammonium oxalate
c. Potassium purpureate
d. Potassium oxalate

60. The equation, pH – ½ pCa = Constant, is called as
a. Lime potential
b. Phosphate potential
c. Potassium potential
d. None

61. Clay minerals predominate in the soils of arid regions are
a. Montmorillonite and vermiculite
b. Illite and montmorillonite
c. Illite and chlorite
d. Illite and vermiculite

62. Dominant clay mineral in semi-arid soils with favourable calcium and magnesium environment is
a. Montmorillonite b. Vermiculite
c. Muscovite d. Chlorite

63. Effective method of iron application is /are
a. Spraying b. Soil application
c. Dipping d. Both a and b
e. All the above

Answers														
	50.	a	53.	b	56.	a	59.	a	62.	a				
	51.	a	54.	d	57.	c	60.	a	63.	a				
	52.	b	55.	a	58.	b	61.	c						

64. Mg rich secondary clay mineral is
a. Montmorillonite b. Kaolinite
c. Chlorite d. Vermiculite

65. Wetting and drying of rice soil increase the loss of
a. Nitrogen b. Phosphorous
c. Potassium d. All

66. Alkali tolerant green manure is
a. Sunnhemp b. Cowpea
c. Dhaincha d. Sesbania

67. Urea constitutes _____% of straight nitrogenous fertilizers used in India.
a. 10 b. 15
c. 20 d. 25

68. In a flower pot water comes out from the pot at the bottom when its potential is
a. 5 b. 15
c. Zero d. -15

69. What is the acid equivalent of ammonium sulphate ?
a. 80 b. 110
c. 128 d. 86

70. Which of the following nutrients are highly mobile in plants ?
a. N, P and K
b. N, P, K and Zn
c. S, Fe, Mn, Cu, Mo and Cl
d. Zn, Ca and B

71. Which of the following nutrients are less mobile in plants ?
a. N, P and K
b. N, P, K and Zn
c. S, Fe, Mn, Cu, Mo and Cl
d. Zn, Ca and B

72. Maximum nitrogen to soil by
a. *Rhizobium meliloti*
b. *Rhizobium leguminosarum*
c. *Rhizobium japanicum*
d. *Rhizobium trifoli*

73. Which of the following is a stem nodulating bacteria ?
a. *Sesbania rostrata*
b. *Rhizobium leguminosaram*
c. *Rhizobium japanicum*
d. *Rhizobium trifoli*

74. BGA as Nitrogen fixing was demonstrated in India by
a. P.K. Dey b. R.N. Singh
c. Jenny d. Bousingault

75. Ethylene glycol is used to determine the
a. Surface area b. Soil texture
c. Soil structure d. All the above

76. The only Noble Laureate from Agriculture has been
a. Norman Borlaug
b. M.S. Swaminathan
c. Gurbaux Singh
d. All the above

77. World food prize has been won by which of the following ?
a. Norman Borlaug
b. M. S. Swaminathan
c. Gurbaux Singh
d. All the above

78. Coromandal Fertilizer gives away which award in India ?
a. Norman Borlaug award
b. M. S. Swaminathan award
c. Gurbaux Singh award
d. All the above

Answers																	
	64.	d	67.	b	70.	a	73.	a	76.	a							
	65.	a	68.	c	71.	c	74.	b	77.	b							
	66.	c	69.	b	72.	a	75.	a	78.	b							

79. EID Perry manufactured which of the following fertilizer for the first time
a. Single superphosphate
b. Diammonium phosphate
c. UREA
d. Monoammonium phosphate

80. Total hardness of water sample contains only
a. Ca^{2+} b. Mg^{2+}
c. K^{+} d. Both a and b

81. What is the specific conductivity of KCl solution at 25°C ?
a. 1.4118 dS/m b. 14.118 dS/m
c. 0.14118 dS/m d. None

82. Presence of $CaCO_3$ in soils
a. Increase the dispersion
b. Decrease the dispersion
c. Will not affect the dispersion
d. None

83. Bulk density of soil is influenced by the
a. Application of green manures
b. Application of soil conditioners
c. Tillage operation
d. All

84. Mn toxicity occur in soils with pH
a. Below 4.0 b. Below 4.5
c. Below 5.0 d. Below 5.5

85. Which is the indicator used for the estimation of Cl^- in the soil ?
a. Phenolphthalein
b. Methyl orange
c. Methyl red
d. Potassium chromate

86. Sources of irrigation water include
a. Canal
b. Shallow and deep wells
c. Tube well
d. Run-off
e. All

87. If pH decreases by one unit, what will be the corresponding decrease in voltage ?
a. 0.59 mV b. 5.91 mV
c. 59.1 mV d. None

88. To calculate ppm salt in solution, which is the best equation ?
a. $EC25 \times 10^3 \times 640$
b. $EC25 \times 10^3 \times 12.5$
c. $EC25 \times 10^3 \times 0.064$
d. $EC25 \times 10^3 \times 0.36$

89. Which of the following is a Mg indicator ?
a. Mureoxide b. EBT
c. Diphenylamine d. Calcon

90. Interference of organic matter is eliminated by adding
a. Activated charcoal
b. Gum acacia
c. Gelatin
d. Glycerol

91. Example(s) for chloride sensitive crops is/ are
a. Citrus b. Peaches
c. Grapes d. All

92. Devarda alloy is composed of
a. 50% Cu, 45% Al and 5% Zn
b. 50% Zn, 45% Al and 5% Cu
c. 50% Al, 45% Cu and 5% Zn
d. 50% Al, 45% Cu and 5% Zn

93. In tobacco KNO_3 improves
a. Burning quality b. Earthly flavour
c. Both a and b d. None

Answers																	
	79.	a	82.	b	85.	d	88.	a	91.	d							
	80.	d	83.	d	86.	e	89.	b	92.	a							
	81.	a	84.	c	87.	c	90.	a	93.	a							

94. In general soil N:P:S ratio is
a. 10 : 1 : 1 b. 5 : 1 : 1
c. 1 : 1 : 1 d. 100 : 10 : 1

95. Addition of NaF or H_3PO_4 in organic carbon determination is aimed to get
a. High heat of dilution
b. Sharp end point
c. Both a and b
d. Faster oxidation

96. 1 meq of HCl is equal to _____ in nitrogen determination.
a. 1.4 mg of N
b. 14 mg of N
c. 0.14 mg of N
d. 140 mg of N

97. EC value for which of the industrial waste water is highest ?
a. Domestic industries
b. Sugar mills
c. Fruit processing industries
d. All

98. A good time of year to sample when
a. Climate is stable b. Post harvest
c. Winter d. All

99. Excess salts affect plant growth by
a. Direct toxicities
b. Disrupt the ionic balance in plants
c. Interfering with nutrient uptake
d. Reducing the availability of water by lowering osmotic potential
e. All the above

100. Pesticides include
a. Herbicides b. Insecticides
c. Fungicides d. All

101. If soil A is having higher buffering capacity than soil B, then
a. Soil A will require less lime than soil B for pH
b. Soil A will require more lime than soil B for pH
c. Both the soil will require same amount of lime
d. None of the above

102. The method to determine pHo was developed by
a. Gilman and Vehera
b. Walkley and Black
c. Arnon and Stout
d. None

103. Exchangeable acidity of a soil
a. Is a sum of total H^+ and Al^{3+} in the soil
b. Consists of monomeric Al or Fe
c. Is more when pH is < 5.5
d. All the above

104. 1 mg of H^+ will be equal to
a. 20 mg of Ca^{2+} b. 9 mg of Al^{3+}
c. 12 mg of Mg^{2+} d. All

105. Phosphate potential measures the intensity with which
a. Soil is holding its removable phosphates
b. Soil is holding its non-removable phosphates
c. Both a and b
d. None of the above

106. The Q/I relationship of soil phosphorus provides
a. A measure of immediately available P
b. Information on phosphate buffering capacity of soil
c. The probability of getting crop response to added P
d. All the above

Answers					
94. a	97. b	100. d	103. d	106. d	
95. b	98. d	101. b	104. d		
96. b	99. e	102. a	105. a		

107. At the same water content, water availability is more in which of the following soils ?
a. Clay soils b. Sandy soils
c. Loamy soils d. All

108. Ammonium oxalate is also called as
a. Calcon reagent
b. Ferroin reagent
c. Grigg's reagent
d. All

109. The index tissue for sampling rice crop is
a. 3rd lead from apex
b. Flag leaf
c. Lower leaf
d. Matured leaf

110. Digestion mixture ratio for ashing is
a. 10 : 1 : 1 b. 1 : 1 : 1
c. 10 : 5 : 1 d. 10 : 10 : 1

111. To avoid explosion in the samples containing high fats and oils, which of the flowing is recommended ?
a. Pre-digestion
b. Direct wet digestion
c. Ashing
d. All

112. What is the temperature of N_2O-acetylene furnace in atomic absorption spectrophotometer ?
a. 200-2400 °C b. 2600-2800 °C
c. 3000-3400 °C d. > 4000 °C

113. The ICP works on
a. Emission spectrometry
b. Optical emission spectrometry
c. Absorption spectrometry
d. All

114. Which of the following forms of water is present in fertilizers ?
a. Water of crystallization
b. Water of absorption
c. Free water
d. All

115. Karl Fisher method for moisture estimation in fertilizers is suitable for
a. Urea
b. Calcium Ammonium Nitrate
c. Nitrophosphates
d. All

116. Karl Fisher's reagent contains
a. Iodine b. SO_2
c. Pyridine d. Both a and c
e. All the above

117. In Devarda alloy, Zn and Al acts as
a. An oxidizing agent
b. A reducing agent
c. A hygroscopic agent
d. All

118. **Zephiran** chloride is also known as
a. Bezarkonium chloride
b. Ammonium chloride
c. Lithium chloride
d. Ammonium purpureate

119. What is a dermal solution ?
a. 1 mole of substance dissolved in 10kg of the solvent
b. 1 mole of substance dissolved in 1L of the solvent
c. 1 mole of substance dissolved in 10L of the solvent
d. 1 mole of substance dissolved in 1000g of the solvent

Answers					
107. b	110. a	113. b	116. e	119. d	
108. c	111. a	114. d	117. b		
109. a	112. b	115. d	118. a		

120. Total solids in sugar is determined by
a. Brix reading
b. Volumetrically
c. Spectrophotometrically
d. All

121. The number of atoms in a flame in a particular excited energy state *(n *)* and the number of atoms in the ground or unexcited state *(n)* are related by which of the following familiar Boltzman relationship?
a. $n^*/n = A \exp(-\Delta E/KT)$
b. $n^*/n = A \exp(-\Delta EK/T)$
c. $n^*/n = A \exp(-\Delta E \times KT)$
d. 4. $n^*/n = AK \exp(-\Delta E/T)$

122. Method of measurement of ICP-OES is
a. Simultaneous
b. Sequential
c. Both a and b
d. None of the above

123. When nutrient management is done by optimizing the benefits from all possible sources of plant nutrients then it is called
a. IPNS b. IPNSS
c. INM d. ISFM

124. $\text{Log } I_0 / It = k.C$ is the basic notation for Beer's law where 'It' denotes which of the following ?
a. Intensity of incident radiation
b. Intensity of transmitted radiation
c. Concentration in solution
d. A constant

125. Who introduced the Indore Method of compost preparation ?
a. Hutchinson and Richards
b. Wiley
c. Howard
d. Richard

126. Epigeic earthworms
a. Make burrows in soil
b. Do not make burrow in soil
c. Are subsoil dwellers
d. Are found in soil

127. How much percentage of moisture is maintained in finished vermicomposting ?
a. 10 – 20% b. 30 – 40%
c. 50 – 60% d. 80 – 90%

128. Persistent binding agents are due to
a. Microbial products
b. Plant derived products
c. Fungal extension
d. Humic materials

129. What is the salt index of ammonium sulphate ?
a. 1.61 b. 2.99
c. 6.83 d. 3.25

130. Which of the following statement is not true regarding arbuscules of VAM fungi ?
a. Transfer mineral nutrients from the fungi to host plant
b. Transfer sugar from host plant to the fungi
c. Work as storage organ for the fungi
d. A highly branched structure

131. Who for the first time showed that legumes can obtain nitrogen from air ?
a. M.W. Beijerink
b. J.B. Bousingault
c. Robert Koch
d. Louis Pasteur

132. What is the amount of N fixed by Azolla ?
a. 20 - 25 kg/ha b. 25 - 50 kg/ha
c. 25 - 30 kg/ha d. 50 kg/ha

Answers					
	120. a	123. a	126. a	129. d	132. c
	121. a	124. b	127. c	130. c	
	122. c	125. c	128. d	131. b	

