AMHARA REGIONAL STATE EDUCATION BUREAU BIOLOGY MODEL EXAMINATION FOR GRADE 12 STUDENTS

TOTAL NUMBER OF ITEMS 100 QUESTIONS.

TIME ALLOWED 2 HOURS

INSTRUCTIONS – CHOOSE THE BEST ANSWER FROM THE SUGGESTED OPTIONS AND WRITE LETTER OF YOUR CHOICE ON THE ANSWER SHEET.

1. Among the following diseases which one is an infectious disease?

   A. Corona
   B. Diabetes
   C. Scurvy
   D. Arthritis

2. Immunity acquired by vaccination of weakened or killed microbe is:

   A. natural active.
   B. natural passive.
   C. artificial active.
   D. artificial passive.

3. From which of the following does the oxygen released during the process of photosynthesis?

   A. Pyruvic acid
   B. Carbon dioxide
   C. Sugar
   D. Water

4. Which of the following are rod-shaped bacteria?

   A. Bacilli
   B. Spirilla
   C. Spirochates
   D. Cocci

5. Patterns of behavior which are repeated every year are said to have:

   A. circadian rhythm.
   B. lunar rhythm.
   C. tropism.
   D. circannual rhythm.

6. Weaving a web by spiders is an example of which behavior?

A. Instinctive behavior
B. Learned behavior
C. Orientational behavior
D. Reflex actions

7. Which of the following is not a feature of eusociality?

A. Co-operative caring for the offspring
B. Division of labor
C. The presence of several generations
D. The presence of intra-specific competition

8. From the following options which one contains the step of writing a scientific report in the correct order?

A. Title → hypothesis → prediction→ procedure → result → conclusion → evaluation → acknowledgment
B. Title → hypothesis→ prediction→ evaluation→ result→ procedure→ conclusion→ acknowledgment
C. Title→ hypothesis→ prediction→ acknowledgment → result→ procedure→ conclusion → evaluation
D. Title → prediction→ hypothesis→ procedure→ evaluation → conclusion→ result→ acknowledgment

9. Sometimes viruses can be classified into living organisms, because they can:

A. excrete.
B. respire.
C. feed.
D. reproduce.

10. Which of the following apparatus is used mainly in the field?

A. Petridish
B. Centrifuge
C. Theodolite
D. Test tube

11. Among the following infectious human diseases, identify the one that is caused by a virus?

A. Malaria
B. Cholera
C. Hepatitis B
D. Candidiasis

12. Which of the following water bodies is unique, due to mixing of salt and fresh water?

A. Lake
B. Estuarine
C. Ocean
D. Stream

13. The process by which mutant genes are absorbed from a dead bacterium to the other live bacterium is:

A. conjugation.
B. transduction.
C. transformation.
D. conduction.

14. A type of microscope that allows a researcher to view the structure of cells in great detail is:

A. optical microscope.
B. simple microscope.
C. transmission electron microscope
D. scanning electron microscope.

15. What is bacteriophage?

A. Bacteria
B. Viruses
C. Protozoa
D. Fungi

16. The relevance and promise of biological sciences can be demonstrated by their contribution in:

A. finding mechanisms to feed the growing human population.
B. finding solutions to ethnic conflict.
C. development of housing and construction sectors.
D. advancement of aviation technology.

17. The negative charge at one end of a water molecule is attracted to the positively charged particle of another water molecule. This attraction is called:

A. an ionic bond.
B. a cohesive bond.
C. a hydrogen bond.
D. a hydrophilic bond.

18. Which animal behavior pattern is best illustrated by Pavlov's dog?

A. Associative learning
B. Latent learning
C. Sensitization
D. Habituation

19. Which property of water allows aquatic organisms to live underneath of frozen water?

A. Ice is less dense than liquid water.
B. Water has a high specific heat capacity.
C. water has a high latent heat of vaporization.
D. water has high surface tension.

20. Carbohydrate has a range of functions **EXCEPT:**

A. releasing of energy.
B. store chemical energy.
C. channel for the passage of ions.
D. building structures.

21. Nucleotides of DNA and RNA differ in

A. the carbon number of sugar.
B. Pyrimidines base.
C. phosphate group.
D. the purine base.

22. The molecular formula of glucose is $C_6H_{12}O_6$. What is the polymer of 12 units of glucose that have been linked by condensation reaction?

