Addis Ababa City Government Yeka Subcity 2013 Biology Model Exam for Grade 12

Each of the following questions is followed by four alternatives. Choose the correct answer from the following alternatives.

1. Which of the following is the Greek word for life?
   A. Bios C. Animalcule
   B. Logos D. Cell
2. Within a few weeks after a heavy rain, pools become filled with tadpoles. What is the source of the tadpoles?
   A. The rain water
   B. The muddy soil
   C. The vegetation of the pond
   D. The eggs laid by the frogs
3. The experimental variables in the scientific experiment that cannot be controlled but can affect the results of the experiment are called
   A. Controlled variables
   B. Dependent variables
   C. Confounding variables
   D. Independent variables
4. Which of the following laboratory tools are used for culturing microorganisms?
   A. Microscopes
   B. Petri dishes
   C. Centrifuges
   D. Balances
5. Which of the following is the last step of the scientific experiment?
   A. Interpretation of results
   B. Specifying the title
   C. Publishing the results
   D. Listing the materials used in the experiment

6. Suppose you want to find out the effect of temperature on the rate of the chemical reaction. In this case
    A. The reaction rate is the controlled variable
    B. Temperature is the dependent variable
    C. The reaction rate is the dependent variable
    D. Temperature is the confounding variable
7. The microscope which uses light rays for observation is
    A. Electron microscope
    B. Optical microscope
    C. Simple microscope
    D. Compound microscope
8. Which one of the following is not useful for ecological field work in biology?
    A. Sweep net
    B. Microscope
    C. Theodolite
    D. Hand lens
9. Which of the following stages of a scientific method is also called an intelligent guess?
    A. Prediction
    B. Experimentation
    C. Observation
    D. Hypothesis
10. In an experiment to investigate the action of saliva on starch
    A. The test tube containing starch and distilled water is the experimental group
    B. The test tube containing starch and saliva is the control group
    C. The test tube containing starch and distilled water is converted to sugar
    D. The test tube containing starch and saliva is the experimental group
11. Which of the following ideas in scientific experiments indicates how precisely something has been measured or counted?
    A. Accuracy
    B. Reliability
    C. Validity
    D. Dependability

12. The variable in an experiment that the scientist changes or manipulates is called the
    A. Independent variable
    B. Controlled variable
    C. Confounding variable
    D. Dependent variable
13. Which area of biological research is involved in effective methods of contraception to limit the size of the population?
    A. Agriculture
    B. Medicine
    C. Biotechnology
    D. Genetic engineering
14. In what way do antiretroviral drugs help AIDS patients?
    A. Provide immunity
    B. Prevent HIV from replicating
    C. Break the transmission pathway
    D. Kill opportunistic infectious agents
15. What are the compounds that have the same chemical composition but different arrangement of atoms?
    A. Aldoses
    B. Polymers
    C. Isomers
    D. Monomers
16. The partial negative charge at one end of a water molecule is attracted to the partial positive charge of another water molecule. This attraction is called
    A. A hydrogen bond
    B. An ionic bond
    C. A hydrophobic bond
    D. A cohesive bond
17. A reaction in which two or more molecules unite to form a large molecule with the removal of water is called
    A. Hydration
    B. Hydrolysis
    C. Condensation
    D. Vaporization

18. The bonds that form between water molecules are called

A. Covalent bonds
B. Hydrogen bonds
C. Ionic bonds
D. Cohesive bonds

19. Which property of water helps organisms in the water to survive the cold winter?

A. Low density of ice
B. High surface tension
C. High heat capacity
D. Low viscosity

20. Organic molecules always contain

A. Carbon and nitrogen
B. Carbon and oxygen
C. Oxygen and hydrogen
D. Carbon and hydrogen

21. Hexoses are

A. Disaccharides that contain 6 carbon atoms
B. Monosaccharides that contain 6 oxygen atoms
C. Disaccharides that contain 6 oxygen atoms
D. Monosaccharides that contain 6 carbon atoms

