

Biology, 2007 EC, entrance exam

Grade 12 · Biology · 2007 E.C.

Time allowed: 120 minutes

Questions: 89

Total marks: 89

Name _____ Grade _____ ID No. _____ Date _____

1. Which of the following units of measurement is more convenient to express the size of cellular organelles? (1)
 - A. Meter
 - B. Centimeter
 - C. Milliliter
 - D. Micrometer
2. Which of the following step of the scientific method comes before all the rest? (1)
 - A. Hypothesis
 - B. Experiment
 - C. Conclusion
 - D. Reporting the result
3. What do we call a scientists who specializes in studying insects? (1)
 - A. An ecologist
 - B. A paleontologist
 - C. An entomologist
 - D. a microbiologist
4. To which one of the following organic molecules do enzymes belong? (1)
 - A. Carbohydrate
 - B. Amino acids
 - C. Proteins
 - D. Lipids
5. Which of the following is a coenzyme (1)
 - A. NAD
 - B. Carbohydrate
 - C. Water molecule
 - D. Proteins
6. Which of the following behavioral biologists is known for his study about imprinting behavior in animals? (1)
 - A. W. Kohler
 - B. B.F.Skinner
 - C. Ivan pavlov
 - D. Konrad Lorenz
7. What colour do gram-positive bacteria stain with Gram's stain? (1)
 - A. Rad
 - B. Pink
 - C. Purple
 - D. White
8. Which group of organisms in the ecosystem release nutrients locked up in dead bodies of organisms? (1)
 - A. Parasites
 - B. Decomposers
 - C. Autotrophs
 - D. Carnivores
9. Which of the following are the two major constituents of eukaryotic chromosomes? (1)
 - A. DNA and RNA
 - B. DNA and protein
 - C. DNA and carbohydrate
 - D. RNA and lipid
10. Which one of the following crops has its center of origin and diversity in Ethiopia has become a leading international commodity of commerce? (1)
 - A. Teff
 - B. Enset
 - C. Coffee
 - D. Anchote

11. Which group of animal has the highest number of total and endemic species in Ethiopia ? (1)

- A.** Amphibians **B.** Birds
C. Mammals **D.** Reptiles

12. What is the molecule that supplies the quickest and suitable source of energy to cells? (1)

- A. Lactose
B. Sucrose
C. ATP
D. Lipid

13. A carbohydrate compound is known to have 12 carbon atoms in the whole molecule. What could this compound be? (1)

- A. A polypeptid B. A disaccharide
C. A monosaccharide D. A polysaccharide

14. Among the following organisms, which one belongs to the prokaryotes? (1)

- A. Paramecium
B. Streptococcus
C. Spirogyra
D. Tapeworm

15. Which of the following is consistent with the understanding of human evolution? (1)

- A. Bipedalism was never important in human evolution.
- B. Larger brain size had no contribute to the evolution of the human species.
- C. Human ancestry hand no relation whatsoever with that of the chimpanzees
- D. Fossils of Lucy and Ardi provided evidence for human origin.

16. Baby ostriches tend to follow the first moving object that they see as they hatch out of the eggs. What kind of animal behaviour does this demonstrate? (1)

- A. Positive taxis** **B. Innate behavior**
C. Positive kinesis **D. Learned behavior**

17. Which of the following true about mutations that occur in normal body cells? (1)

- A. They never lead to cancerous cells.
- B. They never pass to the next generation
- C. They never damage the affected cells.
- D. There is no way that they kill the affected cells.

18. What is the processes called when two bacteria directly contact cell to cell and exchange their genetic information? (1)

- A. Conjugation
B. Transformation
C. Co-transformation
D. transduction

19. Why is it that mutations are considered as one of the raw materials of evolution? (1)

- A. They contribute to new variations in organism
- B. They are usually related to the environment in which they appear.
- C. They are mostly beneficial to the organism in which they appear.
- D. They usually become the causes for species extinction