A. $C_{72}H_{144}O_{72}$
B. $C_{72}H_{122}O_{61}$
C. $C_{61}H_{124}O_{72}$
D. $C_{74}H_{144}O_{24}$

23. Which of the following contain sugars having the same functional group?

A. Dihydroxy acetone, ribulose, fructose
B. Dihydroxy acetone, glucose, fructose
C. Galactose, ribulose, glucose
D. Glucose, fructose, galactose

24. Which of the following is correct order of food substance, enzyme and break down product of the digestive process in the mouth respectively?

A. Lipid, amylase, fatty acids
B. Starch, amylase, maltose
C. Fat, Trypsin, glycerol
D. Starch, lipase, glucose

25. Which one of the following enzymes is used in textiles to remove skin hair?

A. Lactase
B. Protease
C. Cellulase
D. Invertase

26. Which one of the following factors does **NOT** affect enzyme activity?

A. Enzyme concentration
B. Temperature
C. Substrate concentration
D. PH

27. Why Louis pasture use swan-necked flask instead of straight necked one in his experiment to disprove the theory of spontaneous generation?

A. To allow free passage of air to the broth inside the flask
B. To keep the broth in the flask not to kill microorganisms
C. To prevent the escape of any microorganism from the flask
D. To trap particles from the air that might enter the flask before reaching the Broth

28. Which one of the following is correct about apoenzymes and coenzymes?

A. Apoenzymes bind with coenzymes to give catalytic enzyme
B. Coenzymes bind with a cofactor to form active enzyme
C. Both apoenzymes and coenzymes combine to form non-active enzyme
D. Coenzyme binds with active enzyme to give catalytic enzyme

Question number 29 is based on the following reaction
Reactant A + reactant B + enzyme →intermediate →product AB +enzyme

29. At which point are the chemical bond weakened?

A. Product AB
B. Reactant B
C. Reactant A
D. Intermediate

30. In which of the following mixtures the enzyme catalase acts faster in H_2O_2?

A. H_2O +HCl + fresh potato cube
B. H_2O_2 + NaHO + fresh potato cube
C. H_2O_2 + fresh potato cube
D. H_2O_2 + NaCl + fresh potato cube

31. Suppose 25% of the molecule of enzyme is inhibited by a non-competitive inhibitor. Which one of the following will happen if most the substrate increases by 50%?

A. The reaction would be double
B. More enzyme molecules would get inhibited
C. The rate of the reaction would decrease by 50%
D. The rate of the reaction would remain the same

32. Suppose a hypothetical cube-shaped cell has sides of 10 micrometer, what is the surface area to volume ratio of this cell?

A. 6:10
B. 10: 10
C. 3: 6
D. 4: 8

Question 33 is based on the following key events in the study of a cell theory

I. Hooke describes "cell" in a cork
II. Leeuwn hoek discovered protozoa
III. Scheliden and Schwann proposed a cell theory
IV. Janson builds the first compound microscope

33. Which one of the following represents the correct order from ancient to the recent?

A. I, II, III and IV
B. IV, I, II, and III
C. III, II, I and IV
D. II, III, IV and I

34. In which of the following features are eukaryotic cells distinguished from prokaryotic cells?

A. They have mitochondria
B. Their nuclei lack membrane
C. They have no DNA
D. They have smaller ribosome

35. Which of the following scientists disprove the theory of spontaneous generation?

A. Needham
B. Aristotle
C. Vanhelmont
D. Francisco Redi

36. During separation of organelles using cell fractionation, which organelle settles last?

A. Ribosome
B. Mitochondria
C. Lysosome
D. Nucleus

37. The organelle which is responsible to determine the final destination of molecules in a cell is:

A. ribosome.
B. endoplasmic reticulum.
C. golgi apparatus.
D. lysosome.

38. Which factor does **NOT** influence the rate of facilitated diffusion?

A. Surface area of the membrane
B. Concentration gradient
C. Thickness of the membrane
D. Temperature

39. Which of the following paired organelles are membranes bounded?

A. Ribosome and peroxisomes
B. Mitochondrion and ribosome
C. Chloroplast and ribosome
D. Chloroplast and mitochondrion

40. What type of molecules **CANNOT** pass across the cell membrane by simple diffusion?

A. Charged molecules
B. Non-polar molecules
C. Lipid soluble molecules
D. Molecules of very small size

41. Which of the following hominids has larger brain size?

A. *Homo sapiens*
B. *Homo erectus*
C. *Homo neanderthalensis*
D. *Homo hablis*

42. Three cells A, B and C with their concentration 5M, 10M and 2M respectively were placed in three solutions with 2M each. Then which one is **FALSE** about cells?