22. The basic building block that make up the carbohydrates are

A. Simple sugars
B. Amino acids
C. Fatty acids and glycerol
D. Nucleotides

23. Which of the following carbohydrate molecules has a structural function?

A. Cellulose C. Starch
B. Glycogen D. Glucose

24. Water has a high heat of vaporization means

A. A loss of large amount of heat
B. A minimum loss of water
C. A loss of less amount of heat

D. A loss of large amount of water

25. One of the following is **NOT** the function of carbohydrates. They are
    A. Used to store chemical energy
    B. Used as a source of energy
    C. Essential for health
    D. Used as structural components of organisms
26. The group of compounds to which DNA and RNA belong is
    A. Lipids
    B. Proteins
    C. Nucleic acids
    D. Carbohydrates
27. The tertiary structure of a protein is the
    A. Order in which amino acids are joined in a peptide chain
    B. Bonding together of several polypeptide chains by weak bonds
    C. Bonding of two amino acids together to form a dipeptide
    D. Bending and folding of the polypeptide chain into a compact globular shape
28. Which property of water describes the fact that some insects can walk on water
    A. High specific heat capacity
    B. High heat of vaporization
    C. High surface tension
    D. Low density of ice
29. Which statement is **TRUE** about enzymes?
    A. Can be reused
    B. Change after the reactions
    C. Are lipids
    D. Increase activation energy
30. The cofactors that are found in the enzymes include
    A. Proteins and lipids
    B. Vitamins and amino acids
    C. sugars and iron
    D. riboflavin and zinc
31. Assume the following reaction takes place in a cell.
    Substance A $\xrightarrow{E_1}$ Substance B $\xrightarrow{E_2}$ Substance C (E: enzyme). End product inhibition takes place when
    A. E_1 inhibits E_2

B. Substance B inhibits E_2
C. Substance C inhibits E_1
D. E_2 inhibits substance C

32. Which class of enzymes joins molecules together?
A. Lyases C. Transferases
B. Hydrolases D. Ligases

33. Which of the following statements is **TRUE** about enzymes?
A. Enzymes start chemical reactions in cells
B. Enzymes are specific in their actions
C. They are destroyed in the process of the reaction
D. Enzymes have no effect on the rate of a reaction

34. The protein part of an enzyme is called
A. Coenzyme
B. Cofactor
C. Apoenzyme
D. Holoenzyme

35. The rate of chemical reactions is increased by
A. Decreasing the activation energy
B. Cooling the reaction
C. Decreasing the concentration of reactants
D. Removing a catalyst

36. An enzyme catalyzes the reaction of A to B. A third chemical C, which does not resemble A, binds to the enzyme at a position remote from the active site. This increases the activity of the enzyme. In this situation substance A is
A. A cofactor
B. The substrate
C. An inhibitor
D. The product

37. In the above question, Substance C is
A. A cofactor
B. The substrate
C. An inhibitor
D. The product

38. In an experiment, what do we call the group that does not receive the variable being tested?
    A. Control group
    B. Experimental group
    C. Replication
    D. Observation group
39. Which of the following statements is true about the lock and key model of enzyme action
    A. The active site and substrate are not complementary in shape
    B. The binding of the substrate produces a conformational change
    C. The shape of the substrate and the active site are complementary
    D. This model offers a better explanation to enzyme action than induced fit model
40. Which of the following contains phosphate group in its molecule?
    A. Protein C. amino acids
    B. Nucleotide D. cellulose
41. Which of the following is **NOT** accepted in modern theory?
    A. Living things are made up of cells
    B. The cell is the structural and functional unit of living things
    C. All cells come from preexisting cells
    D. Cells form by free cell formation
42. What will happen if you put red blood cells in a hypertonic solution?
    A. The cells become turgid
    B. The cells will not change in their size
    C. The cells lose water
    D. The cells swell and burst
43. What will happen when a cell gets bigger in size?
    A. Its volume decreases
    B. Its surface area to volume ratio decreases
    C. Its surface area to volume ratio increases
    D. Its surface area decreases
44. Which one of the following processes involves the movement of particles from a low concentration to a higher concentration through the plasma membrane of a cell?
    A. Osmosis

B. Passive transport
C. Facilitated diffusion
D. Active transport

45. Which structure is used to modify and pack substances prior to their removal from the cell by exocytosis?
A. Vacuole
B. Golgi body
C. Lysosomes
D. Endoplasmic reticulum

46. The energy used for facilitated diffusion is obtained from
A. ATP
B. ADP
C. Cellular metabolism
D. A concentration gradient

47. Which cellular structures are responsible for autolysis or self-digestion?
A. Chromosomes
B. Ribosomes
C. Lysosomes
D. Golgi apparatus

48. Which of the following structures is missing in the prokaryotic cell?
A. Cytoplasm
B. Plasma membrane
C. Nuclear membrane
D. Nuclear material

49. Which of the following are important in the transport of materials across the cell membrane?
A. Glycoproteins and cholesterol
B. Phospholipid bilayers
C. Channel proteins and peripheral proteins
D. Channel proteins and carrier proteins

50. Which of the following organelles are **NOT** correctly matched with their function?
A. Ribosomes → lipid synthesis
B. Cell wall → supports and protects the cell
C. Golgi body → protein modification

D. Mitochondrion ⟶ aerobic respiration

51. The science concerned with ways of solving problems to meet certain human needs is called

A. Experimental science

C. Applied science

B. Basic science

D. Space science

52. Which of the following cellular organelles settles out first with low centrifuge speed when a mixture of organelles is spun in a centrifuge?

