

Biology, 2010 EC, entrance exam

Grade 12 · Biology · 2010 E.C.

Time allowed: 120 minutes

Questions: 82

Total marks: 82

Name _____ Grade _____ ID No. _____ Date _____

1. Which of the following tools is used by a biologist to study the internal anatomy of experimental animals? (1)
 - A. Dissecting kit
 - B. Hand lens
 - C. Petri dish
 - D. Microscope
2. Which of the following is NOT a characteristic of an enzyme? (1)
 - A. It is a globular protein
 - B. It function as a catalyst
 - C. It lowers the energy of activation
 - D. It converted to products
3. Who was the first person who believed to have seen moving cells under a microscope? (1)
 - A. Robert Hooke
 - B. Rene Dutrochet
 - C. Anton van Leeuwenhoek
 - D. Theodor Schwann
4. Why do micro-organisms decompose dead organic matters? (1)
 - A. To release mineral nutrients for the plants
 - B. To clean up the ecosystem
 - C. To drive energy for their own uses
 - D. To keep the balance of atmospheric gases
5. The practice of modern agriculture that reduces crop biodiversity is: (1)
 - A. Overgrazing
 - B. Forest clearing
 - C. growing land races
 - D. growing few high yielding varieties
6. Of the following organic molecules which one includes a pentose sugar? (1)
 - A. Glucose
 - B. Fructose
 - C. Galactose
 - D. Deoxyribose
7. What dose an enzyme do to a chemical reaction that allows it to proceed optimally? (1)
 - A. It lower the required activation energy .
 - B. It increases the amount of the substrate.
 - C. It increases the required activation energy .
 - D. It modifies both th Ph and the temperature.
8. Which of the following is lacking in prokaryotic cells? (1)
 - A. Cytosol
 - B. Ribosome
 - C. DNA strand
 - D. Cellulose
9. What is the name of a major group of eukaryotic organisms that obtain their nutrition using extracellular digestion? (1)
 - A. Viruses
 - B. Bacteria
 - C. Fungi
 - D. Algae

-
10. What kind of nutrition do most of the decomposers have in general? (1)
- | | |
|---------------------------|-----------------------------|
| A. Auto trophic nutrition | B. Saprobiotic nutrition |
| C. Endosymbiont nutrition | D. Chemosynthetic nurtition |
-
11. To which genus of primates are the Neanderthal humans classified? (1)
- | | |
|---------------------------|-------------------------------|
| A. The genus Ardipithecus | B. The genus Australopithecus |
| C. The genus homo | D. The genus Zinjanthropus |
-
12. In which of the following is there a MISMATCH between the type of innate behavior and the resulting action/response? (1)
- A. Instinctive behavior- imprinting in birds
- B. Reflex action- blinking of the eyes in humans
- C. Instinctive behavior- Nest-building in birds
- D. Presentational movement-weaving a web in spiders
-
13. Cells were first seen using the microscope by: (1)
- | | |
|--------------|-----------------|
| A. Schleiden | B. Robert Hooke |
| C. Schwann | D. Leeuwenhoek |
-
14. The ultimate source of genetic variation is: (1)
- | | |
|------------------|--------------|
| A. Mutation | B. Migration |
| C. Genetic drift | D. Selection |
-
15. Which of the following is the first step in starting a research process? (1)
- A. Searching sources of information to locate problem.
- B. Survey of related literature
- C. Identification of problem
- D. Searching for solution to the problem
-
16. For which of the following purpose is GLOBAL positioning system (GPS) used? (1)
- | | |
|-------------------|---------------------|
| A. Map of an area | B. Theodolite |
| C. Microwave | D. Satellite signal |
-
17. In the energy pyramid, which group of organisms has least amount of energy? (1)
- | | |
|----------------------|-----------------------|
| A. Primary producers | B. Tertiary producers |
| C. Herbivores | D. Animals |
-
18. Which of the following properties of water makes sweat a good body coolant? (1)
- | | |
|-------------------------------------|---------------------------------------|
| A. Its strong surface tension | B. Its low density in the solid state |
| C. Its strong adhesion to a surface | D. Its high heat of vaporization |
-
19. How many molecule of glycerol and fatty acids, respectively, are needed to from 100 molecules of triglyceride fat? (1)
- | | |
|----------------|----------------|
| A. 50 and 50 | B. 100 and 100 |
| C. 100 and 300 | D. 150 and 400 |

20. In a metabolic pathway($A \rightarrow B \rightarrow C \rightarrow D$) where each step is catalyzed by a separate enzyme which substance (1) in the pathway serves as an allosteric regulator?