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- 31.** Which of the following factor determines the rate at which organelle settle out of cell homogenate if spun in a centrifuge? (1)
- A. Mass of the organelle
 - B. Function of the organelle in the cell.
 - C. Location of the organelle in the cell
 - D. Thickness of the membrane covering the organelle
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- 32.** Which one of the following classes of organic molecule is the least important source of energy for cellular respiration? (1)
- A. Nucleic acids
 - B. Lipids
 - C. Carbohydrates
 - D. Proteins
-
- 33.** Which one of the following processes has a decreasing effect on the concentration of atmospheric carbon dioxide? (1)
- A. Cellular respiration
 - B. Combustion of fossil fuels
 - C. Decomposition of dead organism
 - D. Photosynthesis
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- 34.** Which of the following is NOT true about instinctive behaviour? (1)
- A. It can be developed further through learning
 - B. It is triggered by a key stimulus
 - C. It has a fixed action pattern.
 - D. It is adaptive for the species
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- 35.** In which of the following ways do retroviruses differ from other RNA viruses? (1)
- A. Their genetic materials is DNA.
 - B. Their genetic materials is RNA.
 - C. They copy RNA to DNA molecule
 - D. They copy RNA from DNA molecule
-
- 36.** Which of the following group of micro-organisms does not contain parasitic members? (1)
- A. Bacteria
 - B. Algae
 - C. Fungi
 - D. protozoa
-
- 37.** Which of the following is NOT the correct characteristics of tropical rainforests? (1)
- A. Low biodiversity
 - B. High temperature
 - C. Heavy precipitation
 - D. trees of different heights
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- 38.** From evolutionary point of view, which of the following animals is expected to have haemoglobin proteins that are least similar to that of human? (1)
- A. Ape
 - B. Cow
 - C. Chicken
 - D. Frog
-
- 39.** For what purpose do molecular biologists use the technology known as polymerase chain reaction or PCR? (1)
- A. To insert DNA in to plasmids.
 - B. To insert plasmids in to bacteria.
 - C. To multiply copies of DNA molecule.
 - D. To produce DNA from RNA.

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- 40.** What is the long term primary effect of the current tree planting activities that Ethiopia is undertaking ? (1)
- A. It will protect from harmful solar rays.
 - B. It will increase the global temperature.
 - C. It will reduce the atmospheric CO₂.
 - D. It will mend the holes in the ozone layer.
-
- 41.** Suppose when you first enter a room you notice an unpleasant smell which you eventually forget about its presence, what is this behaviour called? (1)
- A. Latent learning
 - B. Insight learning
 - C. Habituation
 - D. Operant conditioning
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- 42.** Which of the following is an evolutionary requirement for two sub-populations of species to evolve in to independent species? (1)
- A. Free exchange of genes
 - B. Geographic isolation
 - C. Free migration between populations
 - D. Absence of natural selection
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- 43.** What does a restriction enzyme do? (1)
- A. Restricts transcription
 - B. Cuts DNA at specific sites
 - C. Prevents DNA from replicating
 - D. Hydrolyses the DNA molecule
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- 44.** Which element is found in nucleic acids? (1)
- A. Calcium
 - B. Iron
 - C. Magnesium
 - D. phosphorus
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- 45.** From where do plants get most of their nutrients? (1)
- A. Chlorophyll
 - B. Soil
 - C. Light
 - D. Atmosphere
-
- 46.** What do you call a group of genetically identical plants produced by vegetative reproduction? (1)
- A. Family
 - B. Clone
 - C. Hybrid
 - D. Genus
-
- 47.** What is the base found in RNA in place of thymine of DNA ? (1)
- A. Cytosine
 - B. Guanine
 - C. Thymine
 - D. Uracil
-
- 48.** The most complex structure of proteins is called (1)
- A. Primary structure
 - B. Secondary structure
 - C. Tertiary structure
 - D. Quaternary structure
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- 49.** Which one of the following is the smallest of all? (1)
- A. A red blood cell
 - B. A virus
 - C. A bacterium
 - D. An amoeba
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- 50.** A cow was found to yield much higher than any of the breeds of the parental cattle. What could be the most probable reason for this ? (1)
- A. Dominant genes
 - B. Hybrid vigour
 - C. Recessive genes
 - D. Co-dominance genes

51. In the formation of a macromolecule, what type of reaction would join two subunits together? (1)

- A. Hydrolysis reaction
B. Dehydration reaction
C. Denaturation reaction
D. Hydrophobic reaction

52. Which are the four most abundant elements in living cells? (1)

- A.** Carbon, oxygen, sulphur, phosphorus. **B.** Carbon, oxygen, hydrogen, nitrogen.
- C.** Carbon, oxygen, nitrogen, sulphur. **D.** Carbon, oxygen, sulphur, magnesium.