133. Three way calibration of critical limit was formulated by
a. Cate and Nelson
b. Mitcherlich
c. Jenny
d. Fisher

134. White bud of maize is caused due to deficiency of which of the following nutrients ?
a. Zn b. Cu
c. Mn d. Fe

135. Little leaf symptom in citrus is called as
a. Frenching
b. Drenching
c. Hen and Chicken
d. All the above

136. Azotobacter is a
a. Nitrogen fixing fungi
b. Nitrogen fixing bacteria
c. Phosphate solubilizing bacteria
d. Symbiotic bacteria forming Nodules on roots

137. The maximum nitrogen containing fertilizer is
a. Anhydrous Ammonia
b. Ammonium sulphate
c. Ammonium chloride
d. All the above

138. Fe deficiency mostly occurs in
a. Calcareous soils b. Alluvial soils
c. Red soils d. Black soils

139. Which of the following nutrients are immobile in plants ?
a. N, P and K
b. Zn
c. S, Fe, Mn, Cu, Mo and Cl
d. Ca and B

140. Which of the following nutrients are moderately mobile in plants ?
a. N, P and K
b. Zn
c. S, Fe, Mn, Cu, Mo and Cl
d. Ca and B

141. Deficiency symptoms of which of the following nutrients occur in terminal buds?
a. N, P and K
b. Zn
c. S, Fe, Mn, Cu, Mo and Cl
d. Ca and B

142. Deficiency symptoms of which of the following nutrients occur in old as well as in new leaves ?
a. N, P and K b. Zn
c. S and Fe d. Ca and B

143. Lodging and abortion of flowers are toxicity symptoms of which of the following nutrients ?
a. N b. P
c. Fe d. Mn

144. Deficiency of iron and zinc is caused by the excess of which of the following nutrients ?
a. N b. P
c. Fe d. Mn

145. Brown spot in rice is caused by the excess of which of the following nutrients?
a. N b. P
c. Fe d. Mn

146. What is the amount of nitrogen fixed by blue green algae ?
a. 25 - 40 kg/ha b. 25 - 30 kg/ha
c. 15 - 45 kg/ha d. 15 - 30 kg/ha

Answers					
	133. a	136. b	139. d	142. b	145. c
	134. a	137. a	140. b	143. a	146. c
	135. a	138. a	141. d	144. b	

147. Azonal soils are
a. Black soils b. Red soils
c. Laterite soils d. Alluvial soils

148. Five stages of soil development was given by
a. Jenny
b. Myers
c. Mohr and von Baren
d. Hilgard

149. Which is the fourth stage of weathering given by Mohr and von Baren ?
a. Juvenile b. Senile
c. Virile d. Final

150. The soil forming factor that has no relevance after soil reaches its maturity is
a. Time b. Topography
c. Climate d. All

151. Weathering sequence of minerals was given by
a. Joffey (1912)
b. Page and Baver (1940)
c. Jenny (1941)
d. Jackson (1964)

152. What is the pH range of calcareous soils ?
a. 8.0 - 8.5 b. 7.0 - 7.5
c. 8.5 - 9.0 d. 6.5 - 7.5

153. A series of monoclinic and triclinic silicates of aluminium with either K, Na or Ca are collectively known as
a. Quartz
b. Feldspar
c. Pyroxenes and Amphiboles
d. Mica

154. Of the following, which is sodium feldspar mineral ?
a. Orthoclase b. Microcline
c. Albite d. Anorthite

155. Of the following, which is calcium feldspar mineral ?
a. Orthoclase b. Microcline
c. Albite d. Anorthite

156. What is the percentage of SiO_2 in quartz ?
a. 80 b. 90
c. 100 d. 95

157. Albite and anorthite can be identified by
a. Cleavage
b. Inclusion
c. Zoning
d. Partial alteration

158. Which of the following is more stable mineral ?
a. Zircon b. Tourmaline
c. Quartz d. Magnetite

159. Which one of the following is the heavy mineral ?
a. Apatite b. Hornblende
c. Tourmaline d. Zircon
e. All the above

160. Of the following, which one is the secondary mineral ?
a. Clay minerals
b. Amorphous silicates
c. Oxides of iron, aluminium and silicon
d. All the above

161. What is the upper limit of colloidal particles ?
a. 0.02 microns
b. 0.2 microns
c. 2 microns
d. 0.1 microns

Answers					
	147. d	150. a	153. b	156. c	159. e
	148. c	151. d	154. c	157. c	160. d
	149. c	152. a	155. d	158. a	161. c

162. Equivalency, reversibility and stoichiometry are the characteristics of which of the following ?
a. Anion exchange capacity
b. Cation exchange capacity
c. Both a and b
d. None

163. What is/are the equation(s) used for heterovalent exchange reactions ?
a. Gapon's
b. Vanselow's
c. Krishnamoorthy, Davis and Overstreet's
d. All the above

164. Buffering capacity is high for the soils with
a. 1 : 1 clay minerals
b. 2 : 1 clay minerals
c. 2 : 1 : 1 clay minerals
d. All

165. The pH of calcareous soil may be as high as 8.3 and it is due to
a. High partial pressure of CO_2
b. Formation of undissociated carbonic acid
c. Reduced hydrolysis of $CaCO_3$
d. All the above

166. Concentration of pure water is
a. 55.5 mol/L b. 45.5 mol/L
c. 48.5 mol/L d. 57.5 mol/L

167. Ionic product of water is
a. 1.01×10^{-7} b. 1.01×10^{-14}
c. 1.01×10^{14} d. 1.01×10^{7}

168. Who were the first to try electron microscopy in the study of humic acids ?
a. Tan and Giddens (1972)
b. Tan and McCreery (1970)
c. Flaig and Beutelspachev (1951)
d. Schnitzer and Khan (1972)

169. According to Flaig hypothesis, _____ to be the source, or starting point, for the formation of fulvic and humic acids.
a. Lignin b. Phenols
c. Quinone d. Quinhydrone

170. Zircon and topaz are the examples for
a. Sorosilicates b. Neosilicates
c. Inosilicates d. Tectosilicates

171. Examples for soil clay minerals that are chain structured one are
a. Polygorskite - Sepiolite
b. Pyrophyllite - Talc
c. Titanium oxides
d. All

172. If all the octahedral positions are occupied by Mg^{2+} ions, it is called as
a. Tetrhedral subgroup
b. Octahedral subgroup
c. Trioctahedral subgroup
d. Dioctahedral subgroup

173. If all the octahedral positions are occupied by Al^{3+} ions, it is called as
a. Tetrhedral subgroup
b. Octahedral subgroup
c. Trioctahedral subgroup
d. Dioctahedral subgroup

174. Which of the following is an example expanding 1 : 1 clay mineral ?
a. Kaolinite b. Halloysite
c. Dickite d. Nackrite

175. Among the 1 : 1 clay minerals, the most widely distributed one in Indian soils is
a. Kaolinite b. Halloysite
c. Dickite d. Nackrite

Answers					
	162. c	165. d	168. c	171. a	174. b
	163. d	166. a	169. a	172. c	175. a
	164. b	167. b	170. b	173. d	

176. Kaolinite is an important fraction of the clays of
a. Alfisols and Vertisols
b. Ultisols and Alfisols
c. Oxisols and Alfisols
d. Ultisols and Oxisols
e. All the above

177. Kaolinite is an accessory fraction of the clays of
a. Alfisols and Vertisols
b. Ultisols and Alfisols
c. Oxisols and Alfisols
d. Ultisols and Oxisols
e. All the above

178. $Al_2O_3.2SiO_2.4H_2O$ is the structural formula of
a. Kaolinite b. Halloysite
c. Dickite d. Nackrite

179. Principle end members in the trioctahedral subgroup of montmorillonite group are
a. Bentonite and Montmorillonite
b. Beidellite and Nontronite
c. Montmorillonite and Beidellite
d. Hectorite and Saponite
e. All the above

180. Montmorillonite is characteristic constituents of clays of
a. Vertisols and Mollisols
b. Alfisols and Vertisols
c. Vertisols, Mollisols and Entisols
d. All

181. Coarse particles of illitic mica group are called as
a. Illite b. Hydrous mica
c. Muscovite d. Biotite

182. Fine-grained minerals of illitic mica group are called as
a. Illite b. Hydrous mica
c. Muscovite d. Biotite

183. Nutrient elements whose soil requirement is directly related to yield goal, yield potential, or growth rate include
a. N, P and K
b. N, S, B and Cl
c. Ca, Mg, K and P
d. Fe, Mn, Zn and Cu

184. Movement of nutrient ions form soil to plant roots by
a. Diffusion b. Mass flow
c. Contact exchange d. All

185. Movement of nutrient ions along with irrigation water or rainwater is called as
a. Diffusion b. Mass flow
c. Contact exchange d. All

186. Increase in soil water content and soil temperature, increases the availability of
a. Nitrogen b. Phosphorous
c. Potassium d. All

187. The availability of calcium and magnesium in soil is low above the pH of
a. 7.5 b. 8.5
c. 9.5 d. 8.0

188. The Law of Diminishing Return was given by
a. Juston von Liebig b. Spillman
c. Mitcherlich d. Schofield

189. The Law of Restitution was given by
a. Juston von Liebig
b. Spillman
c. Mitcherlich
d. Thomas Way

Answers					
	176. d	179. d	182. a	185. b	188. c
	177. a	180. d	183. a	186. b	189. a
	178. b	181. b	184. d	187. b	

190. The Law of Minimum was given by
a. Juston von Liebig
b. Spillman
c. Mitcherlich
d. Thomas Way

191. The equation, $\log (A - y) = \log A - Cx$ is called as
a. Spillman's equation
b. Mitcherlich's equation
c. Liebig equation
d. Gapon's equation

192. The equation, $y = M (1 - R^x)$ is called as
a. Mitcherlich's equation
b. Liebig equation
c. Spillman's equation
d. Gapon's equation

193. Nutrient mobility concept was given by
a. Cate and Nelson
b. Arnon and Stout
c. Larsen
d. Bray

194. Nutrient diagnosis in soil by pot culture methods were first initiated by
a. Bousingault b. Mitcherlich
c. Neubauer d. Mehlich

195. Bray and Kurtz's method of phosphorous determination is used for the soils having pH of
a. 5.5 and below b. 6.0 and below
c. 6.5 and below d. 5.0 and below

196. N-serve and AM are the examples of
a. Urease inhibitors
b. Denitrification inhibitors
c. Phosphate solubilizers
d. Nitrification inhibitors

197. Microorganism that has symbiotic association with casuarinas in atmospheric nitrogen fixation is
a. *Rhizobium* b. *Alnus*
c. *Frankia* d. *Azospirillum*

198. Organism(s) responsible for the conversion of $Fe^{2+} \rightarrow Fe^{3+}$ is/are
a. *Ferrobacillus*
b. *Gallionella*
c. *Hydrogenomonas*
d. Both a and b
e. All the above

199. Phosphate potential measures the intensity with which
a. Soil is holding its removable phosphates
b. Soil is holding its non-removable phosphates
c. Both a and b
d. None of the above

200. The book 'Soil organic matter' was written by
a. K.H.Tan b. Kononova
c. Adams d. Russell

Answers					
	190. a	193. d	196. d	199. a	
	191. b	194. b	197. c	200. b	
	192. c	195. a	198. d		

Model Test Question Paper I

QUESTIONS :

1. Soil water typically differs from pure water because soil water
   a. Contains organic compounds
   b. Contains mineral nutrients
   c. Is restrained in its flow by attraction to particle surfaces
   d. All of the above
   e. None of the above

2. Physical weathering results from
   a. Frost action b. Wind abrasion
   c. Dissolution by water
   d. Both a and b e. All the above

3. A young soil would
   a. Have a deep A horizon
   b. Not have much in the way of horizon development
   c. Be unsuitable for cultivation
   d. Include most or all of the master horizons
   e. Be found in humid tropical regions

4. An example of physical weathering is
   a. Hydrolysis b. Frost–wedging
   c. Solution d. Oxidation
   e. Solufluction

5. Igneous rocks can best be characterized as
   a. Rocks formed when molten magma solidifies
   b. Rocks containing both feldspars and micas
   c. Rocks formed from the recrystallization of sedimentary material
   d. Rocks containing a mixture of primary and secondary minerals
   e. Rocks found primarily near volcanoes

6. Of the following fertilizers and soil amendment, the one which is most soluble is
   a. $CaHPO_4$ b. $CaSO_4 \cdot 2H_2O$
   c. KCl d. $CaCO_3$

