

Biology, 2011 EC, entrance exam

Grade 12 · Biology · 2011 E.C.

Time allowed: 120 minutes

Questions: 94

Total marks: 94

Name _____ Grade _____ ID No. _____ Date _____

1. Which of the following is the Greek word for life? (1)
 - A. 'Logos'
 - B. 'Bios'
 - C. 'Cientia'
 - D. 'Cell'
2. What is the shape of an enzyme molecule? (1)
 - A. Globular
 - B. Linear
 - C. Branched
 - D. Pleated
3. In which of the following groups of organisms are all the members unicellular? (1)
 - A. Algae
 - B. Fungi
 - C. Bacteria
 - D. Viruses
4. Which of the following chromosomal errors creates a cell with an extra chromosome? (1)
 - A. Non-disjunction
 - B. Inversion
 - C. Deletion
 - D. Duplication
5. What is the type of scientific research that is directly concerned with studies of the way of solving problems related to human needs? (1)
 - A. Basic science
 - B. Applied science
 - C. Space science
 - D. Current science
6. For which of the following purposes do biologists use centrifuges? (1)
 - A. Measuring volume
 - B. Magnifying cell parts
 - C. Culturing microorganisms
 - D. Fractionation of cell contents
7. What is the function of DNA polymerase? (1)
 - A. It hydrolyzes the DNA molecule.
 - B. It forms DNA by joining nucleotides.
 - C. It converts the DNA molecule to RNA.
 - D. It joins two RNA molecules to form DNA.
8. Which one of the following is commonly called the code of life? (1)
 - A. Cell
 - B. Organelle
 - C. Nucleus
 - D. DNA
9. What is another name for secondary consumer? (1)
 - A. Producer
 - B. Herbivore
 - C. Carnivore
 - D. Decomposer
10. In which geologic period is the evolution of humans most probably believed to have happened? (1)
 - A. Tertiary period
 - B. Jurassic period
 - C. Quaternary period
 - D. Cretaceous period

-
- 11.** Of the following patterns of innate behaviour in animals, which one is considered the simplest? (1)
- | | |
|---------------------------------|----------------------------|
| A. Instinctive behaviour | B. Reflex action |
| C. Taxis movement | D. Kinesis movement |
-
- 12.** The hypothesis which a scientist tries to disprove is called: (1)
- | | |
|----------------------------------|--------------------------------|
| A. Alternative hypothesis | B. Ad hoc hypothesis |
| C. Null hypothesis | D. Auxiliary hypothesis |
-
- 13.** What are the compounds that have the same chemical composition, but different arrangement of atoms? (1)
- | | |
|--------------------|--------------------|
| A. Anomers | B. Isomers |
| C. Polymers | D. Monomers |
-
- 14.** Which one of the following conditions is least likely to denature an enzyme? (1)
- | | |
|------------------------------|-----------------------------|
| A. A high temperature | B. An extreme pH |
| C. Heavy metal ions | D. A low temperature |
-
- 15.** Respiration is: (1)
- | | |
|-----------------------------------|------------------------------------|
| A. Anabolic and exergonic | B. Anabolic and endergonic |
| C. Catabolic and exergonic | D. Catabolic and endergonic |
-
- 16.** Both photosynthesis and respiration are involved in: (1)
- | | |
|--------------------------|-----------------------------|
| A. Nitrogen Cycle | B. Phosphorous Cycle |
| C. Water Cycle | D. Carbon Cycle |
-
- 17.** Which of the following statements best describes the role of bacteria in the nitrogen cycle? Bacteria turn: (1)
- A.** oxygen into nitrogen for plants to use.
 - B.** nitrogen into a usable form for plant use called ammonia.
 - C.** nitrogen into a usable form in a process called transpiration.
 - D.** carbon dioxide into oxygen during the process of photosynthesis.
-
- 18.** Which one of the following terms best describes the number of different species in the biosphere or in a particular area? (1)
- | | |
|-------------------------------|-----------------------------|
| A. Biodiversity | B. Genetic diversity |
| C. Ecosystem diversity | D. Species diversity |
-
- 19.** The daily cycle of activity that occurs over a 24-hour period of time is called a: (1)
- | | |
|-----------------------------|----------------------------|
| A. Stimulus-response | B. Kinesis behavior |
| C. Circadian rhythm | D. Taxis behavior |
-
- 20.** Within a few weeks after a heavy rain, pools become teemed with tadpoles. What is the source of the tadpoles? (1)
- | | |
|---|----------------------------------|
| A. The rain water | B. The eggs laid by frogs |
| C. The decaying vegetation of the pond | D. The mud on the floor |
-
- 21.** In what way does an antiretroviral drug help AIDS patients? It (1)
- A.** stops the multiplication of HIV.
 - B.** kills opportunistic infectious agents.
 - C.** stimulates multiplication of T-helper cells.
 - D.** provides immunity.