53. When the F1 hybrid of a monohybrid cross is back crossed with the homozygous recessive parent, what percentage of the offspring would be homozygous recessive? (1)

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

54. which of the following is an inorganic molecule? (1)

- A. CaCO_3
B. CH_4
C. $\text{C}_6\text{H}_{22}\text{O}_{11}$
D. $\text{C}_{18}\text{H}_{36}\text{O}_2$

55. Which of the following expression is more related to the phase "survival of the fittest"? (1)

- A.** Natural selection
- B.** Mendelian inheritance
- C.** Gene mutation
- D.** Inheritance of acquired characteristics

56. To which group of organic compounds do the triglycerides and waxes belong? (1)

- A.** Carbohydrate **B.** Proteins
C. Lipids **D.** Vitamins

57. What did Francesco Redi prove through his scientific experiment? (1)

- A. Maggots appear spontaneously on foods placed anywhere.
- B. Maggots do not appear in foods kept in jars that are protected with a cover.
- C. Maggots do not appear in foods kept in open jars
- D. flies appear spontaneously on rotting meat kept in closed or open jars alike.

58. Which one of the following shows the feeding methods of decomposers? (1)

- A. Saprobic nutrition
B. Autotrophic nutrition
C. Parasitic nutrition
D. Intracellular digestion

59. What happens when the carrying capacity of an ecosystem is reached? (1)

- A. Excretory product accumulates and population numbers increase.
- B. Population numbers decline rapidly.
- C. Population numbers remain more or less constant.
- D. Resources are plentiful and populations shoot up

60. In which industrial products is pyruvate fermentation by yeast practically applied? (1)

- A.** Brewing beer
- B.** Swiss cheese making
- C.** Production of vinegar
- D.** Yoghurt making

61. If a substance that weighs 2000 grams and has a half-life of 100 years is left with only 250 grams, for how long has the radioactive decaying activity been undergoing? (1)

A. 200 years
B. 250 years
C. 300 years
D. 500 years

62. What does an ethnologist study? (1)

A. Insect diets
B. Soil types
C. Fossil fuel
D. Animal behavior

63. Which one of the following is a biotic factor operating within an ecosystem? (1)

A. The amount of helium gas in the air
B. The rate of flow of water in a river
C. The carnivores that consume other animals
D. The type of climate in a given region

64. When athletes take part in short distance running, how do the cells generate most of the energy that is quickly needed? (1)

A. Aerobic respiration in muscle cells
B. Mitochondrial respiration in any cells
C. Anaerobic respiration in muscle cells
D. Yeast fermentation in the stomach.

65. What do you call the reasoning technique in science where general principle are used to analyse specific cases? (1)

A. Induction
B. Deduction
C. Pseudo-deduction
D. Pseudo-induction

66. Which of the following will primarily happen if the enzymes in the lysosomes of a cell are defective? (1)

A. Cellular debris will not be removed
B. Chromosome replication will cease
C. ATP production will stop
D. Diffusion process will stop

67. Which of the following is true about all proteins? (1)

A. They are twenty amino acids long
B. They are globular in shape
C. They perform the same function
D. The monomers are held together by peptide bonds

68. Which of the properties of water allows mosquito larvae to hung themselves down in to the water from the water surface? (1)

A. Its high specific heat capacity
B. Its high latent heat of vaporization
C. Its high surface tension
D. Its low density in solid state

69. Which of the following properties of enzymes makes it possible that a single enzyme molecule can act on many substrate molecules? (1)

A. Enzymes are proteins
B. Enzymes lower the energy of activation
C. Enzymes are reused over and over again
D. Enzymes are substrate specific