7. Soil surface area _____ as soil particle size _____.
   a. Increases; Increases
   b. Increases; Decreases
   c. Decreases; Increases
   d. Decreases; Decreases

8. Which soil physical property is least likely to be altered by growers?
   a. Soil structure b. Soil texture
   c. Soil permeability d. Bulk density

9. "Illite → kaolinite → iron/aluminum oxide" represents a
   a. Catena
   b. Weathering sequence
   c. Silicate mineral sequence
   d. Both a and b
   e. None of the above

10. Three types of soil structure include
    a. Prisms, subangular blocky, granular
    b. Columnar, porous, brittle
    c. Fine, medium, and coarse
    d. Brittle, firm, and friable
    e. Sand, silt and clay

11. A significant osmotic potential (y_o) makes a soil seem _____ to a plant than it really is.
    a. Drier b. Wetter
    c. More compacted d. Finer textured
    e. Deeper

12. _____ help in developing soil structure.
    a. Freeze/thaw cycles b. Wet/dry cycles
    c. Organisms d. All

13. Brown and red colors in subsurface horizons are caused by ____ in the soil.
    a. Manganese
    b. Aluminum oxides
    c. Organic matter
    d. Iron oxides
    e. Clay

14. The soil water potential that is the main force in most soils is
    a. Matric b. Gravitational
    c. Osmotic d. Gravity flow
    e. Solution potential
    f. Kinetic potential

15. The potential differential between moist soil and the plant root moves water from
    a. Soil to root b. Stem to root
    c. Root to soil
    d. Fine to coarse layer
    e. Downward

16. Soils will commonly have a medium textured surface horizon with finer textured sub–surface horizons. At the layer interface water will
    a. Move readily and downward into the finer textured soil
    b. Pile up until the surface layer is saturated
    c. Be held more tightly in the coarser layer
    d. Move via macropore flow
    e. Move into finer layer at slower rates consistent with fine soils

17. Wet soil may be the result of
    a. Natural impermeable layers
    b. Flooding
    c. High water table
    d. All

18. The zone of wet soil above a perched water table is _____.
    a. Saturated zone
    b. Impermeable soil layer
    c. Matric soil
    d. Gravitational soil
    e. Capillary fringe

19. Soil–water potential is lowest at
    a. Saturation
    b. Field capacity
    c. Permanent wilting point
    d. Hygroscopic percentage

20. Available water lies between the field capacity and _____
    a. Saturation
    b. The permanent wilting point
    c. The hygroscopic percentage
    d. Oven dryness

21. Windbreaks can help improve water use by reducing
    a. Runoff b. Percolation
    c. Evapotranspiration d. None of these

22. The following are characteristics of a water molecule
    a. The H to O to H angle is approximately 90°
    b. The two H atoms are on diametrically opposite ends of the molecule
    c. It has a positive and a negative side
    d. It is attracted to surfaces with negative but not positive charges
    e. It is held in soils by adhesion by not adsorption

23. Capillarity in soils
    a. Involves both adhesion and cohesion
    b. Is enhanced by the symmetrical nature of the water molecule
    c. Is independent of the matric potential in soils
    d. Is not involved in the process of water uptake from soils
    e. Does not account for unsaturated water movement in soils

24. Which component of soil salts destroys soil aggregates?
    a. Calcium b. Magnesium
    c. Sodium d. Chlorides

25. The wet soil zone above the water table is called a
    a. Wet zone b. Cohesion zone
    c. Capillary fringe d. Adhesion fringe

26. In which of the following "forms" of soil water are pesticides, excess plant nutrients and waste chemicals most apt to move through soils?
    a. Gravitational water
    b. Unsaturated water
    c. Available water
    d. Hygroscopic water
    e. Capillary water

27. Plant roots obtain access to soil water in which of the following ways?
    a. The roots contact and leave room in the pores for the water to move in
    b. Roots extend into moist soil area
    c. Water vapor moves from the wet soil areas to the root surfaces
    d. Water flows to the roots by capillarity
    e. Both b and d

28. Eutrophication _____.
    a. Is a process of enriching ponds and lakes with plant nutrients
    b. Enhances the production of fish in ponds
    c. Decreases the growth of weeds in ponds
    d. Is discouraged by the application of farm manures
    e. Increases the loss of soil by erosion

29. If the soils on south–facing slopes are wetter and deeper than those on north–facing slopes, and therefore support more wildlife, what likely accounts for this difference?
    a. Differences in rainfall from one area to another
    b. More rapid plant growth on the south slopes
    c. Higher soil temperatures on the north slopes
    d. More solar radiation on the south slopes
    e. Sandier soils on the north slopes

30. The most abundant organism in most soil ecosystems is
    a. Fungi b. Bacteria
    c. Actinomycetes d. Eukaryotes
    e. Nematodes

31. An autotroph is an organism that
    a. Feeds on plants
    b. Belongs to the animal kingdom
    c. Produces its own food by photo–synthesis or oxidation
    d. Is most abundant in soil ecosystems
    e. Is anaerobic

32. Three domains for classifying living organisms include
    a. Eucarya, protista, and plants
    b. Eucarya, archaea, and bacteria
    c. Plant, animals and archaea
    d. Microfauna, mesofauna, and macrofauna
    e. Eucarya, monera, and protista

33. Organisms that exhibit filamentous growth and whose metabolic activities give soil the wonderful, fresh, earthy aroma are
    a. Macroflora b. Fungi
    c. Actinomycetes d. Enchytraeids
    e. Nematodae

34. A mycophagous organisms will feed on
    a. Bacteria b. Higher plants
    c. Mesofauna d. Mycofauna
    e. Fungi

35. Soil organic matter in the passive pool may reside in the soil without being decomposed for
    a. 3–5 years
    b. 500–5000 years
    c. 1–2 years
    d. About a century
    e. It is passive, so it doesn't resist the organisms and is immediately metabolized

36. Autochthonous organisms can be thought of as "k–strategists." They
    a. Are opportunists
    b. Have high rates of competition
    c. Are indigenous to their environment
    d. Increase exponentially with the addition of fresh material
    e. Both b and c
    f. All the above

37. Decomposition of soil organic matter that releases methane will proceed
    a. In highly weathered soils only
    b. When pH = 5.5
    c. In well oxygenated soils
    d. Under anaerobic conditions
    e. In the presence of Nitrosomonas

38. Soil detritivores feed principally on _____.
    a. Smaller organisms
    b. Plant roots
    c. Larger, but defenseless animals
    d. Dead tissues
    e. Microorganisms

39. An organisms that subsists by eating predators would function as a(n) ____ in the soil ecosystem.
    a. Primary consumer
    b. Detritivore
    c. Tertiary consumer
    d. Decomposer
    e. All the above

40. The most visible primary producers are
    a. Fungi b. Bacteria
    c. Plants d. Animals

41. The area of high biological activity surrounding plant roots is the
    a. Rhizosphere b. Biosphere
    c. Atmosphere d. Lithosphere

42. The opposite of immobilization is
    a. Nitrification b. Fixation
    c. Mobilization d. Mineralization
    e. Denitrification

43. The organisms that act as extensions of plant roots are called
    a. Actinomycetes b. Mycorrhizae
    c. Cyanobacteria d. Nematodes

44. Which relationship between two organisms benefits both?
    a. Parasitism b. Symbiosis
    c. Predation d. Casual
    e. Lysis

45. Which of the following pools contain the largest amount of the world's carbon?
    a. Soil b. Vegetation
    c. Atmosphere d. Animals
    e. Primary minerals

46. Which of the following is (are greenhouse gases contributed to the atmosphere by soils?
    a. Nitrous oxides b. Carbon dioxide
    c. Methane d. All the above
    e. None of the above

47. Humus consists of
    a. Living organisms and cells
    b. Dead tissues and wastes
    c. Identifiable biomolecules
    d. Polymerized, non–identifiable molecules
    e. All the above

48. Biomass consists of
    a. Living organisms and cells
    b. Dead tissues and wastes
    c. Identifiable biomolecules
    d. Polymerized, non–identifiable molecules
    e. All the above

49. One would expect well drained soils to

have the highest organic matter contents where the climate is
a. Warm and dry
b. Warm and humid
c. Cool and dry
d. Cool and humid

50. Which of the following components of organic matter most resists decay?
a. Starches b. Cellulose
c. Sugars d. Lignin

51. Nitrogen tie–up is greatest when
a. Fresh, high C:N ratio materials are added to soil
b. Fresh, high nitrogen materials are added to soil
c. Aged compost is added to soil
d. Crops are fertilized with nitrogen

52. Macronutrient that comes from the soil include
a. Fe b. Mn
c. Ni d. N

53. The three types of soil colloids include
a. Silicate clays and micelles
b. Silica tetrahedrons and humus
c. Oxide clays, humus and mica
d. Kaolinite, chlorite, and smectite
e. Silicate clays, humus, and oxide clays

54. An example of 1:1 layer silicate clay is
a. Kaolinite b. Montmorillonite
c. Chlorite d. Mica
e. Illite

55. Nutrients that move along with the soil solution are moving by
a. Active transport
b. Energy transport
c. Diffusion
d. Mass flow

56. The electronegative charge on 2:1 type silicate clays is due primarily to
a. Ionization of surface OH groups
b. Substitution of one atom or ion for another in the crystal structure of the clay
c. Extremely small size of the individual colloid particles
d. The effect of pH on the presence of H^+ ions in the exchange complex
e. The dominance of tetrahedron containing sheets over those with octahedral units

57. Some soil colloids exhibit positive charges under highly acid conditions. To what are these charges likely due?
a. Protonation of some hydroxy groups by excess H^+ ions
b. The adsorption of Al^{3+} ions on the colloid
c. The release of some OH^- ions leaving an unsatisfied positive charge on the colloid
d. Substitution of lower valent atoms for higher valent atoms in the octahedral sheet
e. Increase in the level of H^+ ions on the exchange complex

58. Which form of nitrogen is absorbed by plant roots?
a. Nitrate nitrogen – NO_3–N
b. Nitrogen gas – N_2
c. Protein molecules, containing nitrogen
d. Nitrogen in organic matter
e. Nitrous oxide – N_2O

59. Which of the following ions is an exchangeable base?
a. Calcium (Ca^{2+})
b. Aluminum (Al^{3+})
c. Hydrogen (H^+)
d. Chloride (Cl^-)
e. Ferric iron (Fe^{3+})

60. There are three ways that plant roots contact nutrients. They are
a. Cation exchange, isomorphous substitution, adsorption
b. Percolation, root interception, cation exchange
c. Root interception, diffusion, adsorption
d. Root interception, mass flow, diffusion
e. Root interception, mass action, adsorption

61. Which of the following is true of high cation exchange capacity soils compared to low CEC soils?
a. They retain plant nutrients less well
b. They require higher rates of herbicide application
c. They need less lime to correct acidity.
d. They show physical properties common to sandy soils
e. They are poorly structured

62. Cation exchange capacity of soil is determined by three properties. Which of these is not one of the three?
a. Soil structure
b. Organic matter content
c. Amount of clay
d. Type of clay

63. Phosphorus availability in acid soils is constrained by the presence of significant quantities of reactive
a. Iron b. Calcium
c. Magnesium d. Sulfur
e. Boron

64. In humid regions repeat applications of limestone are needed after a few years primarily because of
a. The release of aluminum ions from the structure of silicate clays
b. The annual loss of calcium and magnesium in drainage waters
c. Increases in soil acidity from acid rain
d. Increased rates of formation of carbonic acid (H_2CO_3)
e. Increases in phosphate fertilization

65. A pH of 3.0 is _____ a pH of 6.0.
a. Twice as acidic as
b. 1000 times more acidic than
c. Twice as basic as
d. Three times more basic than
e. 100 times more acidic than

66. Soil acidity occurs mostly
a. In soils formed of calcareous materials
b. In residual soil
c. In regions with a humid climate
d. In regions with an arid climate
e. In Ap horizons under current cropland management

67. Problems with soil salinity arise most often
a. In humid regions
b. From irrigation in arid regions
c. When parent materials are saline
d. When coastal areas are flooded with salt water

68. Sodium is removed from sodic soils by
a. Flooding to leach out salts
b. Treatment with gypsum
c. Treatment with lime
d. Applying extra water during irrigation

69. The form of nitrogen that can be lost by leaching and denitrification is
a. Organic nitrogen
b. Ammonium nitrogen
c. Nitrate nitrogen
d. Nitrite nitrogen

70. Most of the nitrogen in the soil is in the form of
a. Organic nitrogen
b. Ammonium nitrogen
c. Nitrate nitrogen
d. Nitrite nitrogen

