

Biology, 2006 EC, entrance exam

Grade 12 · Biology · 2006 E.C.

Time allowed: 120 minutes

Questions: 93

Total marks: 93

Name _____ Grade _____ ID No. _____ Date _____

1. Which of the following do viruses share with cells? (1)
 - A. Cell wall
 - B. Cytoplasm
 - C. Nucleic acid
 - D. Protoplasm
2. Which one of the following cellular forms did Robert Hooke observe under his crude microscope? (1)
 - A. Bacteria
 - B. Protozoa
 - C. Yeast
 - D. Empty cell wall
3. In the case of enzymatic chemical reactions, what do you call the substance that is acted up on by an enzyme? (1)
 - A. Polypeptide
 - B. Coenzyme
 - C. Vitamin
 - D. Substrate
4. Choose the organisms that belong to the eukaryotes? (1)
 - A. Bacteria
 - B. Blue -green algae
 - C. Amoeba
 - D. Virus
5. While conducting research, which of the following should a biologist do first? (1)
 - A. Generate a hypothesis
 - B. Conduct experiment
 - C. Communicate the results
 - D. Identify a research question / problem
6. Which of the following structures is NOT present in animal cells? (1)
 - A. Cell wall
 - B. Nucleus
 - C. Protoplasm
 - D. Nucleic acid
7. An experimental animal stopped responding to a stimulus that has been repeated so many times .What type of learned behavior is this ? (1)
 - A. Latent learning
 - B. Habituation
 - C. Imprinting
 - D. Operant conditioning
8. Behavior that is repeated on a daily basis is referred to as: (1)
 - A. Lunar
 - B. Circadian
 - C. Circannua
 - D. Seasonal
9. Which molecule in the cell is the constituent of the gene? (1)
 - A. Nucleic acid
 - B. Protein
 - C. Lipid
 - D. Carbohydrate
10. Which is the branch of biology that studies about the origin and gradual changes of living things? (1)
 - A. Microbiology
 - B. Evolution
 - C. Mutation
 - D. Reproduction

11. What is the general term for the part of the protoplasm that lies outside the nucleus? (1)

- A. Cytosol** **B. Cytoplasm**
C. Central vacuole **D. Plasma membrane**

12. How many net ATP molecule are generated through anaerobic respiration , when a single glucose molecule is change to pyruvate in the human body? (1)

- A. Tow B. Three
C. Four D. Six

13. Which of the following groups of bacteria consists of rod shaped cells? (1)

- A. Gram - positive
B. Bacilli
C. Cocci
D. Spirilla

14. How many carbon and oxygen atoms are there in a molecule of maltose? (1)

- A.** 6 carbon and 6 oxygen **B.** 12 Carbone and 11
- C.** 11 carbon and 12 oxygen **D.** 24 carbon and 12 oxygen

15. On which of the following organelles of the eukaryotic cell does protein synthesis take place? (1)

- A.** The nucleus
- B.** The ribosome
- C.** The chloroplast
- D.** The mitochondrion

16. Which of the following parts of plant roots is harboring nitrogen fixing bacteria (1)

- A.** Root nodule **B.** Root hair
- C.** Root tip **D.** Root cap

17. Which of the following is true about protozoa? (1)

- A.** They are a group of bacteria
B. They are one-celled organisms
C. They represent both plant and animals
D. They are unicellular animals

18. Which of the following is a distinguishing feature of amino acids that is NOT found in carbohydrates? (1)

- A. Carbon
B. Oxygen
C. Hydrogen
D. Nitrogen

19. Which of the following statement is true about matter and energy in the ecosystem? (1)

- A. Both matter and energy are recycled
B. Matter is not recycled energy is recycled
C. Matter is recycled energy is not recycled
D. Energy is recycled more than matter does

20. Which one of the following molecule in living things is not an organic molecule? (1)

- A. Sugar** **B. Nucleotide**
C. Amino acid **D. Water**

21. At which stage is most of the ATP generated in aerobic respiration? (1)

- A.** Glycolysis **B.** Link reaction
- C.** Krebs cycle **D.** Electron transport