A. Cell "C" burst if it is animal cell
B. The environment is hypotonic to cell "A"
C. Cell "B" becomes turgid if it is plant cell
D. Cell "A" gains water by osmosis

43. An enzyme which initiates the separation of the polynucleotide strands during DNA replication is:

A. RNA polymerase.
B. Ligase.
C. DNA helicase.
D. DNA polymerase.

44. Which of the following cell types can be rich in lysosome?

A. Red blood cells
B. Nerve cells
C. Phagocytic cells
D. Muscle cells

45. Which of the following terms best describes the concepts of variety of organisms present in a given area?

A. Biome
B. Biodiversity
C. Population
D. Niche

46. One of the following is **NOT** true about substrate level phosphorylation?

A. ATP synthase does not involve
B. Produces a relatively small amount of ATP
C. Takes place only in cytoplasm
D. The process is catalyzed by an enzyme

47. Which one of the following molecules regenerates at the end of kreb's cycle?

A. Acetyl coA
B. Oxaloacetate
C. Citrate
D. Pyruvate

48. Among the following demographic factors, which one that affect the world human population?

A. Immigration
B. Emigration
C. Migration
D. Mortality

49. The reaction of Calvin cycle require all of the following **EXCEPT:**

A. NAD oxidized.
B. ATP.
C. NADP reduced**.**
D. carbon dioxide.

50. The following organic molecule which is neither produced nor used up by glycolysis process is:

A. ATP
B. NADH
C. NAD+
D. FAD

51. How many molecules of ATP will be generated as a result of the oxidation of one mole of NADH2 in actively respiring mitochondria?

A. 0
B. 2
C. 3
D. 6

52. What is the importance of chemiosmosis in photosynthesis and cellular respiration?

A. Splitting of water molecule
B. Operating the proton pump
C. Combining hydrogen and carbon
D. Synthesizing ATP

53. How it is possible for different species co-exist in an ecosystem?

A. Each species has a specific biome
B. Each species occupies a different niche within the ecosystem.
C. All the species occupies the same niche within the ecosystem.
D. Each species has a specific biosphere.

54. Which one of the following is **NOT** true about cyclic photophosphorylation?

A. Only photosystem I is used
C. Oxygen does not produced
B. Reduced NADP is not formed
D. It occurs when there is excess sugar

55. Where does the light dependent reaction of photosynthesis occur in the chloroplast?

A. In the thylakoids membrane
B. In all parts of the chloroplast
C. In the fluid of the stroma
D. In the stroma opening

56. Which of the following statement about C4 and CAM photosynthesis is true?

A. In CAM photosynthesis, the C4 stage and the Calvin cycle are separated in time.
B. In CAM photosynthesis, the C4 stage and the Calvin cycle are separated in place.
C. In C4 photosynthesis, the C4 stage and the Calvin cycle are separated in time.
D. In C4 photosynthesis, the C4 stage and the Calvin cycle both occur in the same cell.

57. Which one of the following point mutations does **NOT** causes frame shift?

A. Substitution
B. Addition
C. Deletion
D. Inversion

58. Why are T-lymphocytes more vulnerable to HIV infection? Because they possess:

A. thin cell membrane.
B. gp120 on their surface.
C. HIV receptor protein.
D. large pores in their cell membrane.

59. Which of the following is true about gram positive bacteria?

A. They stained pink by gram's stain
B. They have thick peptidoglycan cell wall
C. They produce endotoxins
D. They are producer

60. At which phase of the population growth curve is the fastest growth rate?

A. Lag
B. Log
C. Stationary
D. Decline

61. Which of the following drugs is illegal in Ethiopia?

A. Alcohol
B. Khat
C. Nicotine
D. Cannabis

62. Which of the following contraceptive methods results in sterilization of males?

A. Vasectomy
B. Tubectomy
C. Condom
D. Norplant

63. Suppose in a monohybrid cross 120 F2 plants were produced, what is the number of the plants that are expected to have the dominant and recessive phenotype?