71. A deficiency of N typically _____ the maturity of annual plants.
a. Hastens b. Delays
c. Does not affect d. None

72. In the early stages of plant nitrogen deficiency, the most obvious symptoms are_____.
a. Yellowing of the youngest leaves
b. Brown spots and tiny holes on the underside of most leaves
c. Purpling of the youngest leaves
d. Yellowish colors in the oldest leaves
e. Brown edges on leaves scattered randomly all over the plant

73. Plants obtain nitrogen from the soil by taking up _____.
a. Soluble anions b. Soluble cations
c. Soluble humates d. Both a and b
e. None of the above

74. The great majority of nitrogen (95 to 98%) in soils can be found in the form of ____.
a. Primary minerals
b. Secondary minerals
c. Dissolved cations
d. Dissolved anions
e. Organic compounds

75. The process of _____ releases soluble nitrogen as the result of the breakdown of nitrogen–rich organic compounds.
a. Nitrification b. Denitrification
c. Symbiosis d. Volatilization
e. Mineralization

76. The opposite process from mineralization is _____.
a. Immobilization b. Nitrification
c. Denitrification d. Ammonification
e. None of the above

77. Ammonium fixation would be expected to be greatest in soils containing a lot of_____
a. *Rhizobium* bacteria b. *Frankia* c. Vermiculite
d. Iron oxides e. Both c and d

78. In order for nitrate to form from soil organic matter, _____ must be present in the soil.
a. *Nitrosomonas* b. *Nitrobacter*
c. Either a or b d. Both a and b
e. None of the above

79. Driving force for saturated flow in soil is
a. Gravitationalforce b. Matric suction
c. Osmotic suction d. Both a and b
e. All the above

80. Wetlands and forests growing along the banks of rivers remove much nitrogen by the process of_____.
a. Immobilization b. Nitrification
c. Denitrification d. Ammonification
e. None of the above

81. The opposite process from nitrification is _____.
a. Immobilization b. Mineralization
c. Denitrification d. Ammonification
e. None of the above

82. One of the following is a description of a soil that may not be able to supply enough phosphorus to a young plant. Which soil is it?
a. A soil with a pH of 6.5
b. A soil with a low cation exchange capacity
c. A soil with many mycorrhizae
d. A cold, wet soil

83. In various parts of the world, soil phosphorus is associated with which of the following environmental problems?
a. Soil degradation because of depletion of soil phosphorus
b. Eutrophication of lakes because of build–up of soil P in the watersheds
c. Toxic levels of phosphate in groundwater supplies
d. Both a and b e. All the above

84. In a soil at pH 5.0, most of the inorganic P is likely to be in the form of
a. Monocalcium phosphates
b. Tricalcium phosphates
c. Hydroxy apatites
d. Hydrous iron phosphates
e. Phospholipids

85. Mycorrhizae improve the nutrition of many plants by
a. Transporting phosphorus through the soil to the plant root
b. Fixing atmospheric phosphorus into forms readily used by plants
c. Masking P–fixation sites on the surface of certain soil minerals
d. Readily dissolving iron and aluminum phosphate compounds
e. Making the root cell membrane more permeable to phosphate ions

86. The sites in certain clay minerals which fix potassium ions are also capable of fixing which other ion?
a. NO_3^- b. NH_4^+
c. $H_2PO_4^-$ d. Ca^{2+}
e. H^+

87. In what range of soil pH is phosphorus generally most available to plants?
a. 3.5–4.5 b. 4.5–5.5
c. 5.5–7.0 d. 7.0–8.0
e. > 8.0

88. Exchangeable potassium
a. Occupies the cation exchange complex
b. Occupies the pores between soil particles
c. Is Part of organic matter
d. Is in mineral form

89. Chlorophyll contains
a. Calcium b. Magnesium
c. Phosphorus d. Boron

90. Which secondary macronutrient occurs in the soil as an anion and is stored mostly in organic matter?
a. Calcium b. Magnesium
c. Sulfur d. Potassium

91. A concern with trace elements, but usually less of a problem with macronutrients, is
a. Possible toxicity
b. Widespread shortage
c. Lack of good fertilizers
d. Effect on soil microorganisms

92. The decomposition of soil organic matter shown below releases methane. Under what conditions will this process proceed?
a. $R—COOH + 2H_2O \rightarrow R—COOH + CO_2\uparrow + 3CH_4\uparrow$
b. $R—COOH \rightarrow CO_2\uparrow + 3CH_4\uparrow$
c. $CO_2 + 4H_2 \rightarrow 2H_2O + CH_4$
d. Both a and b e. All the above

93. White muscle or muscular dystrophy in human beings is caused by the deficiency of
a. Selenium b. Vanadium
c. Sodium d. Strontium

94. Selenium concentration in single super phosphate is
a. 10 ppm b. 15 ppm
c. 20 ppm d. 25 ppm

95. _____ is the best indicator of metal toxicity in soil.
a. Maize b. Sunflower
c. Radish d. Asparagus

96. _____ requires high selenium.
a. Maize b. Sunflower
c. Radish d. Asparagus

97. The primary mineral nutrients taken up by plants from the soil are
a. C, H, O b. N, P, K
c. Ca, Mg, S d. Both a and b

98. The secondary plant nutrients are
a. C, H, O b. N, P, K
c. Ca, Mg, S d. Fe, Mn, Zn, Cu

99. The plant nutrients supplied by water and air are
a. C, H, O b. N, P, K
c. Ca, Mg, S d. Fe, Mn, Zn, Cu

100. Calcium carbonate mineral is commonly absent in the soils having pH less than
a. 6.0 b. 7.0
c. 5.0 d. 4.0

101. Rhizobia are a group of bacteria which
a. Convert phosphorus oxide into soluble phosphorus
b. Convert nitrogen gas into ammonia
c. Convert nitrogen gas into nitrates
d. Provide water and minerals for the plant

102. Which phenomenon is commonly exhibited by the isomorphous group of minerals?
a. Partial alteration b. Zoning
c. Cleavage d. Inclusion

103. The flocculating power of the monovalent anions decreases slightly in the order
a. $F^- > Cl^- > Br^- > NO_3^- > I^- > CNS^-$
b. $CNS^- > I^- > NO_3^- > Br^- > Cl^- > F^-$
c. $F^- > I > Cl^- > Br^- > NO_3^- > CNS^-$
d. $I^- > F^- > Cl^- > Br^- > NO_3^- > CNS^-$

104. Lambert's and Beer's law is used in
a. Spectrophotometer
b. Chromatography
c. Potentiometer
d. pH mater

105. Molybdenosis is caused by the imbalance between
a. Mo and Cu b. Mo and Mn
c. Mo and Fe d. Mo and Zn

106. Actinium series is also known as
a. 4n series b. (4n + 1) series
c. (4n + 2) series d. (4n + 3) series

107. Which of the following oxides reacts with acid and alkaline both?
a. MgO b. SO_2
c. ZnO d. Fe_2O_3

108. Let be the equilibrium constant for the reaction $PCl_{5(g)} \leftrightarrow PCl_{3(g)} + Cl_{2(g)}$. If the pressure is doubled without changing the temperature
a. Kc is doubled
b. Kc is unaffected
c. The reverse reaction is favoured
d. The forward reaction is favoured

109. The equilibrium constant Kc for the reaction $2HI_{(g)} \leftrightarrow H_{2(g)} + I_{2(g)}$ at 250'c is 4 what would be the Kc for the reaction $H_{2(g)} + I_{2(g)} \leftrightarrow 2HI_{(g)}$ at 250'c ?
a. 4 b. 0.25
c. 16 d. 2

110. In which of the following Kc is greater than Kp
a. $2SO_{2(g)} + O_{2(g)} \leftrightarrow 2SO_{3(g)}$
b. $N_2O_{4(g)} \leftrightarrow 2NO_{2(g)}$
c. $H_{2(g)} + I_{2(g)} \leftrightarrow 2HI_{(g)}$
d. $PCl_{5(g)} \leftrightarrow PCl_{3(g)} + Cl_{2(g)}$

111. A reversible reaction $A_2 + B_2 \leftrightarrow 2AB$ is carried out in one litre flask. If the same reaction is carried out in two litre flask, the equilibrium constant would be
a. Double
b. Decreased four times
c. Halved
d. Same

112. Which one of the following equilibrium is not affected by total pressure? (All the reactants and products are gases)
a. $\frac{1}{2} N_2 + \frac{1}{2} O_2 \leftrightarrow NO$
b. $2NO_2 \leftrightarrow N_2O_4$
c. $PCl_5 \leftrightarrow PCl_3 + Cl_2$
d. $SO_{2(g)} + Cl_{2(g)} \leftrightarrow SO_2Cl_2$

113. le Chatelier–Braun principle is applicable only to
a. Homogenous reaction
b. Heterogeneous reactions
c. Systems in equilibrium
d. Systems not in equilibrium

114. Equilibrium constants for reaction $N2 + O_2 \leftrightarrow 2NO$: K1 and $NO + \frac{1}{2}O_2 \leftrightarrow NO_2$: K2 then the equilibrium constant for the reaction $N_2 + 2O_2 \leftrightarrow NO_2$ is
a. K1/K2 b. K1. K2
c. K1. $(K2)^2$ d. $(K1)^2$. K2

115. In which of the following case dose the reaction goes to farthest to completion?
a. k = 10 b. k = 1
c. $k = 10^3$ d. $k = 10^{-2}$

116. Which of the following information can be obtained from le Chateliers principle?
a. Shift in equilibrium position on changing the value of constraints
b. Disassociation constant of week acid
c. Energy change in reaction
d. Equilibrium constant of the reaction

117. For the reaction $PCl_{5(g)} \leftrightarrow PCl_{3(g)} + Cl_{2(g)}$. The forward reaction at constant temperature is favoured by
a. Introducing an inert gas at constant volume
b. Introducing $Cl_{2(g)}$ at constant volume
c. Increasing the volume of the container
d. Increasing $PCl_{3(g)}$ at constant volume

118. Determine log (Kc2/kc1) by van't Hoff equation
a. $\Delta H'(T2–T1)/2.303.R.T1.T2$
b. $\Delta E'(T2–T1)/2.303.R.T1.T2$
c. $\Delta H'/RT^2$
d. $\Delta E'/RT^2$

119. The rate constant of a first order reaction is 4.606 min^{-1}. What is the time required for 75% completion of reaction?
a. 3.495 min^{-1} b. log 2 min^{-1}
c. log 2/v3 min^{-1} d. log 16/9 min^{-1}

120. Which of the following is/are true?
(1) Rate of reaction in homogenous reaction is independent of the concentration of catalyst
(2) Chemical composition, but not mass of a catalyst may change end of reaction
(3) In heterogeneous catalysis the catalyst is in different phase from those of reactants and products
a. (1) and (2) only b. (3) only
c. (3) and (2) only d. (1) and (3) only

121. If 70% of A and 60% of B remained at the end of the reaction $2A + B \rightarrow C + D$ the order of the reaction is
a. Zero b. One
c. Two d. Three

122. According to Arheneous equation relating rate constant K, temperature T and the collision frequency A of a reaction, when the energy of activation (K/A) is
a. Is doubled
b. Is halved
c. Becomes square root of original
d. Is squared

123. Decomposition of HI on gold is
a. Pseudo first order b. Zero order
c. First order d. Second order

124. The specific rate constant of a first order reaction depends on
a. Concentration of reactant
b. Concentration of product
c. Time
d. Temperature

125. Active mass of gas (C) is relayed to its pressure (P) and absolute temperature (T) as
a. P = CRT b. P = C/RT
c. P = RT/C d. P = CR/T

126. The modularity of each step of a reaction can be ascertained only
a. By experiment
b. From stoichiometric equation
c. From knowledge of a reaction
d. From the rate law of the reaction

127. Arheneous equation can also be written as
a. $\ln K = -Ea/RT$
b. $\ln K = \ln A + Ea/RT$
c. $\ln K = Ln\ A - Ea/RT$
d. $\ln L = Ae^{-Ea/RT}$

128. Which order of the reaction obeys the expression $t\ ½ = 1/Ka$?
a. First b. Second
c. Third d. Zero

129. The rate of the reaction intermediates can be determined by the study of
a. Catalyst effects
b. Concentration of the reactants
c. Temperature effect
d. Solvent effects

130. Which of the following is true?
a. Endothermic reactions have higher activation temperature than exothermic reactions
b. The rate of catalyzed reaction is independent of concentration of catalyst
c. Specific rate constant for a reaction is independent of concentration of reacting species
d. There is a single rate determining step in any reaction mechanism