- A. Substance A B. Substance B
C. Substance C D. Substance D

21. Which of the following organelles settles out last when homogenized cells are centrifuged? (1)

- A.** Chloroplast **B.** Nucleus
C. Mitochondria **D.** Ribosome

22. At which stage is most of the carbon dioxide released during aerobic respiration? (1)

- A. Glycolysis
B. Kreabs cycle
C. Electron transport
D. Chemiosmosis

23. One of the following groups of plants carry out light dependent and ligh independent reactions of photosynthesis in separate cells of the leaf . (1)

- A. Plants adapted to temperature regions B. Carbon -3 plants
C. Carbon -4 plants D. Cacti

24. What is the nutritional mode of those bacteria which decompose dead organic matter and thus recycle nutrients? (1)

- A. Auto trophic** **B. Parasitic**
C. Saprobiotic **D. Symbiotic**

25. In what main way do retroviruses such as HIV differ from other types of RNA viruses ? (1)

- A.** They require a host cell to reproduce
- B.** They reversely copy RNA to DNA
- C.** Their genes are resistant to mutation
- D.** They are free living viruses

26. Which of the following is NOT true about the flow of energy in the ecosystem? (1)

- A. It is recycled by decomposer.
- B. It passes from one trophic level to the next.
- C. It enters the ecosystem in the form of light.
- D. It leaves the ecosystem in the form of heat.

27. Through which of the following processes do all living organisms contribute to carbon cycle? (1)

- A.** Photosynthesis **B.** Cellular respiration
C. Decomposition **D.** Combustion

28. In the process of allopatric speciation, which of the following is the mechanism that prevents populations from exchanging genes? (1)

- A. Polyploidy
B. Geographic barrier
C. Seasonal isolation
D. Temporal isolation

29. How are organic molecules distinguished from inorganic molecules? Organic molecules always contain: (1)

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

30. In which industrial enzyme technology is lactase practical applied to produce lactose-free milk for used by lactose intolerant individuals? (1)

- A. Chocolate manufacturing industry
B. Human hormone manufacturing industry
C. Dairy product manufacturing industry
D. Cereal food manufacturing industry

31. Which kind of enzyme inhibitors bind to enzyme only weakly and the bond that hold them breaks easily releasing the inhibitor to allow the enzyme to become active again? (1)

- A. Irreversible inhibitors
- B. Reversible inhibitor
- C. Inhibitors that bind strongly to enzymes
- D. Inhibitors that permanently alter enzyme structure

32. Of the following models describing the nature of the cell membrane, which one was proposed before all the others? (1)

- A.** The sandwich model **B.** Fluid mosaic model
C. The unit membrane model **D.** Phospholipid bilayer model

33. Why is that longer races by athletes must be run slower than shorter than shorter races? (1)

- A. To give time for lactic acid fermentation in muscle cells
B. To avoid hunger as food is quickly converted to energy
C. To allow aerobic respiration to produce the required ATP
D. To adapt to the weather condition at the racing place

34. In which organ of the human body are more bacteria found? (1)

- A.** Lungs **B.** Stomach
C. Small intestine **D.** Large intestine

35. From which group of micro-organisms was the first antibiotics produced ? (1)

- A.** Gram-negative bacteria **B.** Gram-positive bacteria
- C.** Fungal organism **D.** Viral agents

36. If two heterozygous tall pea plants are crossed, how many of the offspring would be phenotypically tall plants? (1)

- A. 0%** **B. 25%**
C. 50% **D. 75%**

37. How can biotechnology be applied to reduce the use of inorganic fertilizers in agriculture? (1)

- A. By using the golden rice and producing organic fertilizers from betacarotenes
- B. By using thermostable enzyme of genetically engineered bacteria used in washing powders
- C. By selecting and propagating varieties with high growth rates and high productivity.
- D. By using enzyme produced by genetically engineered bacteria used in the food industry