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- 22.** Which of the following is the common characteristic of all enzymes? (1)
- A. They act inside cells only B. They are proteins
C. They require cofactors D. They operate at any P^H
-
- 23.** In a cross between round green pea of RRyy genotype wrinkled yellow pea of rrYY genotype, what is the expected genotype of the F1? (1)
- A. RRyy B. rrYY
C. RRYy D. RrYy
-
- 24.** Which of the following cellular structures is possessed by all cells (1)
- A. Cell membrane B. Nucleus
C. Cell wall D. Golgi apparatus
-
- 25.** During the krebs cycle which of the following molecule temporarily stores most of the energy released from food molecule (1)
- A. ADP B. ATP
C. NADH D. FADH
-
- 26.** Which of the following carbohydrate has structural function? (1)
- A. Cellulose B. Glycogen
C. Starch D. Sucrose
-
- 27.** Which of the following forms of nitrogen are readily utilization by green plants? (1)
- A. Atmospheric nitrogen B. Nitrite
C. Ammonium ion D. Nitrate
-
- 28.** In some crosses of maize, the progeny produces better yield than the parents. What is this phenomenon known as? (1)
- A. Dominance B. Hetrozygosity
C. Hybrid vigor D. Inbreeding depression
-
- 29.** Which of the following techniques is used to separate DNA fragments according to their size on gel? (1)
- A. Southern blotting B. Electrophoresis
C. Radioactive labeling D. Digestion by restriction
-
- 30.** Which of the following group of animals have males with ZZ and females with ZW sex chromosome constitution? (1)
- A. Grasshopper B. Birds
C. Mammals D. Honey bee
-
- 31.** The molecule of which pigment is located at the reaction center of a photosystem? (1)
- A. Chlorophyll a B. Chlorophyll b
C. Carotenoid D. Accessory pigments
-
- 32.** According to Lamarck's theory of evolution what is the mechanism by which evolving organisms acquire new structures? (1)
- A. Mutation B. Hereditary variation
C. Use -and- disuse of parts of the body D. Recombination of ancestral genes
-

33. In which of the activities of the honey bee colony are worker bees involved? (1)

- A.** Laying eggs
- B.** Serving as queens
- C.** Reproductive function
- D.** Taking care of the larvae

34. In which one of the following ways the Tundra biome differs from desert biome? (1)

- A.** It is a treeless biome
- B.** It has little biodiversity
- C.** It receives little precipitation
- D.** It has permanently frozen subsoil

35. Which one of the following is the mechanism by which two genes located on the same chromosome are separated? (1)

- A.** Independent assortment **B.** Segregation
C. Linkage **D.** Crossing over

36. If present in the fermentation system which one of the following would negatively affect alcohol production by yeasts? (1)

- A. Water
B. Oxygen
C. Glucose
D. Fermentation enzyme

37. Which of the following mechanism moves digested amino acids and glucose across the plasma membrane of the cell lining the wall of the small intestine? (1)

- A. Osmosis
B. Simple diffusion
C. Facilitated diffusion
D. Active transport

38. Where exactly in the cell dose the Krebs cycle take place? (1)

- A.** Mitochondrial matrix **B.** Inner mitochondrial membrane
- C.** Cytoplasmic fluid **D.** Outer mitochondrial membrane

39. What is the ultimate source of renege for all organism living on the earth? (1)

- A. Water
B. Oxygen
C. Nitrogen
D. The sun

40. Which of the following substance is NOT necessary for photosynthesis to take place? (1)

- A.** Chlorophyll **B.** Carbon dioxide
C. Oxygen **D.** Water

41. Which group of organic compound includes the enzymes? (1)

- A.** Proteins
- B.** Lipids
- C.** Starches
- D.** Carbohydrates

42. Into which of the following organic compound can lipase maltase and sucrase be grouped? (1)

- A. Hormones
B. Carbohydrates
C. Nucleic acids
D. Enzymes

43. Choose the characteristics that viruses share with living things. (1)

- A. They are made up of many specialized cells
- B. They contain genetic material
- C. They reproduce by mitosis
- D. They contain chlorophyll