131. A catalyst
a. Alerts the equilibrium in a reaction
b. Dose not participate in the reaction but speeds it up
c. Is always in the same phase a reactants and products
d. Participates in the reaction and provides an easier pathway for the same

132. Which of the following is not correct in case of heterogeneous catalyst?
a. The catalyst decreases the energy of activation
b. The surface of catalyst plays an important role
c. The catalyst actually forms a compound with reactants
d. There is no change in the energy of activation

133. In a reversible reaction catalyst
a. Increase the rate of forward reaction
b. Decreases the rate of backward reaction
c. Increases the rate of both forward and backward reaction
d. Alerts the equilibrium constant of the reaction

134. The migration of colloidal particles under the influence of electric field is known as
a. Electrophoresis b. Dialysis
c. Electroosmosis d. Electrodialysis

135. Examples of colloids is in the state of liquid in solid dispersion medium are
a. Curd and milk
b. Milk and whipped cream
c. Cheese and curd
d. White of egg and milk

136. Coagulation occurring while colloidal solution is prepared by chemical methods is due to
a. Inadequate impurities
b. Presence of soluble impurities
c. Stabilization of lyophobic sols
d. Excess amount of soluble impurities

137. C : N ratio of oil cakes
a. 10-15 : 1 b. 3-5 : 1
c. 10-20 : 1 d. 20-50 : 1

138. A mineral that is the primary and an ultimate source of P in soils is
a. Apatite
b. Inosital phosphate
c. Phospholipids
d. Feldspars

139. Generally soil P tests work well in predicting P deficient soils because
a. It accurately measures biologically available P and can predict mineralization of P from organic P sources
b. It extracts P in mica minerals
c. P availability is dominated by chemical reactions such as adsorption and precipitation
d. P fertilizer recovery is very high in soils

140. Why is cation exchange capacity (CEC) important?
a. Provides sites on soil solid phase for positive charges through pH dependent charge to reduce nutrient leaching losses for cations
b. Provides sites on soil solid phase for adsorption to reduce cation leaching losses
c. Provides sites on soil solid phase with negative charges that reduces anion leaching losses
d. Provides sites on soil solid phase with negative charge that reduces cation leaching losses

141. Which of the following cations has the strongest ionic attractions to exchange sites?
a. K^+ with ionic radius of 1.33 D
b. NH_4^+ with ionic radius of 1.43 D
c. Mg^{2+} with ionic radius of 0.66 D
d. Ca^{2+} with ionic radius of 0.99 D

142. In consideration of plant availability of all essential nutrients, what is a typical range for the optimal pH for many agricultural soils?
a. 5.2–5.8 b. 5.5–6.3
c. 6.0–7.5 d. 7.0–8.5

143. What is the purpose of nitrification inhibitors?
a. To stop conversion of nitrite to nitrate and to hold nitrite by anion exchange to reduce its chances of leaching to groundwater
b. To stop rapid mineralization of NH_4^+ to reduce leaching losses of N to groundwater
c. To convert nitrate to NH_4^+ to reduce the potential losses of N as nitrate to groundwater
d. Inhibit conversion of NH_4^+ to nitrite to keep NH_4^+ on exchange sites, reducing losses of nitrate to groundwater

144. What are the advantages of ammonium phosphates?
a. Low cost N fertilizer
b. Good starter fertilizer for seedlings, providing both N and P
c. Good starter fertilizer for seedlings that besides nutrients has a liming effect on soils
d. Good starter fertilizer for seedlings that provides significant amounts of sulfur

145. The availability to plants of P from rock phosphate can be improved by
a. Premixing it and composting it with organic amendments prior to application
b. Banding beneath the seed rows
c. Use on alkaline soils rather than acid soils
d. Use coarse textured rock phosphate

146. Of the following which would require the least amount of lime per acre to increase the pH to a given level assuming purity, moisture content and fineness was the same?
   a. Ground limestone with a calcium carbonate equivalent (CCE) of 100
   b. Dolomitic limestone with a CCE of 109
   c. Hydrated lime with a CCE of 135
   d. Burned lime with a CCE of 179

147. Which of these processes/mechanisms is the main controlling factor in determining the amount of plant available P (PO_4) in soil solution?
   a. Mineralization of P from organic matter
   b. PO_4 precipitation with soluble Fe or Al and PO_4 sorption reactions with solid phases in soil
   c. Biological immobilization of P in organic matter
   d. Solubility of apatite
   e. All the above

148. Urea
   a. Is the principle dry form of N fertilizer in the world
   b. Is first hydrolyzed to nitrate in soil and can be surfaced applied to alkaline soils
   c. Is first hydrolyzed to ammonium in soil and should not be surfaced applied to alkaline soils
   d. Both a and b
   e. Both a and c
   f. None of the above

149. Why is cation exchange capacity (CEC) important?
   a. Provides sites on soil solid phase for positive charges through pH dependent charge to reduce nutrient leaching losses for cations
   b. Provides sites on soil solid phase for adsorption to reduce cation leaching losses
   c. Provides sites on soil solid phase with negative charges that reduces anion leaching losses
   d. Provides sites on soil solid phase with negative charge that reduces cation leaching losses
   e. All the above

150. Which of the following can be considered a neutral salt that have no effect on soil pH?
   a. Calcium sulfate
   b. Ammonium sulfate
   c. Ammonium nitrate
   d. Urea

151. Diffusion in soils is
   a. The movement of ions down a concentration gradient
   b. PO_4 moving with water via gravity flow
   c. Movement of ions by electrostatic attraction
   d. Evapotranspiration in plants

152. Ions such as Mg and Ca held by cation exchange on surfaces in soils
   a. Can not go into soil solution as plants take up cations
   b. Are plant available
   c. Are held by electrostatic attraction
   d. Share electrons
   d. Both a and c
   e. Both b and c
   f. None of the above

153. In general, soils maintain a constant pH in a similar manner as a buffer solution. In the case of acid soils what is the buffering mechanism?
   a. H readily dissociates from the soil colloid
   b. The soil acts as weak acid with soil colloids acting as the excess weak acid
   c. The soil acts as a strong acid
   d. The soil maintain greater amounts of Al^{3+} and H^+ in soil solution than in the solid phase of soil

154. Mineralization of P is the
   a. Conversion of PO_4^{2-} to phospholipids
   b. Incorporation of soluble P into microbial tissue
   c. Conversion of organic P to inorganic P
   d. Uptake of P by plants

155. Which factors do not usually cause an increase in P availability?
   a. Increasing the $CaCO_3$ content in alkaline soil
   b. Liming an acid soil
   c. Decrease in organic matter
   d. Acidifying an alkaline soil
   e. Both a and c
   f. Both c and d
   g. All the above

156. An example of a phosphate adsorption reaction
   a. Precipitation of an Al phosphate compound
   b. Formation of an Fe phosphate compound
   c. Is ligand exchange of a phosphate group for an OH or OH_2 group on a solid surface
   d. Formation of tricalcium phosphate

157. Which combination of solid phases of phosphate compounds would be typically found in acid and alkaline soils?
   a. Fe and Al phosphates in acid soil and tricalcium phosphate in alkaline soils
   b. Fe and Al phosphates in alkaline soil and tricalcium phosphate in acid soils
   c. H_2PO_4 in acid soils and PO_4^{2-} in alkaline soils.
   d. H_2PO_4 ~~in acid~~ soils and monocalcium phosphate in alkaline soils.

158. Potassium as K^+ held by cation exchange on surfaces in soils
   a. Can not go into soil solution and be available to plants
   b. Is plant available
   c. Is held by electrostatic attraction
   d. Share electrons
   d. Both a and c
   e. Both b and c
   f. None of the above

159. How can decomposition of organic matter cause soil acidity?
   a. Releases Al^{3+} from organic matter that splits water and releases H
   b. Has a liming effect that causes leaching of basic cations
   c. Produces strong bases during decomposition
   d. Releases CO_2 which forms H_2CO_3

160. A soil pH of 5.4
   a. Should always be limed to at least pH 6.5 if it is economically feasible
   b. Is not necessarily of concern because there is no free Al^{3+} in soil solution
   c. Requires an SMP buffer test and should be limed according to the crops to be grown
   d. Requires an assessment of active pH and limed to a pH of 6.5 or greater
   e. All the above

161. Slowly available K
   a. Can be released from between the partially opened lattices of partially weathered hydrous micas or illite clay minerals

b. Is soluble K^+ in soil solution
c. Is K in primary minerals fixed in the lattice clay structure
d. Is measured in a standard NH_4OAc solution in soil testing
e. All the above

162. Commercial phosphate fertilizer such as triple superphosphate
a. Is made by mining apatite which is reacted with acids to form phosphate fertilizer
b. Can be made in unlimited amounts
c. Is made by grinding apatite and using density separation techniques to obtain the P fertilizer
d. Both b and c
e. All the above
f. None of the above

163. An example of phosphate adsorption is
a. Soluble Al^{3+} reacting with phosphate to form a 3 dimensional precipitate of an Al phosphate compound
b. Soluble Fe^{2+} reacting with phosphate to form a 3 dimensional precipitate of an Fe phosphate compound
c. Ligand exchange of soluble phosphate anions with OH or OH_2 groups on a solid surface forming a monolayer of phosphate anions at the surface of the solid.
d. Penetration of phosphate into a granule of $CaCO_3$
e. All the above

164. Blue green algae and the Azolla fern both derive benefits from each other in which of the following ways?
a. Where the algae provides energy to the plant and fern fixes N_2 which is a non–symbiotic relationship
b. Where the algae fixes N_2 and is considered a free–living organism
c. Where the algae fixes N_2 and the fern provides energy to the algae which is a symbiotic relationship
d. Where the algae provides energy to the plant and fern fixes N_2 which is a symbiotic relationship
e. All the above

165. The person who in the 19th century destroyed the humus theory (plants get C from soil) and established that H and O in plants comes from water is
a. Justus von Liebig b. Jethro Tull
c. J. R. Glauaber d. None

166. Primary minerals
a. Provides nutrients in a form that is normally directly available to plants
b. Are important as the primary source of N in soils
c. Are of sedimentary origin
d. Are formed from volcanic activity and provide very low amounts of plant available forms of nutrients
e. All the above

167. Arrange the cations based on their power to fix potassium in releasing power.
a. $Na^+ > Ca^{++} > Mg^{2+} > NH_4^+ > H^+$
b. $Na^+ > Mg^{2+} > Ca^{2+} > NH_4^+ > H^+$
c. $H^+ > NH_4^+ > Ca^{2+} > Mg^{2+} > Na^+$
d. $NH_4^+ > Ca^{2+} > Mg^{2+} > Na^+$

168. Anhydrous ammonia and urea have what in common?
a. Will be acid producing and volatilize on the surface of alkaline soils
b. Will cause alkalinity and volatilize on surface of acid soils
c. Can not be a source of nitrate for ground water pollution
d. Are uncommon forms of commercial N fertilizer
e. All the above

169. Keeping a micronutrient in solution and available to plants by forming an organic complex around the micronutrient is called
a. Chemisorption of the cation with soil organic matter
b. Chelation
c. Adsorption
d. Substitution of one ion for another

170. Non-exchangeable K is
a. K^+ in soil solution
b. K^+ held by negative charges on the surface of clays
c. Hydrated K^+ between the expanded layers of 2 : 1 clays
d. K^+ fixed between the lattice layers of clay minerals

171. Why do some microorganisms reduce NO_3 and other molecules when oxygen is depleted after a soil is flooded for extended periods?
a. These organisms switch from oxygen to another electron acceptor in order to gain energy to carry out their cellular processes
b. To release N_2 to the atmosphere to lower N in soils to levels acceptable for microbial activity under anaerobic conditions
c. To supply nutrients to plants that grows under flooded conditions
d. To maintain pH in soil
e. All the above

172. Besides plant uptake, what is one major fate of sulphate fertilizer added to aerobic soils?
a. Immobilized in the soil organic matter as sulphides
b. Immobilized in the soil as ester sulfates, C-bonded S and other organic fractions
c. Immobilized as sulphate
d. Volatilized as H_2S

173. A chelated micronutrient is
a. Chemisorption of the cation with soil organic matter
b. An organic metal/organic complex that is soluble and available to plants
c. An adsorption reaction
d. Substitution of one ion for another
e. All the above

174. The first reaction to occur when a previously aerobic soil is flooded and becomes anaerobic is
a. Oxidation of NH_4 to NO_3
b. Depletion of oxygen and reduction of NO_3 and release of N_2 to the atmosphere
c. Depletion of oxygen and reduction of CO_2 to carbonic acid
d. Depletion of Fe^{3+} and reduction of SO_4