38. Which of the following feature do analogous structures mostly share? (1)

- A. Phylogenetic similarity
B. Development
C. Ancestral similarity
D. Functional similarity

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- 39.** In which of the following ways does learned behavior differ from innate behavior? (1)
- A. Learned behavior is adaptive in nature .
 - B. Learned behavior is genetically determined.
 - C. Learned behavior is modified by new experiences .
 - D. Learned behavior is functional at the first attempt.
-
- 40.** Current human concerns such as famine, pestilence, and environmental degradation would be solved through the use of: (1)
- | | |
|--------------------------|---------------|
| A. Biological principles | B. Irrigation |
| C. Aquaculture | D. Terracing |
-
- 41.** Which is the possible effect of the weak hydrogen bond among water molecules? (1)
- A. It helps water to boil at low temperature
 - B. It results in the crystal shape of ice
 - C. Plays a significant role in the interaction of a water molecule with hydrophobic surfaces
 - D. It speeds up photosynthesis
-
- 42.** Cell organelles that contain hydrolytic enzymes are called: (1)
- | | |
|----------------|--------------|
| A. Peroxisomes | B. Lysosomes |
| C. Mesosomes | D. Ribosomes |
-
- 43.** Which part of the cell makes necessary changes packages and secretes proteins? (1)
- | | |
|--------------------|--------------------------|
| A. Golgi apparatus | B. Endoplasmic reticulum |
| C. Mitochondria | D. Cell wall |
-
- 44.** Which of the following takes place under normal conditions as electrons flow down the electron transport chain of the mitochondria? (1)
- | | |
|-----------------------------------|--|
| A. NADH and $FADH_2$ are oxidized | B. The pH of the matrix increases |
| C. The electrons lose free energy | D. An electrochemical gradient is formed |
-
- 45.** In the processes of photosynthesis light is necessary to: (1)
- | | |
|------------------------------|---|
| A. Split carbon dioxide | B. Release energy |
| C. Combine CO_2 and H_2O | D. Produce ATP and a reducing substance |
-
- 46.** Which of the following is not an industrial use of bacteria? (1)
- | | |
|---|--------------------------|
| A. Recycling of minerals through ecosystems | B. Food processing |
| C. Genetic engineering | D. Waste water treatment |
-
- 47.** Carbon cycle is important in nature because: (1)
- A. The amount of energy before and after a reaction must be the same
 - B. It continuously reuses and recycles carbon in the ecosystem.
 - C. It consumes oxygen and nitrogen in the atmosphere.
 - D. It is used in energy capture and recapture.

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- 48.** Which of the following is essential in order for a virus to replicate? (1)
- A. The capsid must enter the host cell cytoplasm
 - B. The host cell must be undergoing mitosis
 - C. The host cell must lack cell membrane.
 - D. The genome must be released in to the cytoplasm
-
- 49.** Which one of the following NOT in situ conservation of Biodiversity? (1)
- A. Botanical garden
 - B. Sanctuary
 - C. Biosphere reserves
 - D. National parks
-
- 50.** One goat is heterozygous, long hair(Rr), and its mate carries homozygous short (rr). What is the probability of the offspring having short hair? (1)
- A. 25%
 - B. 100%
 - C. 75%
 - D. 50%
-
- 51.** The type of enzyme used in recombinant DNA technology to spilt a specific sugar phosphate bond in each strand of a DNA double helix is called: (1)
- A. Esterase
 - B. Restriction enzyme
 - C. Lipase
 - D. Ligase
-
- 52.** Lamarck's theory of evolution is know as: (1)
- A. Natural selection
 - B. Survival of the fittest
 - C. Mutation theory
 - D. Inheritance of acquired characters
-
- 53.** The evolution of species which is based upon the sum total adaptation changes could be preserved by: (1)
- A. Natural selection
 - B. Speciation
 - C. Human conservation
 - D. Isolation
-
- 54.** Based on differences in DNA which of the following animals is closer to human beings? (1)
- A. Frog
 - B. Domestic pig
 - C. Zebra fish
 - D. Domestic chicken
-
- 55.** To which group of sugar can the molecule dihydroxyacetone be classified ? (1)
- A. Hexose sugars
 - B. Pentose sugars
 - C. Triose sugars
 - D. Oligosugars
-
- 56.** Choose the one in which the human digestive enzyme is INCORRECT matched with the substance that it normally catalyzes. (1)
- A. Lipase-fat
 - B. Pepsin-protein
 - C. Trypsin-starch
 - D. Pancreatic amylase-starch
-
- 57.** The organelle of the cell which is concerned with the synthesis of lipids in addition to being associated with carbohydrate metabolism and detoxification is: (1)
- A. Golgi body/apparatus
 - B. Thylakoid membrane
 - C. Rough endoplasmic reticulum
 - D. Smooth endoplasmic reticulum