A. Nucleus

C. Ribosome

B. Chloroplast

D. Mitochondria

53. How many reduced FDA molecules can be produced from 2 glucose molecules in aerobic respiration?

A. 2

C. 4

B. 6

D. 8

54. Products of light-dependent reactions of photosynthesis that are used in the synthesis of carbohydrates are

A. Oxygen and ATP

C. Reduced NAD and carbon dioxide

B. Reduced NADP and ATP

D. Carbon dioxide and water

55. Which of the following stages of aerobic respiration produce carbon dioxide?

A. Krebs cycle and the Link reaction

C. Glycolysis and Krebs cycle

B. Electron transport and chemiosmosis

D. Krebs cycle and electron transport

56. Which of the following equations represents photorespiration?

A. $CO_2 + H_2O \rightarrow$Glucose

B. Ribulose bisphosphate + $O_2 \rightarrow CO_2$

C. Ribulose bisphosphate + O_2→ Glucose

D. CO_2 → Ribulose bisphosphate

Answer item number 57 based on the four stages of aerobic respiration below

1. Krebs cycle
2. Glycolysis
3. Link reaction
4. Electron transport and chemiosmosis

57. Which of the following shows the correct sequence of stages?

A. 1,2,3,4

B. 1,2,4,3

C. 2,3,1,4

D. 2,4,1,3

58. All are sub units of ATP molecule except

A. Adenine

B. Ribulose

C. Ribose

D. Phosphate

59. Where does light dependent reaction occur in a chloroplast?

A. Thylakoid membrane

B. Grana and stroma

C. Thylakoid membrane and stroma

D. Stroma

60. Which of the following is the correct representation of alcoholic fermentation?

A. Ethyl alcohol → pyruvic acid → Glucose

B. Glucose → pyruvic acid → Ethyl alcohol + CO_2

C. Glucose → pyruvic acid → CO_2 + H_2O

D. CO_2 + H_2O → pyruvic acid → Glucose

61. Which of the following stages of aerobic respiration does NOT produce ATP?

A. The link reaction

B. Electron transport and chemiosmosis

C. Glycolysis

D. Krebs cycle

62. In which part of the mitochondrion does the Kreb's cycle take place?

A. On the outer membrane

B. On the inner membrane

C. In the fluid matrix

D. In the inter membrane space

63. What is the source of the electrons that replace electrons lost from photosystem II during photosynthesis?

A. chlorophyll a

B. chlorophyll b

C. Water

D. photosystem I

64. Which of the following compounds contains more energy per molecule than all the others?

A . ATP

B. $FADH_2$

C. $NADH_2$

D. Acetyl CoA

65. If a cell contains 10 NADH + 10 $FADH_2$ molecules, a total of how many ATP molecules would it produced from them?

A. 20 ATP

B. 30 ATP

C. 50 ATP

D. 60 ATP

66. C_4 plants can be distinguished from C_3 plants in that C_4 plants

A. do not produce oxygen during day time

B. photorespire during the day time

C. use bundle sheath for Calvin cycle

D. Grow in cold areas

67. What's the initial accepter of carbon dioxide in C_3 plants?

A. Oxaloacetate

C. phenol enolpyruvate

B. Malate

D. Ribulose bisphosphate

68. What is the final electron acceptor in the transport chain during aerobic respiration?

A. Oxygen

C. FAD

B. NAD

D. Cytochrome

69. Enzymes can be used over and over again, because enzymes are

A, specific to their substrates

B. not consumed by the reactions they catalyze

C. affected by temperature and PH

D. globular in their shape

70. The molecule that links glycolysis and the Krebs cycle is

A. acetylaldehyde

C. pyruvate

B. acetyl coenzyme A

D. citrate

71. Microorganisms that cause diseases by digesting the tissues where they grow are

A. Viruses

C. Fungi

B. protozoa

D. Algae

72. Alcoholism and drug addiction are examples of

A. Human induced diseases

C. social diseases

B. Genetic diseases

D. Degenerative diseases

73. The bacteria that return the nitrogen to the air and reduce the amount of nitrogen in the soil are

A. Nitrosomonas

C. Rhizobium

B. Pseudomonas

D. Azotobactor

74. Vectors that are used to transport foreign genes into a bacterial host cell are

A. Viruses

C. plasmids

B. Agrobacteria

D. Gene gun

75. The population growth curve where the numbers of the population remain low and static is the

A. log phase

C. lag phase

B. stationary phase

D. decline phase

76. To which group of viruses does HIV belong?

A. Bacteriophages

C. Retroviruses

B. RNA viruses

D. DNA viruses

77. In exponential pattern of population growth , the population

A. decreases in each time period

B. remains the same in each time period

C. increases by a fixed amount in each time period