175. Which of the following would be the condition and explanation for a plant deficiency of Mn?
a. Alkaline (> pH 7.5) soil and precipitation of Mn to insoluble precipitates
b. Acid soil (< pH 5.2 where Mn^{4+} is converted to Mn^{2+}
c. Alkaline (> pH 7.5) soil and reduction of Fe^{3+} to Fe^{2+}
d. Acid soil (< pH 5.2) where Al interferes with Mn uptake by plants

176. Reserve K is
a. K^+ in soil solution
b. K^+ held by negative charges on the surface of clays
c. Hydrated K^+ between the expanded layers of 2:1 clays
d. K^+ in primary minerals such as micas and feldspars

177. Which form of S in soils is thought to be the most important source for S that will be mineralized during the growing season?
   a Ester sulfate
   b. Carbon–bounded S
   c. Calcium carbonate–sulfates
   d. FeS

178. Why is elemental S not directly available to plants in an aerobic soil?
   a. Forms insoluble S compounds
   b. Is reduced to S^{2-}
   c. Forms H_2S which needs to be oxidized first
   d. Must first be oxidized to form SO_4^{2-}

179. Which micronutrient increases in availability with increasing pH?
   a. Cu b. Mo
   c. Zn d. Mn
   e. None of the above

180. Soil solution K
   a. Is unavailable for plants
   b. Is slowly available to plants
   c. Is available to plants
   d. Is the same as exchangeable K

181. Structural features associated with compression are
   a. Stretching of the crust and normal faulting
   b. Strike-slip faults and normal faults
   c. Folded strata and reverse faults
   d. None of the above

182. The earth's core is made of
   a. Liquid and solid iron metal
   b. Silicate minerals
   c. Iron and magnesium
   d. All

183. The earth's mantle
   a. Is composed mainly of the elements oxygen, silicon and magnesium
   b. Has regions that are partially molten
   c. Is about 2,900 kilometers thick
   d. All of the above

184. The most abundant mineral in the earth's crust is
   a. Hematite b. Calcite
   c. Feldspar d. Quartz

185. Compared with the continental crust, the oceanic crust is
   a. Younger, thicker and less dense
   b. Younger, thinner and denser
   c. Older, thicker and denser
   d. Younger, thinner and less dense

186. Which of the following are ferromagnesian (or mafic silicates) minerals?
   a. Olivine and feldspar
   b. Olivine and pyroxene
   c. Quartz and feldspar
   d. All

187. Igneous rocks are classified on the basis of
   a. The content of silica (SiO_2)
   b. The abundance of different minerals
   c. Their grain size or texture
   d. All of the above

188. Rocks that form when magma cools slowly beneath the earth's surface are called
   a. Intrusive igneous rocks
   b. Extrusive igneous rocks
   c. Felsic igneous rocks
   d. Pyroclastic rocks

189. Hydrolysis and oxidation are examples of
   a. Chemical weathering processes
   b. Metamorphic processes
   c. Lithification processes
   d. Mechanical weathering processes

190. Carbonic acid
   a. Forms when water reacts with carbon dioxide
   b. Promotes chemical weathering processes
   c. Is most abundant where there is decomposing vegetation
   d. All of the above

191. Over time, soil develops a layered structure called
   a. Stratification b. A soil profile
   c. Foliation d. Cleavage

192. Soils that develop by intense chemical weathering of rock in hot humid climates are
   a. Called aridisols
   b. Hard and infertile
   c. Fertile because they contain many soluble elements
   d. Easy to cultivate once the organic layer is removed

193. An example of a coarse–grained, detrital sedimentary rock is
   a. Chalk b. Conglomerate
   c. Quartzite d. Shale

194. The alignment of platy minerals, like mica, in a metamorphic rock is called
   a. Stratification
   b. Foliation
   c. Lithification
   d. A pyroclastic texture

195. When limestone is metamorphosed it becomes the rock
   a. Calcite b. Schist
   c. Chalk d. Marble

196. The bulk density of a soil must consider which of the followings?
   a. Total soil volume and oven dry soil weight
   b. Volume of soil and volume of pore space
   c. Pore volume and weight of soil particles
   d. Volume of soil particles and weight of soil particles

197. The weight of a graduated cylinder is 54 grams, the cylinder is filled with 85 ml of oven dry field soil. The weight of soil and cylinder is 186 grams. The bulk density of the soil is ____ g/cc.
   a. 0.65 b. 1.15
   c. 1.35 d. 1.55

198. What is the bulk density of the soil in question 6 in grams per cubic centimeter? (BD of water is 62.4 lbs/ft^3.
   a. < 0.9 g/cc
   b. Between 1.00 and 1.20 g/cc
   c Between 1.21 and 1.50
   d. > 1.51 g/cc

199. Which of the following is a buffer mechanism with approximate pH range?
   a. Cation exchange buffer (pH 5.0 to 4.2)
   b. Aluminium buffer (ph 4.2 to 2.8)
   c. Iron buffer (pH 3.8 to 2.4)
   d. All the above

200. The mononuclear hydrolytic Al species example is/are
   a. $Al(OH)^{2+}$. b. $[Al_2(OH)_2]^{4+}$
   c. $[Al_3(OH)4]^{5+}$ d. $[Al_4(OH)_{16}]^{2+}$

Model Test Question Paper II

QUESTIONS :

1. Of the following fertilizers and soil amendment, which is most soluble?
   a. $CaHPO_4$ b. $CaSO_4 \cdot 2H_2O$
   c. KCl d. $CaCO_3$

2. Of the following fertilizers and soil amendment, which is least soluble?
   a. $Ca(H_2PO_4)_2$ b. $CaSO_4.2H_2O$
   c. KCl d. NH_4NO_3

3. The cost of urea is Rs 180/bag, ammonium nitrate Rs 120/bag, solution 28 Rs 110/bag and ammonium sulphate Rs 100/bag. The lowest cost/pound of N is from
   a. Urea
   b. Ammonium nitrate
   c. Solution 28
   d. Ammonium sulphate

4. The capacity of soil to buffer against change in pH would be greatest in a soil that is
   a. Sandy and low in organic matter
   b. Clayey and high in organic matter
   c. Sandy and high in organic matter
   d. Clayey and low in organic matter
   e. All the above

5. When deciding on whether or not to lime acid soils, the main criterion should be
   a. pH and type of crop (plant)
   b. pH and yield goal
   c. Buffer Index and type of crop (plant)
   d. Buffer Index and ECCE
   e. All the above

6. A major cause of increasing soil acidity is
   a. Not enough gypsum present
   b: Not enough organic matter present
   c. Poor soil drainage (both surface and internal)
   d. Intensive use of the land (harvest and removal of large biomass yields) and annual application of N-fertilizers
   e. All the above

7. Plant nutrients that are relatively mobile in the soil are
   a. N, P, and K
   b. Fe, Mn, Cu, Zn, Mo, Cl, and B
   c. N, K, S, Cl, and B
   d. N, S, Cl, and B
   e. All the above

8. Plant nutrients that are mobile in the soil can best be managed if we have knowledge of
   a. Percent sufficiency of the nutrient in the soil
   b. Yield goal and % tissue concentration of the nutrient
   c. Length of the growing season for the crop
   d. How much the soil test levels have changed over the past five years
   e. All the above

9. A nutrient element that is commonly deficient in acid soils developed under high rainfall, but seldom deficient in neutral and basic (pH) soils developed in arid climates is
   a. Fe b. K
   c. P d. Zn

10. A soil test value that is unlikely to change much from one growing season to the next, under normal fertilizer input and crop production output is
    a. pH b. N
    c. S d. Cl
    e. All the above

11. A nitrogen transformation process responsible for causing at least a temporary decrease in ammonium-N, increase in nitrate-N, and decrease in pH is
    a. Mineralization b. Nitrification
    c. Denitrification d. Immobilization

12. A nitrogen transformation process responsible for causing a decrease in nitrate-N under anaerobic conditions is
    a. Mineralization b. Nitrification
    c. Denitrification d. Immobilization

13. When ammonia reacts with water, the result is
    a. Increased nitrate and decreased pH
    b. Decreased nitrate and increased pH
    c. Increased ammonium and decreased pH
    d. Increased ammonium and increased pH
    e. None of the above

14. Processes and transformations responsible for loss of N from soils include
    a. Leaching, immobilization and volatilization
    b. Immobilization and mineralization
    c. Leaching and volatilization
    d. Denitrification and immobilization
    e. All the above

15. Available soil nitrogen may be lost as ammonia volatilization when nitrogen is present in the ammonium form and
    a. The soil is limed and then becomes hot and dry
    b. The soil is limed and then becomes waterlogged
    c. The ammonification process is reversed as a result of incorporating a fresh supply of easily decayed crop residue
    d. Denitrification takes place rapidly

16. The nitrogen fertilizer material that has the highest likelihood of being lost to the atmosphere as a result of surface soil reactions is
    a. Ammonium nitrate
    b. Urea
    c. Ammonium sulphate
    d. Diammonium phosphate

17. The form of calcium absorbed by plants is
    a. Ca^- b. $Ca^=$
    c. Ca^+ d. Ca^{++}

18. Sulphur deficiency is not as common as nitrogen deficiency in plants because
    a. The form of S absorbed by plants is immobile in soils
    b. The S-requirement of crops is only about $1/20^{th}$ that of N and about 6 lb of sulphate-S/acre is received each year in rainfall
    c. Sulphur is mobile in plants
    d. More sulphur than nitrogen is mineralized from soil organic matter each year

19. A plant that exhibits interveinal chlorosis in the newest leaves is likely suffering from deficiency of
    a. N b. P
    c. K d. Fe

20. A fertilizer material that is a good source of phosphorous and nitrogen is called
    a. Urea
    b. Ammonium sulphate
    c. DAP d. UAN

21. A nutrient element for which plants depend strongly on chelation to improve availability and transport from the soil to plant root surfaces, is
    a. Ca b. Mg
    c. Fe d. B

22. The immobility of P in soils is primarily a result of orthophosphates
    a. Reacting with Ca in acid soils and Fe and Al in neutral and basic soils
    b. Being immobilized in soil organic matter
    c. Reacting with Fe and Al in acid soils and Ca in neutral and basic soils
    d. Reacting with K in acid soils and Ca in neutral and basic soils
    e. All the above

23. Total P in soils is not related well to plant available-P because much of the total P is
    a. In the subsoil
    b. Within insoluble compounds or complexes
    c. In the chemical form of $Ca(H_2PO_4)_2$
    d. Fixed within the lattice of alumino-silicate minerals and clay particles

24. Related to its mobility in soils, movement of soil P to plant roots is primarily by the process of
    a. Diffusion
    b. Contact exchange
    c. Mass flow
    d. Correlation and calibration

25. Since most plant growth occurs in soils with pH in the range of 5.5 to 8.0, the form of P absorbed by plants is
    a. H_3PO_4 and $H_2PO_4^-$
    b. $H_2PO_4^-$ and HPO_4^{2-}
    c. HPO_4^{2-} and PO_4^{3-}
    d. H_3PO_4 and PO_4^{3-}

26. Plant available phosphates are immobile in soils because almost all soils will contain sufficient amounts of reactive
    a. Ca or Al and Fe to form insoluble phosphate compounds
    b. Organic matter to immobilize added fertilizer P
    c. Si^{4+} to form insoluble silicon phosphates
    d. H^+ and/or OH- to fix P in both acid and basic soils

27. Most of the fertilizer P is produced by refining material mined from geological deposits of
    a. Apatite b. Gypsum
    c. Biotite d. Muscovite

28. When paired sets of soil test values and crop yield (or growth) are found to be strongly related and yield is expressed as a % of maximum yield, the soil test value associated with 65 % of maximum yield may also be referred to as
    a. The critical level
    b. Correlation
    c. Calibration point
    d. 65 percent sufficient

29. In developing a reliable soil test for P, the term calibration refers to the process of identifying -
    a. The critical level
    b. The correlation between paired sets of soil test-P and crop yield values
    c. How much fertilizer-P needs to be applied when the soil test identifies a deficiency
    d. How much fertilizer-P it will take to raise the soil test-P by one unit

30. Compared to Olsen bicarbonate and Bray P1 soil tests, the Mehlich-3 test has the advantage of being
    a. Suitable for use in both acid and basic soils
    b. Able to extract K in addition to P
    c. Suitable for extraction of both N and P
    d. Correlated and calibrated for the major crops in India

31. The most common P fertilizer used in India is
    a. Diammonium phosphate
    b. Monoammonium phosphate
    c. Rock phosphate
    d. Triple superphosphate