58. Where is convergence point for the metabolism of the building blocks of carbohydrates lipids and proteins (1)

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- 68.** A country with a high youth population but a low old age population and low infant population shows (1)
- A. A population pyramid with bulge in the middle
 - B. A population with wide base and narrow apex
 - C. A inverted pyramid
 - D. A pyramid assuming a rectangular shape
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- 69.** Which one of the following is the primary contribution of Darwin to biological theory? (1)
- A. An important mechanism of biological evolution is natural selection
 - B. New alleles arise through mutation
 - C. Evolution is the change in gene frequencies over time.
 - D. Genes are the units of inheritance.
-
- 70.** Which of the following nucleotide sequences contains four pyrimidine bases? (1)
- A. GATCAATGC
 - B. UAGCGGUAA
 - C. GCUAGACAA
 - D. Both B and C
-
- 71.** Significant change in Ph that can affect an enzyme molecule include (1)
- A. Building strong ionic bonds leading to stabilization of enzymes
 - B. Altering the charges on some substrates making it difficult to bind to enzyme
 - C. Changing the color and palatability of food items
 - D. Increasing the boiling temperature of the substrate
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- 72.** Which of the following two elements are found in all organic molecules? (1)
- A. Carbon and oxygen
 - B. Carbon and nitrogen
 - C. Carbon and hydrogen
 - D. Carbon and PHOSPHORUS
-
- 73.** If two molecule of a six carbon sugar are condensed to form a disaccharide, which of the following is the correct molecular formula of the disaccharide? (1)
- A. $C_{12}H_{24}O_{12}$
 - B. $C_6H_{12}O_6$
 - C. $C_{12}H_{24}O_{12}$
 - D. $C_{12}H_{22}O_{11}$
-
- 74.** Which of the following is NOT a requirement for a molecule to directly diffuse across the cell membrane? (1)
- A. Small size
 - B. Non-polarity
 - C. Large size and polarity
 - D. Lipid solubility
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- 75.** Which of the following molecules can provide the cell the least amount of energy per molecule? (1)
- A. Glucose
 - B. Reduced NAD
 - C. Reduced FAD
 - D. ATP
-
- 76.** During photosynthesis, which of the following is first step in the transduction of light energy to chemical Energy? (1)
- A. ATP formation
 - B. Carbon fixation
 - C. Photolysiss of water
 - D. Glucose formation
-
- 77.** Which of the following terms specifically refers to an ecological succession that starts in an aquatic environment? (1)
- A. Xerosere
 - B. Hydrosere
 - C. Primary succession
 - D. Secondary succession

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- 78.** Suppose the age pyramid of population has a broad base with a narrow top, which of the following is NOT true about the population? (1)
- A. It is fast growing
B. It has high growing
C. It is dominated by young people
D. It has a high birth rate
-
- 79.** What is the reason that Stanley Miller excluded free oxygen from the Mixture of the gases that he used for his simulation experiment? (1)
- A. Early organic molecules did not contain oxygen
B. Oxygen cannot react with the rest of the gases
C. Primitive atmosphere was reducing
D. The primitive atmosphere was full of oxygen
-
- 80.** Which of the following organic molecules is least informative about the evolutionary relationships between species (1)
- A. Carbohydrates
B. Proteins
C. DNA
D. RNA
-
- 81.** In which of the following ways dose mutation contribute most to evolution? (1)
- A. It preserves adaptive genes
B. It creates new alleles
C. It forms a new gene pool
D. It helps genes to recombine
-
- 82.** A small girl who had observed her mother making a telephone call one day made a call on her own. Which learning behavior dose this exemplify? (1)
- A. Insight ?learning
B. Trial and error
C. Latent learning
D. Sensitization

— END OF EXAMINATION —