D. doubles in each time period

78. The process that breaks down proteins in dead organisms and animal wastes into ammonia is called

A. Nitrification

C. Ammonification

B. Nitrogen fixation

D. Denitrification

79. All of the following statements are correct except

A. All Viruses are parasites

B. Gram-negative bacteria are highly susceptible to antibiotics

C. Endotoxins are structural components of Gram-negative bacteria

D. Gram-positive bacteria have thick peptidoglycan

80. Which of the following makes T-helper cells more vulnerable to HIV-infection?

A. The presence of gp 120 and gp 41 on their surface

B. The presence of HIV-receptor proteins on their surface

C. The presence of an envelope on their surface

D. The absence of antibodies on their surface

81. Which of the following is true about primary succession?

A. The succession starts from the ground previously colonized

B. There is a seed bank

C. The soil is already present

D. The succession starts from a bare rock

82. Which of the following is **TRUE** about viruses?

A. Viruses have independent reproduction

B. Only some viruses are parasites

C. Viruses have cellular organelles

D. Viruses have genetic material

83. The enzyme used to cut DNA molecules into small pieces is

A. protease C. Reverse transcriptase

B. Restriction endonuclease D. DNA-ligase

84. In the sulphur cycle, plants absorb sulphur in the form of

A. hydrogen sulphide C. sulphates

B. protein D. sulphur dioxide

85. In the sulphur cycle, sulphur is oxidized to sulphates by

A. Thiobacillus C. Photosynthetic sulphur

B. Sulphate-reducing bacteria D. Desulphovibrio

86. Which of the following is NOT part of HIV particle?

A. CD_4 protein C. Lipid membrane

B. Genetic material D. gp 120

87. The final stage of demographic transition has a

A. high death rate and a high birth rate

B. high birth rate and a low death rate

C. higher death rate than a birth rate

D. low birth rate and a low death rate

88. Which of the following group of vertebrates in Ethiopia is the most diverse in terms of species number?

A. Mammals C. Reptiles

B. Birds D. Amphibians

89. Countries characterized by a high birth rate but a low death rate are

A. Developed countries

B. Developing countries

C. Underdeveloped countries

D. Both developing and undeveloped countries

90. The biome where epiphytes are common is

A. Tropical rainforest

C. Thorn forest

B. Boreal forest

D. Temperate deciduous rain forest

91. Which one of the following describes the number of different species that are present in an ecosystem?

A. Biodiversity

C. Genetic diversity

B. Species diversity

D. Ecosystem diversity

92. Which of the following is used to separate the different cellular organelles to study their structure and functions in a cell?

A. Dehydrogenation

C. Dehydrogenation

B. Polymerization

D. Cell fractionation

93. Which of the following carbohydrates is obtained when beta glucose molecules are joined by beta 1, 4 glycosidic bonds?

A. Starch

C. Glycogen

B. Lactose

D. Cellulose

94. The population growth pattern that occurs under ideal conditions and unlimited resources is called

A. An arithmetic growth

C. An exponential growth

B. A density dependent growth

D. A uniform growth rate

95. How do retroviruses differ from RNA viruses?

A. Their genetic material is RAN

B. Converts their genetic material from RNA into DNA in the host cell

C. They are parasitic

D. They are smaller in size

96. Anti-retroviral drugs that prevent the conversion of RNA into DNA are called

A. Protease inhibitors

B. Entry inhibitors

C. Reverse transcriptase inhibitors

D. Integrase inhibitors

97. The final complex state of succession is

A. Serial community

C. Herbal community

B. Pioneer community

D. Climax community

98. A certain community in a certain area was destroyed by fire. After sometime, new plants and animals began to colonise the area in a regular sequence. This phenomenon best illustrates

A. Primary succession

C. Secondary succession

B. Food chain

D. Food web

99. What is the reason for the fact that there is no cure or vaccine for AIDS so far? It is because HIV

A. is too small to be targeted

B. has a spherical shape

C. has RNA instead of DNA

D. mutates regularly and rapidly

100. The aquatic biomes which has the highest number of plants and animals is

A. Steam

C. Estuarine

B. Wetland

D. Coral reef