32. K deficiency is more common in
    a. Sandy, low pH soils than loamy, high pH soils
    b. Sandy, high pH soils than loamy, low pH soils
    c. Desert soils than soils developed under high rainfall
    d. All the above

33. The majority of plant available K found in most soils is in the category of soil K called
a. Occluded b. Fixed
c. Exchangeable d. Solution

34. Soil test values that change very little from one year to the next, under normal crop production practices, are
a. pH, NO_3-N, extractable P, and extractable K
b. NO_3-N, extractable P, and extractable K
c. pH, NO_3-N, and extractable P
d. pH, extractable P, and extractable K

35. In order for soil testing to be a useful tool for managing nutrients (fertilizer inputs) it is important that
a. The field be sampled every year
b. A composite sample, of at least 15 randomly selected cores, be obtained from the field
c. A composite sample, of at least 15 randomly selected cores, be obtained from every 40 acres of the field
d. The yield from last year's crop be known

36. Nutrients for which a subsoil (6-24 inch depth) sample is important to identify total crop availability, include
a. N, P, K and pH
b. N, S, B, and Cl
c. N, S, Fe, and Mn
d. N, Cl, B, and Fe

37. Management of S, for meeting plant needs from soil and fertilizer, is most like that for the nutrient
a. N b. P
c. K d. Ca

38. An inexpensive, readily available, slow-release form of fertilizer-S is
a. Ammonium sulphate
b. Gypsum
c. Ammonium thiosulphate
d. Dolomitic lime

39. An inexpensive, readily available, slow-release form of fertilizer-Mg is
a. Ammonium sulphate
b. Gypsum
c. Ammonium thiosulphate
d. Dolomitic lime

40. A micronutrient whose plant availability is usually improved by increasing the soil pH is
a. Fe b. Mn
c. B d. Mo

41. Iron chelates are an important form of Fe in soils because they significantly improve
a. Total Fe content of the soil
b. The amount of mobile Fe in the soil
c. Soil pH
d. Reduction of Fe^{3+} to Fe^{2+}

42. When developing a N management plan for any crop (plant) the first, and most important step is to know the
a. Chemical form of N that will be added
b. Crop yield goal or plant growth potential
c. Soil pH
d. Soil CEC

43. The form of nitrogen most easily lost by volatilization from soils with a pH > 7.5 is
a. Amino acids b. Nitrate
c. Ammonium d. Nitrite

44. When plant available N is consumed by microorganisms during organic matter decay, the process is called
a. Mineralization b. Volatilization
c. Denitrification d. Immobilization

45. The last layer in the soil profile is the
a. A Horizon b. B Horizon
c. C Horizon d. R Horizon

46. The layer that is made up of mostly sand and silt is the
a. A Horizon b. C Horizon
c. E Horizon d. O Horizon

47. Which of the following may be considered soil "fauna"?
a. A nematode
b. A mushroom fungus
c. An oak tree root
d. A bacterium
e. All the above

48. Which of the following types of microorganisms is commonly found in soils?
a. Algae
b. Fungi
c. Penicillium
d. Cyanobacteria, chlorophyll-containing bacteria
e. All the above

49. Which of the following management strategies might be used to control certain microbes that damage crop plants?
a. Lime application
b. Covering the soil with clear plastic prior to planting
c. Use of raised beds
d. Application of compost
e. All the above

50. GEMs are _____.
a. Genetically engineered microorganisms
b. Capable, in some cases, of producing toxins that kill plant pests
c. Known to pose no risk to the environment because the transfer of genetic material in making this organism is very precise
d. Both a and b
e. All the above

51. All of the following factors affect a soil's profile except which of the following?
a. Vegetation
b. Climate
c. Presence of metals
d. Local environmental conditions

52. Which of the following is not a renewable resource?
a. Forests b. Metals
c. Soil d. Water

53. In relation to bacterium's optimal growth requirements, which group would you expect to be most likely involved in decomposition of compost piles?
a. Acidophiles b. Psychrophiles
c. Extreme halophiles d. Mesophiles
e. Thermophiles

54. Because the soil primarily is an _____ environment; the elements, such as carbon, nitrogen, sulphur and iron, will tend to be in the _____ state in the soil.
a. Aerobic; oxidized
b. Aerobic; reduced
c. Anaerobic; oxidized
d. Anaerobic; reduced

55. _____ is the process in which microorganisms are used as a food source resulting in nitrogen and phosphorous mineralization
a. Nitrogen fixation
b. Ammonification
c. Microbivory
d. Eutrophication
e. Homeostasis

56. A microbial community that develops in puddles in low areas and retained on the soil surface is called a
a. Zooglea b. Desert crust
c. Mychorrhizae d. Microfilm
e. Rhizosphere

57. The _____ is where organisms that are found on and in the aerial surface plants are growing.
a. Rhizosphere b. Microfilm
c. Desert crust d. Phyllosphere
e. Rhizoplane

58. The function of growth promoting rhizobacteria is to
a. Decompose the organic materials secreted by the plant making the elements available to the plant again
b. Stimulate mineral uptake by inhibiting activities of other bacteria in the vicinity
c. Enhance mycorrhizal activity
d. Inhibit competing bacteria by producing antibiotics
e. Promote plant growth by producing chemical signals

59. Which of the following genera synthesizes Nod factors in order to activate a plant to allow development of an infection thread?
a. *Agrobacterium* b. *Escherichia*
c. *Pseudomonas* d. *Frankia*
e. *Rhizobium*

60. Nodulation and the development of an anaerobic environment to facilitate nitrogen fixation is characteristic of which genus?
a. *Agrobacterium* b. *Escherichia*
c. *Pseudomonas* d. *Cryphanectria*
e. *Rhizobium*

61. The nitrogen-fixation form of the Rhizobium bacterium is called a
a. Bacteroid b. Symbiosome
c. Infection thread d. t-plasmid
e. Mycorrhizae

62. Which of the following genera posses a tumor inducing plasmid?
a. *Rhizobium* b. *Agrobacterium*
c. *Frankia* d. *Pseudomonas*
e. *Erwinia*

63. When it induces a tumor in plants, *Agrobacterium* introduces _____ into the DNA of the plant cell.
a. mRNA b. Ti plasmid
c. cDNA d. T-DNA
e. Induction factor

64. Nitrogen fertilizers disrupt ecosystem structure and function by
a. Promoting heterotrophic growth causing an imbalance in CO_2 levels
b. Decreasing filamentous fungal development which causes loss of soil crumb structure and subsequent soil fertility
c. Causing more antibiotic producing bacteria to grow and produce antibiotics which stunt the growth of plants
d. Reducing the number of nitrogen fixing bacteria in soils
e. Causing formation of nitrosamine carcinogens
f. All the above

65. Addition of nitrogen-containing fertilizers affects gas exchange processes in the soil
a. Resulting in release of NO and N_2O which are greenhouse gasses
b. Causing methane gas to be consumed
c. Causing methane gas to be produced
d. Causing antibiotic production in bacteria which leads to antibiotic resistance
e. Assimilation of NO_3 by the plants

66. Methanotrophic bacteria
a. Oxidize methane gas
b. Produce methane gas
c. Utilize methane as the electron source for reduction processes
d Are responsible for the greenhouse effect
e. Are most active in anaerobic environments

67. Which of the following genera of fungi produces a black slime that dries out to produce a dusty layer of fungal spores and is implicate in "sick building" diagnosis.
a. *Mycobacterium* b. *Agaricus*
c. *Stachybotrys* d. *Puccinia*
e. *Penicillium*

68. Mechanical weathering produces _____.
a. Clay minerals
b. Quartz
c. Smaller particles
d. Calcium carbonate

69. When liquid water freezes
a It does not change in volume
b. It expands by 5% in volume
c. It expands by 9% in volume
d. It decreases in volume

70. What is the term for the general process by which rocks are broken down at the Earth's surface?
a. Deposition b. Erosion
c. Lithification d. Weathering

71. Which of the following affect the rate of weathering?
a. The soil type and extent
b. The rock type
c. The climate d. All the above

72. Soil is composed of _____.
a. Organic matter produced by organisms
b. Fragments of bedrock
c. Clay minerals formed by the chemical alteration of bedrock
d. All the above

73. In which of he following climates will chemical weathering be most rapid?
a. Hot and dry b. Hot and humid
c. Cold and dry d. Cold and humid

74. Which of the following statements about weathering is false?
a. Rocks of different compositions weather at different rates
b. Heat and heavy rainfall increase the rate of chemical weathering
c. The presence of soil slows down the weathering of the underlying bedrock
d. The longer a rock is exposed at the surface, the more weathered it becomes

75. Which of the following minerals has a low solubility and therefore is least susceptible to chemical weathering at the Earth's surface?
a. Calcite b. Plagioclase
c. Quartz d. Olivine

76. The rate of chemical weathering is increased by acids. The most common natural acid on the Earth's surface is _____.
a. Nitric b. Hydrochloric
c. Carbonic d. Sulphuric

77. Carbon dioxide makes up about _____ of the Earth's atmosphere.
a. 0.1 % b. 1 %
c. 10 % d. 25 %

78. Carbonic acid, the primary agent of chemical weathering is produced by _____.
a. Carbon dioxide dissolving in rainwater
b. Plant roots
c. Bacteria that feed on plant and animal remains
d. All the above

79. Which of these is least likely to form a clay mineral during weathering?
a. Feldspar b. Quartz
c. Amphibole d. Olivine

80. Caves are most lively to form in which of the following rock types?
a. Granite b. Limestone
c. Basalt d. Sandstone

81. Which of the processes is not an example of chemical weathering?
a. Dissolution of calcite
b. Breakdown of feldspar to form clay
c. Splitting of a rock along a fracture
d. Rusting of a nail

82. As a rock breaks into smaller pieces, the surface area to volume ratio _____.
a. Increases
b. Decreases
c. Stays the same
d. Can increase or decrease depending on the size of the pieces

83. The physical and chemical weathering of granite will produce _____.
a. Ions dissolved in rainwater and soil water
b. Mineral fragments and granite fragments
c. Clays and iron oxides
d. All the above

84. The deep red color of soils found in Andra Pradesh and other warm, humid regions is caused by _____.
a. Reduced iron oxides
b. Oxidized iron oxides
c. Quartz
d Feldspar

85. Which of the following factors would increase the rate of weathering?
a. Increasing rainfall
b. Increasing temperature
c. Increasing organic activity
d. All the above

86. The major source of aluminum metal, _____, is a clay-rich ore composed of aluminum hydroxide.
a. Hematite
b. Bauxite
c. Kaolinite
d. Montmorillonite

87. Fe^{3+} refers to _____.
a. Iron metal b. Ferrous iron
c. Ferric iron d. Hematite

88. Which of the following minerals is most stable at the Earth's surface?
a. Hematite b. Mica
c. Olivine d. Feldspar

89. A substance that releases hydrogen ions (H+) to a solution is called a(n) _____.
a. Oxidizer b. Reducer
c. Acid d. Pedalfer

90. What is the term geologists use for the layer of loose, heterogeneous weathered material lying on top of the bedrock?
a. Humus b. Laterite
c. Regolith d. Soil

91. Which of the following farming practices helps to prevent the erosion of topsoil?
a. Ploughing a field perpendicular to the contour lines
b. Ploughing a field parallel to the contour lines
c. Ploughing a field in the direction that the water drains
d. None of the above

92. What is the name for soils that are rich in calcium?
a. Laterites b. Evaporites
c. Pedocals d. Pedalfers

93. The physical and chemical weathering of granite will produce _____.
a. Ions dissolved in rainwater and soil water
b. Mineral fragments and granite fragments
c. Clay minerals and iron oxides
d. All the above

94. In the atmosphere, carbonic acid forms from the reaction of carbon dioxide and _____.
a. Fossil fuels b. Nitrogen
c. Oxygen d. Water

95. Which of the following minerals found in a granite is not altered by chemical weathering?
a. Biotite b. Feldspar
c. Magnetite d. Quartz

96. Which of the following minerals would be most likely to form a clay mineral during chemical weathering?
a. Iron oxide b. Mica
c. Calcite d. Quartz

97. Which of the following factors would increase the chemical weathering rate?
a. Increasing rainfall
b. Increasing temperature
c. Increasing organic activity
d. All the above

98. Which of the following conditions promotes slow chemical weathering?
a. Cold temperatures b. Thick soils
c. High rainfall d. Fracturing

99. Which of the following human activities has resulted in increased rates of weathering?
a. The release of sulphur and nitrogen oxides that cause acid rain
b. The physical disintegration of rocks during construction and mining
c. Both a and b
d. Neither a nor b