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- 44.** Which one of the following eukaryotic cell organelles was a free living cell before eukaryotic cells evolved? (1)
- A. Nucleus
B. Ribosome
C. Chloroplast
D. Nucleolus
-
- 45.** If radioactive substance that weighs one kilogram has a half-life of 100 years what would be the percentage of the substance left after 300 years? (1)
- A. 50
B. 30
C. 25
D. 12.5
-
- 46.** Which of the following PH values represents the strongest base? (1)
- A. 2
B. 7
C. 13
D. 15
-
- 47.** In Ethiopia, which one of the following vertebrate groups has the largest number of genera? (1)
- A. Mammals
B. Birds
C. Reptiles
D. Amphibians
-
- 48.** Which of the following is an accurate representation of the relationships between the terms metabolism anabolism and catabolism? (1)
- A. Anabolism = Catabolism
B. Metabolism =Catabolism
C. Anabolism = Catabolism + Metabolism
D. Metabolism = cataboilsm + Anabolism
-
- 49.** Which do you call structures that have the have the same evolutionary origin but now are different in structure or have different functions? (1)
- A. Endemic
B. Analogous
C. Homologous
D. Indigenous
-
- 50.** Which term describes the process by which water is lost by evaporating through the stomata of leaves ? (1)
- A. Transport
B. Transpiration
C. Anchorage
D. Adhesion
-
- 51.** Which of the following is true about saturated fatty acids? (1)
- A. They have single bonds between carbon atoms
B. They are the same as polyunsaturated fatty acids
C. They are the same as monounsaturated fatty acids
D. They have double bonds between the carbon atoms
-
- 52.** For a biological detergent to effectively remove oily and greasy dirt, which of the following enzymes should it contain? (1)
- A. Cellulase
B. Protease
C. Amylase
D. Lipase
-
- 53.** In which kingdom of life is it most likely to finde many examples of organisms that can undergo metamorphosis? (1)
- A. Monera
B. Fungi
C. Plantae
D. Animals

-
- 54.** During protein synthesis where in the cell does transcription take place? (1)
- | | |
|--------------------------|--------------------|
| A. Ribosome | B. Nucleus |
| C. Endoplasmic reticulum | D. Golgi apparatus |
-
- 55.** What is a perfect flower? (1)
- | | |
|-------------------------------------|-------------------------------------|
| A. A flower with petals and pistil | B. A flower with stamens and sepals |
| C. A flower with stamens and pistil | D. A flower with sepals and petals |
-
- 56.** Which molecules carry the instruction for protein synthesis? (1)
- | | |
|-----------------------------|----------------|
| A. Carbohydrates and lipids | B. Amino acids |
| C. DNA and RNA | D. Enzymes |
-
- 57.** Which of the following resources is needed by an ecosystem from outside in order to sustain itself (1)
- | | |
|-------------------|-------------------|
| A. Producers | B. Macronutrients |
| C. Micronutrients | D. Sunlight |
-
- 58.** Which of the following is true about the substance represented by the chemical formula $C_2H_5NO_2$? (1)
- | | |
|-----------------|------------------------|
| A. Simple sugar | B. Inorganic substance |
| C. Fatty acid | D. Amino acid |
-
- 59.** Which one of the following characteristic is UNNECESSARY for an object to be considered a living thing? (1)
- | | |
|----------------------------------|-------------------------|
| A. Ability to respond to stimuli | B. Ability to reproduce |
| C. Ability to grow | D. Ability to move |
-
- 60.** Which field studies the way in which individual traits of organisms are transmitted from one generation to the next? (1)
- | | |
|--------------|---------------|
| A. Genetics | B. Ecology |
| C. Evolution | D. Morphology |
-
- 61.** In which of the following ways is the carbon dioxide of the atmosphere fixed into the Carbon found in organic molecules? (1)
- | |
|---|
| A. In the breathing processes of all animals |
| B. In the decomposition of organic molecules |
| C. In the process of photosynthesis by green plants |
| D. In all the cellular respiration processes of organisms |
-
- 62.** Which of the following is NOT a term used to describe organisms that have had foreign genes added to them? (1)
- | | |
|-------------------------------------|-------------------------|
| A. Genetically modified organisms | B. Transgenic organisms |
| C. Genetically engineered organisms | D. Pathogenic organisms |
-
- 63.** Which of the following is prevented from taking place if populations are separated by a geographic barrier? (1)
- | | |
|--------------|----------------------|
| A. Mutation | B. Evolution |
| C. Gene flow | D. Natural selection |
-
- 64.** In protein synthesis, what is produced during transcription? (1)
- | | |
|------------|----------------|
| A. Protein | B. mRNA |
| C. DNA | D. Polypeptide |