A. 90 dominant and 30 recessive
B. 100 dominant and 20 recessive
C. 60 dominant and 60 recessive
D. 120 dominant and 120 recessive

64. When the F_1 hybrid of a monohybrid cross is back crossed with the homozygous recessive parent, what percentage of the offspring would be homozygous recessive?

A. 25%
B. 50%
C. 75%
D. 100%

65. The process that converts genetic information from a DNA code in to mRNA code is:

A. transformation.
B. translation.
C. replication.
D. transcription.

Questions 66- 68 are based on the following Groups of organisms
1. Arthropods 2. Angiosperms 3. Birds 4. Gymnosperms 5. Algae
6. Amphibians 7. Fish 8. Molluscs 9. Ferns 10. Mossess

66. Which of the above groups belong to the plant kingdom?

A. 1, 2,3,4,5,
B. 2, 4, 8,9,10
C. 2, 4, 5,9,10
D. 4, 5, 6,9,10

67. The biological field that studies about the groups listed under numbers 1,3,6,7 and 8 is:

A. Botany
B. Anthropology
C. Zoology
D. Invertebrate Zoology

68. The best place for classifying the house fly would be in:

A. Group 1
B. Group 6
C. Group 7
D. Group 8

69. According to the theory of evolution as proposed by Charles Darwin, which one of the following is the most important driving force of evolution?

A. Mutation
B. Genetic recombination
C. Over reproduction
D. Natural selection

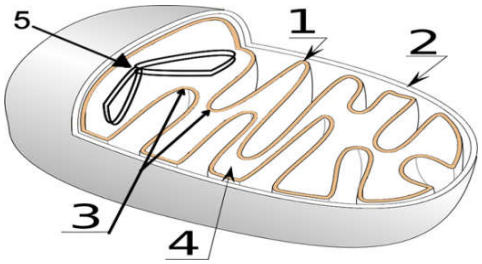
70. A cross between a white and a red flower produce all pink flowers in the F_1 generation. What type of dominance is operating in the cross?

A. Complete dominance
B. Co-dominance
C. Incomplete dominance
D. Independent assortment

71. If a substance is injected into the right ventricle of a live human being, in which part of the body the substance reach last?

A. Lungs
B. Left auricle
C. Left ventricle
D. Pulmonary artery

72. This item is based on the diagram of mitochondria given below.



Most of the ATP produced in number:

A. 5
B. 1
C. 2
D. 4

73. The tricuspid valve prevents the back flow of blood from the :

A. left ventricle to left auricle.
B. right auricle to vena cava.
C. right auricle to right ventricle.
D. right ventricle to right auricle.

74. If one breathes over cobalt chloride paper, for some time, the colour of the paper will turn from blue to pink, This indicates that:

A. exhaled air contains carbon dioxide.
B. exhaled air contains water vapour.
C. exhaled air contains heat.
D. exhaled air contains oxygen.

75. What percentage the amount of carbon-14 originally present in a fossil woud be left after its second half –life?

A. 25%
B. 50%
C. 75%
D. 12.5%

76. Which of the following is the correct order in which vibrations caused by sound waves pass from the outer to the inner ear?

A. Malleus → incus →stapes →oval window
B. Malleus →stapes → incus → oval window
C. Malleus → stapes → incus→ round window
D. Incus → malleus →stapes → oval window

77. Which one of the following pairs of molecules can give information about how much two- species are evolutionary related to one another?