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- 70.** Which stage in the life cycle of HIV is disrupted if AIDs patients are treated with a drug that has protease inhibiting activity? (1)
- A. Entry of the virus in to the host
 - B. Conversion of viral RNA to DNA.
 - C. Integration of viral DNA into host DNA.
 - D. Assembly of viral parts in to whole virus
-
- 71.** Cells immediately use the energy that electrons lose as they pass along the chain of electron carriers to: (1)
- A. Produce ATP
 - B. Pump protons
 - C. Spin the rotor of ATP synthase
 - D. reduce NAD
-
- 72.** Which of the following is a routine method used by clinics to test people for HIV infection? (1)
- A. Microscopic examination for the virus
 - B. Counting the number of white blood cells
 - C. Testing for human anti-HIV antibody
 - D. Measuring the amount of haemoglobin
-
- 73.** Which of the following is NOT true about the nature of the first form of organisms on earth? They were (1)
- A. Prokaryotic
 - B. Unicellular
 - C. aerobic
 - D. anaerobic
-
- 74.** Suppose a fossil initially contains 100,000 atoms of a certain radioactive element whose half-life is 10,000 years, after how many years would the number of the atoms be 12500? (1)
- A. Ten thousand years
 - B. Twenty thousand years
 - C. Thirty thousand years
 - D. Forty thousand years
-
- 75.** The following are Simpson's Index of species diversity calculated for four areas containing the same types of species. Which index value is from the area dominated relatively by a fewer number of species? (1)
- A. 8.00
 - B. 6.00
 - C. 3.5
 - D. 2.5
-
- 76.** which of the following happens in both cyclic and non-cyclic photophosphorylation? (1)
- A. ATP is formed
 - B. Oxygen is generated
 - C. NADP is reduced
 - D. water molecule splits
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- 77.** Which of the following is NOT a true characteristic of the populations of most of the developing countries of the world? (1)
- A. High fertility rate
 - B. Increasing population size
 - C. More number of old people than young people
 - D. Birth rate greater than mortality rate
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- 78.** Choose the step that comes at the last step in the scientific method. (1)
- A. Proposing the research hypothesis
 - B. Formulation of a scientific theory
 - C. Conducting experiments
 - D. Making predictions

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- 79.** Which of the following is NOT true about C_4 plants such as tef (*Eragrostis tef*) (1)
- A. CO_2 is harvested during the night time.
 - B. The bundle sheath cells contain chloroplasts.
 - C. Light -dependent reaction occurs in mesophyll cell.
 - D. Chloroplasts of bundle sheath cells lack thylakoids.
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- 80.** What does the fermentation of glucose by yeast normally yield? (1)
- A. Lactic acid, CO_2 , and 2 ATP
 - B. CO_2 , H_2O , and 36 ATP
 - C. Alcohol, CO_2 , and 2 ATP
 - D. Alcohol, CO_2 , and 36 ATP
-
- 81.** Which hormone promotes human sleepfulness in darkness and controls the sleep-wake cycle? (1)
- A. Insulin
 - B. Adrenaline
 - C. Melatonin
 - D. Thyroxine
-
- 82.** Which two nitrogenous bases belong to the purines? (1)
- A. Adenine and thymine
 - B. Adenine and guanine
 - C. Guanine and cytosine
 - D. Thymine and uracil
-
- 83.** Which of the following is true ? (1)
- A. Recessive alleles are only expressed in the homozygote.
 - B. Dominant alleles are expressed only in the heterozygote.
 - C. Recessive alleles are expressed in the heterozygote.
 - D. Genetically modified organisms are never used to manufacture vaccines
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- 84.** Which of the following is a functional group of a fatty acid? (1)
- A. A ketone group
 - B. An aldehyde group
 - C. An amino group
 - D. A carboxyl group
-
- 85.** Which one of the following is an example of an orientational innate behaviour? (1)
- A. Kinases in woodlice
 - B. Blinking of the eyes
 - C. Sudden withdrawal of limbs from hot object
 - D. Nest building by weaver birds
-
- 86.** One of the following is true about bacteriophages that have lysogenic life cycle. (1)
- A. They are RNA viruses
 - B. They integrate their nucleic acid into that of the host
 - C. They multiply in the host immediately after infection
 - D. Progeny viruses are released by chronic release method
-
- 87.** In Pavlov's experiment on the classical conditioning of dogs, what does the reaction of the dogs to the sound of the bell represent? (1)
- A. The conditioned stimulus
 - B. The conditioned response
 - C. The unconditioned stimulus
 - D. The unconditioned response

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- 88.** What is the purpose of the in folding of the inner -membrane of the mitochondrion? (1)
- A. Increasing the photosynthetic capacity of the cell.
 - B. Speeding up the loss of CO_2 during fermentation.
 - C. Speeding up the process of glycolysis
 - D. Increasing the surface area for ATP production
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- 89.** Which of the following biomass of the earth has the greatest diversity of species? (1)
- | | |
|---------------------|-------------------------|
| A. Deciduous forest | B. Tropical rain forest |
| C. Desert | D. Tundra |

— END OF EXAMINATION —

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