-
- 65.** If a cell fails to clear its cellular debris which one of its organelle is most likely NOT functioning? (1)
- | | |
|---------------------------------|------------------------|
| A. Nucleus | B. Mitochondria |
| C. Endoplasmic reticulum | D. Ribosomes |
-
- 66.** Which of the following applies to the tropical rainforest? (1)
- | | |
|--|---|
| A. Low rainfall and high temperature | B. Low rainfall and low temperature |
| C. High rainfall and high temperature | D. High rainfall and low temperature |
-
- 67.** Which stage in the life cycle of HIV is inhibited by the antiretroviral drug known as integrase  inhibitor? (1)
- A.** conversion of viral RNA to DNA
B. Replication of the viral genome
C. Insertion of the viral genome into host genome
D. Release of the viral progeny from the cell
-
- 68.** Which of the following groups of plants carry out light dependent and light independent reaction of photosynthesis in separate cells? (1)
- | | |
|----------------------|--------------------------------------|
| A. C-3 plants | B. C-4 plants |
| C. CAM plants | D. plants without chlorophyll |
-
- 69.** Among the following identify the organelle in which nucleic acid is NOT found ? (1)
- | | |
|------------------------|---------------------------|
| A. Mitochondria | B. Chloroplast |
| C. Ribosome | D. Golgi apparatus |
-
- 70.** The half-life of carbon-14 is about 5730 years. If a fossil is 17200 years old, about what percent of its original carbon -14 is still present in the fossil? (1)
- | | |
|----------------|----------------|
| A. 75 % | B. 50 % |
| C. 25 % | D. 12 % |
-
- 71.** Which of the following pairs of individuals have identical DNA fingerprints? (1)
- | | |
|------------------------------|-------------------------------|
| A. Father and son | B. Mother and daughter |
| C. Brother and sister | D. Monozygotic twins |
-
- 72.** Among the following which one has little or no contribution to the loss of biodiversity? (1)
- | | |
|---|--|
| A. Overgrazing by domestic animals | B. Clearing forests to grow crops |
| C. Growing crops of improved varieties | D. Growing crops on land |
-
- 73.** Suppose sites A,B,C and D have Simpson's Index of Diversity (d) values of 20,8,16, and 3, respectively, which site is dominated by one or just a few species? (1)
- | | |
|------------------|------------------|
| A. Site A | B. Site B |
| C. Site C | D. Site D |
-
- 74.** Which of the following types of chromosome mutations gives rise to an extra chromosome? (1)
- | | |
|---------------------|---------------------------|
| A. Inversion | B. Translocation |
| C. Deletion | D. Non-disjunction |

75. Suppose a hypothetical cube- shaped cell has sides of 10 micrometers, what is the surface area to volume ratio of this cell? (1)
- A. 6:10
B. 10:10
C. 3:6
D. 4:8
76. which of the following pairs are analogous structures ? (1)
- A. Wing of bird and wing of a butterfly
B. Front leg of a horse and a human arm
C. Wing of a bird and wing of a bat
D. Front leg of a frog and wing of a bat
77. How are unsaturated fats distinguished? (1)
- A. They are made up of glucose and fructose
B. They are made up of amino acids and glycerol
C. They have double bonds in their carbon chains
D. They have only single bonds at the points of attachment
78. Which of the the following mating produces children all having the same ABO blood phenotypes (1)
- A. AO x AB
B. BB x OO
C. AO x BO
D. AA x BO
79. During aerobic respiration what is the route through which protons return from the mitochondrial inter-membrane space back to its matrix? (1)
- A. Proton pump
B. ATP synthase
C. Ion channel
D. Membrane lipid
80. From which of the processes of cellular respiration is the majority of the ATP generated? (1)
- A. Anaerobic fermentation
B. Glycolysis and link reaction
C. Electron transport and chemiosmosis
D. Krebs cycle and glycolysis
81. Choose the one that represent a chemical formula of an organic compound? (1)
- A. $C_{12}H_{22}O_{11}$
B. $Mg(OH)_2$
C. NH_3
D. NaCL
82. In which of the following solutions does an animal cell undergo hemolysis? (1)
- A. In hypotonic solution
B. In hypertonic solution
C. In isotonic solution
D. In both hypotonic and hypertonic solution
83. What does the absence of chloroplast in a unicellular organism indicate? (1)
- A. Reproduction by sexual means
B. Autotrophic nutrition
C. Heterotrophic nutrition
D. Completed lack of metabolic processes
84. Which of the following did the early heterotrophs do that probably assisted the origin of autotrophs? (1)
- A. They added oxygen and chlorophyll to the environment
B. They added carbon dioxide to the environment
C. They stored energy in the bonds of inorganic compound
D. They manufactured food from carbon dioxide and oxygen