A. DNA and protein
B. Glucose and Starch
C. Carbohydrate and Lipid
D. RNA & vitamins

78. The taste buds located at the back of the tongue detects:

A. Bitter taste
B. Salty taste
C. Sour taste
D. Sweet taste

79. The eye accommodates for distant and near objects by changing the

A. Size of the pupil
B. Shape of the lens
C. Length of the eyeball
D. Distance of the retina from the lens

80. In a simple reflex arc, the path of the nerve impulse is:

A. Sensory neuron → motor neuron → association neuron
B. Motor neuron → association neuron → sensory neuron
C. Association neuron → sensory neuron → motor neuron
D. Sensory neuron → association neuron → motor neuron

81. How many chromosomes do humans inherit from each of their parents?

A. 23 pairs of chromosomes
B. 46 pairs of chromosomes
C. 46 chromosomes
D. 23 chromosomes

82. Which of the following is not part of the central nervous system?

A. Medulla oblongata
B. Cerebellum
C. Spinal cord
D. cranial nerves

83. A person under the increasing influence of alcohol loses, first his ability to think clearly; second his ability to walk straight; third his ability to breath normally. Based on this evidence, which is the correct order in which alcohol affects the central nervous system?

A. Medulla → cerebellum→ cerebrum
B. Cerebrum →cerebellum → medulla
C. Cerebellum → medulla→ cerebrum
D. Cerebellum →cerebrum → medulla

84. Modification of Darwin's theory to take account for genetics and ethology is:

A. Lamarckism
B. Creationism
C. neo- Darwinism
D. Spontaneous generation

85. Which of the following is true about tropism?

A. Shoots are negatively phototropism
B. Shoots are positively geotropism
C. Roots are positively phototropism
D. Roots are positively hydrotropism

86. The tube that brings urine from the kidney to the urinary bladder is:

A. Renal artery
B. Ureter
C. Renal vein
D. Urethra

87. Among the following the mechanism that facilitates the loss of excess heat from the body of a warm blooded animal is:

A. thick deposit of subcutaneous fat.
B. vasoconstriction.
C. thick cover of fur or feather.
D. vasodilation.

88. Which of the following pairs of hormones are produced in the pancreas?

A. Insulin and gonadotrophin
B. Glucagon and gonadotrophin
C. Insulin and thyroxin
D. Glucagon and Insulin

89. If a kidney is surgically removed ,the endocrine gland that would be removed along with it is:

A. pituitary.
B. adrenal.
C. parathyroid.
D. thyroid.

90. Dr. Tewoldeberhan Gebre Egziabher is a biologist whose researches on:

A. genetic engineering.
B. human evolution.
C. HIV/AIDS.
D. environmental protection and diversity.

91. Which of the following is not a component of biogas?

A. Carbon dioxide
B. Ethanol
C. Water
D. Methane

92. The finger like projections in the small intestine is known as:

A. sphincters.
B. alveoli.
C. villi.
D. lymph.

93. If you think of a food web consisting of grass, rabbit and fox, which one of these would have the highest and lowest numbers respectively?

A. rabbit and grass
B. fox and rabbit
C. grass and fox
D. fox and grass

94. How do animals obtain nitrogen?

A. By absorbing nitrates from the soil
B. From the proteins in the organisms they consume
C. By absorbing nitrogen gas from the atmosphere
D. Through mutuality relationship with nitrogen fixing bacteria

95. Which of the following is more likely to ensure the conservation of all the rest?

A. Soil conservation
B. Wildlife conservation
C. Plant conservation
D. Domestic animal conservation

96. Individuals at both extremes of a range have some advantage over those displaying the mean value. This selection operates:

A. stabilizing selection.
B. directional selection.
C. adaptive radiation.
D. disruptive selection.

97. Which of the following is **NOT** usually true as an ecological succession progresses to advanced seral stages?

A. Less populations are supported
B. The depth of the soil increases
C. More ecological niches are formed
D. Species become more diverse

98. From the evolutionary relationships, which of the following animals has hemoglobin and proteins that is more similar to human?

A. Frog
B. Cat
C. Chicken
D. Monkey

99. If you enter into a recreational place where there is a loud music and start to study. Initially, the music is disturbing, but after a while you do not notice it. What type of learned behavior?

A. Operant conditioning
B. Classical conditioning
C. Habituation
D. Sensitization

100. A person crossed two round shaped seeds; he obtained 5474 round shaped and 1850 wrinkled shaped. What are the most likely genotypes of the two round shaped seeds?

A. Rr and Rr
B. RR and rr
C. Rr and rr
D. RR and Rr