100. Exfoliation domes form from
a. Frost wedging b. Pressure release
c. Hydrolysis d. Root wedging

101. Laterite soils
a. Are red in color
b. Are formed in tropical climates
c. Often contain high concentrations of aluminum
d. All the above

102. What is the correct order of the horizons from top to bottom?
a. O, E, B, C, A b. E, B, C, A, O
c. O, A, E, B, C d. C, B, A, E, O
e. O, E, C, A, B

103. Earth-surface processes are the actions that take place at the interface of the geosphere with the _____.
a. Hydrosphere and atmosphere
b. Atmosphere and biosphere
c. Hydrosphere and biosphere
d. Hydrosphere, atmosphere, and biosphere

104. Which type of soil is infertile because mineral nutrients are dissolved and removed and organic matter is not retained in the soil?
a. Desert soils b. Forest soils
c. Rainforest soils d. Grassland soils

105. B horizons are most notable for _____.
a. Colors and size
b. Size and density
c. Textures and minerals
d. Colors and textures

106. What are the types of soils?
a. Forest, Desert, and Rainforest
b. Forest, Rainforest, Grassland
c. Wetland and Grassland
d. Forest, Rainforest, Grassland, Desert, Wetland
e. None of the above

107. What was the "Dust Bowl" of the 1930s?
a. Soil erosion by flowing water
b. Soil erosion by wind
c. Soil erosion by rills and gullies
d. Eluviation

108. "Clods" tend to form in which soil horizon?
a. O b. A
c. E d. B
e. C

109. The successful growth of plants is most directly dependent on which of the following?
a. Infertile Soil b. Brown Soil
c. Black Soil d. Fertile Soil

110. All of the factors except _____ determine soil characteristics.
a. Sunlight
b. Sediment deposition
c. Time
d. Slope

111. Calcite is usually only found in which types of soil?
a. Frozen b. Forest
c. Rainforest d. Desert
e. Grassland

112. Which soil has major Iron oxide/hydroxide minerals in it?
a. Forest b. Desert
c. Rainforest d. Grasslands

113. Which of the following is true about the role of climate in determining soil characteristics?
a. Moisture is essential for weathering reactions to take place
b. There is less mineral dissolution from near-surface horizons in a humid region
c. Quantity of precipitation and temperature are not key variables in soil formation
d. Chemical-weathering reactions are enhanced by low temperatures in the hot tropics

114. Which soil layer consists of a light-colored horizon lacking clay, organic matter, and easily weathered minerals?
a. O b. A
c. E d. B
e. C

115. What material has varying susceptibility of chemical weathering and decomposes into different products?
a. Regolith b. Clay
c. Parent Material d. Bedrock
e. None of the above

116. Soil forms from what parent material?
a. Creep b. Rockslide
c. Bedrock d. Regolith
e. Both C and D

117. The _____ horizon is at the bottom of the soil, it is the least weathered horizon and is the parent material for soil formation.
a. A b. B
c. C d. E
e. O

118. Regolith is a term derived from the greek word "rhegos" meaning _____ and "lithos" meaning?
a. Carpet and rock
b. Blanket and stone
c. Trees and boulders
d. Animals and plants

119. Which three horizons are close to the surface?
a. A, B, C b. A, B, O
c. A, O, E d. B, O, E
e. A, C, O

120. This zone contains the largest variety of mineral compositions?
a. O b. A
c. E d. B
e. C

121. Which zone does leeching most often occur?
a. O b. A
c. E d. B

140. Which one of the following is a Mn containing minerals?
a. Magnetite b. Tourmaline
c. Apatite d. Pyrolusite

141. Which one of the following sets shows the correct soil order in sequence of increasing age?
a. Entisols, Mollisols, Alfisols, Ultisols
b. Entisols, Mollisols, Ultisols, Alfisols
c. Ultisols, Alfisols, Mollisols, Entisols
d. Alfisols, Mollisols, Entisols, Ultisols

142. Humic acid isolated from soil is
a. Aromatic with high molecular weight
b. Aromatic with low molecular weight
c. Aliphatic with high molecular weight
d. Aliphatic with low molecular weight

143. Soils having available K_2O of 200 kg /ha will be classified as
a. Low b. Medium
c. High d. None

144. Sugarbeet is an indicator plant of
a. P b. B
c. Mg d. Na

145. On the functional basis Fe, Mn, Zn and Cu have been classified as
a. Main structural elements
b. Accessory structural elements
c. Regulators and carriers
d. Catalysts and activators

146. A mature and dry plant tissue contains about _____ % proteins.
a. 20-50 b. 1-15
c. 1-8 d. 10-30

147. The moisture equivalent was introduced by
a. Briggs and McLane (1907)
b. Richards and Weavers (1944)
c. Shaw and Baver (1939)
d. Whitney

148. Which type of soil survey use the lowest categories of taxonomic and mapping units, i.e. types and phases?
a. Detailed soil survey
b. Reconnaissance soil survey
c. Detailed reconnaissance soil survey
d. None

149. Fe concentration used for foliar spray is
a. 0.2% b. 0.4%
c. 0.05% d. 1.0%

150. Equivalent acidity of anhydrous ammonia is
a. 148 b. 128
c. 110 d. 93

151. Molybdate reagent is used for the estimation of
a. N b. P
c. Ca d. B

152. Who developed the method for estimation of lime requirement?
a. Sckooner (1952)
b. Shoemaker *et al.* (1961)
c. Standford and English (1949)
d. Olsen *et al.* (1954)

153. Indicator plant for copper is
a. Maize b. Wheat
c. Sorghum d. Potato

154. Which science assumes the status of petrology, petrography and pedogenesis?
a. Soil science b. Edaphology
c. Pedology d. Petrology

155. Chemical formula of siderite is
a. $CaCO_3$ b. Fe_2O_3
c. $Ca_3(PO_4)_2$ d. $FeCO_3$

156. The peeling off the plates from parent rock due to differential expansion and contraction of minerals as a result of changes in temperature, is called as
a. Meander b. Exfoliation
c. Illuviation d. Moraine

157. The negative charge on 2:1 clay s is
a. pH dependent b. pH independent
c. Both a and b d. None

158. CEC range of organic soils lies in the range of
a. 3-5 meq/100g
b. 10-20 meq/100g
c. 20-50 meq/100g
d. 50-100 meq/100g

159. Materials transported by water and settled out in lakes are called as
a. Alluvium b. Lacustrine
c. Glacial drift d. Colluvium

160. Pedogenic process dominant in tropical and subtropical regions of the world is/are
a. Laterization b. Podzolization
c. Salinization d. Gypsification
e. All the above

161. Which extractant is used for determination of CEC?
a. 1N NH_4OAc b. 1N $NaOHCO_3$
c. 1N KOAc d. Olsen reagent

162. Which one of the following formula is used for the calculation of base saturation?
a. Total base/CEC × 100
b. Exchangeable bases/CEC × 100
c. CEC/Total bases × 100
d. CEC/Exchangeable bases × 100

163. Red soils are mainly confined to
a. Uttar Pradesh b. Rajasthan
c. Tamilnadu d. Bihar

164. Nutrient index between 1.5 and 2.5 is categorized as
a. Low b. Medium
c. High d. None

165. The coordinated project on long term fertilizer experiment was sponsored by ICAR in
a. 1970-71 b. 1975-76
c. 1980-81 d. 1985-86

166. Total number of master horizons present in soil is
a. 4 b. 5
c. 6 d. 7

167. The B horizon is generally absent in
a. Black soils b. Red soils
c. Desert soils d. Brown hill soils

168. Apparent nutrient recovery (ANR) can be calculated by using of which formula
a. ANR = Nutrient removed from fertilized plots-Nutrient removed from unfertilized plot/Nutrient added × 100
b. ANR = Nutrient removed from unfertilized plots-Nutrient removed from fertilized plot/Nutrient added × 100
c. ANR = Nutrient removed from unfertilized plots-Nutrient removed from fertilized plot/Nutrient removed from unfertilized plot × 100
d. None of the above

169. Oldest surviving long term manurial trial in India is located as _____, initiated in 1909.
a. Kanpur b. Coimbatore
c. Bijapur d. Pusa, Bihar

170. Biosuper is a fertilizer containing
a. Rock phosphate + Elemental S + S oxidizing bacteria
b. Phosphoric acid + Elemental S + S oxidizing bacteria
c. Ammonium sulphate + Elemental S + S oxidizing bacteria
d. None of the above

171. Chlorite and/or serpentine, epidote, calcite and hornblende are the altered products of
a. Muscovite b. Quartz
c. Amphiboles d. Pyroxenes

172. Colour of the land capability class-III on LCC maps is
a. Purple b. Brown
c. Dark grey d. Orange

173. Fertilizer control order was issued in
a. 1947 b. 1957
c. 1977 d. 1986

174. Gapon's equation is widely used equation to describe
a. P status of soils
b. CEC of soils
c. Phosphate potential of soils
d. Q/I relationship of Potassium

175. Who established the essentiality of Fe for plant in 1844?
a. Gilbert b. Glauber
c. Gris d. Grigg

176. Major deposits of Gypsum are found in
a. Rajasthan b. Haryana
c. Gujarat d. Punjab

177. In Mitcherlich technique, _____ plants are grown to maturity.
a. Barley b. Oat
c. Wheat d. Sunflower

178. Which of the following oil cakes, in addition to its manurial value, also acts as a nitrification inhibitor?
a. Mustard b. Groundnut
c. Neem d. Sesame

179. Science dealing with the origin or formation of soil from the unconsolidated parent material with special reference to factors and processes of soil formation is known as
a. Soil science b. Pedology
c. Soil genesis d. Edaphology

180. The rate of weathering is generally high in
a. Arid tropical climate
b. Arid temperate climate
c. Humid tropical climate
d. Humid temperate climate

181. The major source of negative charge on humus colloids is due to
a. Carboxylic (-COOH) groups
b. Enolic (-OH) groups
c. Phenolic groups
d. All of these

182. Munsell colour chart contains about ____ different coloured papers or chips.
a. 100 b. 125
c. 150 d. 175

183. Major deposits of lime are found in
a. Tamilnadu b. Bihar
c. Meghalaya d. Karnataka

184. Who developed the DTPA tests for available soil micronutrients?
a. Kurtz LT b. Lindsay WL
c. Larsen d. Jackson ML

185. Stem nodulating Rhizobium sp. is
a. Sino-rhizobium
b. Bradyrhizobium
c. Azo-rhizobium
d. All

186. One hectare cm of water is equal to
a. 100 tonnes b. 100000 litres
c. Both a and b d. 10 tonnes

187. A soil which has pH < 8.5, ESP < 15 and EC > 4 dSm^{-1} at 25 °C is called as
a. Saline soils b. Alkaline
c. Saline-alkaline soils d. None

188. Which aluminium hydrous oxide mineral is also called as hydrargillite?
a. Diaspore b. Boehmite
c. Gibbsite d. Bayerite

189. Brown to yellowish colour of soil is due to the presence of
a. Lepidochrosite b. Magnetite
c. Maghemite d. Haematite

190. Which clay has the greatest capacity to shrink and swell?
a. Kaolinite
b. Montmorillonite
c. Vermiculite
d. Illite

191. Fertility gradient approach was given by
a. BV Mehta
b. B. Ramamoorthy
c. AB Gosh
d. B. Murthy

192. Ionic potential is maximum in case of
a. Na b. Cs
c. K d. Li

193. Ligand adsorption of weak acid anion is maximum at a pH which is
a. Equal to pK of weak acid
b. Greater than 10 times of pK
c. Less than 10 times of pK
d. Independent of pK

194. Which country has the largest deposits of K?
a. India b. Canada
c. USA d. China

195. Which country has monopoly in P deposits?
a. Morocco b. South Africa
c. Russia d. Pakistan

196. In India, which fertilizer was manufactured first?
a. Urea b. DAP
c. SSP d. ASN

197. Hartig net in soil is produced by
a. Rhizobium
b. Ectomycorrhiza
d. Endomycorrhiza
d. None

198. Which nitrogenous fertilizer industrially made first
a. $CaCN_2$
b. Ammonium sulphate
c. $NaNO_3$
d. Urea

199. _____ suggested that saltpeter (KNO_3), and not water, was the 'principle of vegetation'.
a. JB Glauber
b. Jethro Tull
c. John Woodward
d. John Mayow

200. The bacteria *Nitrosomonas*, *Nitrobacter*, *Thiobacillus* and *Ferrobacillus* fall under
a. Heterotrophs
b. Photoautotrophs
c. Obligate chemoautotrophs
d. None of the above