-
- 22.** Of the following four elements, which one is the least abundant in living things? (1)
- | | |
|------------------|--------------------|
| A. Oxygen | B. Hydrogen |
| C. Carbon | D. Sulfur |
-
- 23.** If a homogenate of eukaryotic cells is spun in a centrifuge, which of the cellular organelles settles out first? (1)
- | | |
|-----------------------|------------------------|
| A. Nucleus | B. Ribosome |
| C. Chloroplast | D. Mitochondria |
-
- 24.** In which part of mitochondria does the Krebs's cycle take place? (1)
- | | |
|---|---|
| A. In the matrix | B. On the inner membrane surface |
| C. On the outer membrane surface | D. In the inter-membrane space |
-
- 25.** What is the ultimate source of the electrons that replace those lost from the photosystem II during photosynthesis? (1)
- | | |
|-------------------------|-------------------------|
| A. Photosystem I | B. Chlorophyll-b |
| C. Chlorophyll a | D. Water |
-
- 26.** Which one of the following human diseases is NOT correctly matched with its mode of transmission? (1)
- | | |
|--|---|
| A. Malaria - vector | B. Sleeping sickness- physical contact |
| C. Cholera - contaminated water | D. Influenza - droplet infection |
-
- 27.** Which clinical test is routinely performed to diagnose patients for AIDS? (1)
- A.** Culturing opportunistic infectious agents
- B.** Culturing the virus on a special media
- C.** Serological test for anti-HIV antibody
- D.** Determining hemoglobin amount
-
- 28.** Which bacterial genus fixes nitrogen in the nodules of leguminous plants? (1)
- | | |
|-------------------------|-----------------------|
| A. Agrobacterium | B. Escherichia |
| C. Rhizobium | D. Azobacter |
-
- 29.** One of the following agricultural practices does NOT have a negative effect on biodiversity? (1)
- | | |
|--------------------------------------|-------------------------------|
| A. Use of pesticides | B. Use of insecticides |
| C. Growing improved varieties | D. Growing landraces |
-
- 30.** On which of the following points do Lamarck's and Darwin's theories of evolution agree? (1)
- | | |
|--|--|
| A. Evolution produces new species | B. Evolution occurs by natural selection |
| C. All living things tend to over reproduce | D. New structures arise by use-and-disuse |
-
- 31.** What is the behavior that an animal learns to ignore a trivial stimulus that is repeated many times? (1)
- | | |
|-------------------------|----------------------------|
| A. Sensitization | B. Insight learning |
| C. Habituation | D. Latent learning |
-
- 32.** One of the following is true about a behavior that has a fixed action pattern. (1)
- A.** It is a learned behavior.
- B.** It is always done in the same way.
- C.** It can be perfected through experience
- D.** It does not need a stimulus to trigger it.

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- 33.** If a chimpanzee piles up boxes and climbs on it to reach a bunch of banana hanging from a ceiling, which behavior is manifested? (1)
- A. Operant conditioning
B. Trial and error learning
C. Insight learning
D. Latent learning
-
- 34.** Which of these elements is known to have less than 10% occurrence in many cells? (1)
- A. Carbon
B. Hydrogen
C. Nitrogen
D. Oxygen
-
- 35.** One of the following is a non-carbohydrate molecule. (1)
- A. Starch
B. Cellulose
C. Glycogen
D. Collagen
-
- 36.** Which model of enzyme action requires that the shape of the substrate molecule is complementary to that of the active site? (1)
- A. The induced-fit model
B. The lock-and-key model
C. The activation energy model
D. The enzyme function model
-
- 37.** If the average diameter of the human red blood cell is 0.000007 m, which one is its correct diameter when expressed in a smaller unit? (1)
- A. 0.00007 μm
B. 0.007 μm
C. 7 mm
D. 7000 nm
-
- 38.** Which procedure allows biologists to separate different cellular organelles and study their structures and compositions separately? (1)
- A. Dehydrogenation
B. Cell fractionation
C. Phosphorylation
D. Polymerization
-
- 39.** How many ATP molecules are produced during the complete cellular respiration of one glucose molecule? (1)
- A. 2
B. 4
C. 18
D. 36
-
- 40.** What is the main method of transmission of botulism? (1)
- A. Direct contact
B. Droplet infection
C. Eating contaminated food
D. Drinking contaminated water
-
- 41.** From which group of microorganisms was the first antibiotics produced? (1)
- A. Members of viruses
B. Members of the fungi
C. Gram-negative bacteria
D. Gram-positive bacteria
-
- 42.** What is a capsid? (1)
- A. The genetic material of a virus
B. The DNA of a virus
C. The RNA of a virus
D. The protein shell of a virus
-
- 43.** What is the general name of crop plants that add nitrogen to the soil because of their symbiotic association with certain types of bacteria? (1)
- A. Nodules
B. Legumes
C. Cereals
D. Herbs

44. If two parents with genotypes 'Aa' are cross-bred and that there is no codominance in the inheritance pattern, what proportion of the offspring would have genotypes exactly like that of their parents? (1)

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

45. Which of the following is an example of a cell formed by reduction division? (1)

A. Nerve cells B. Kidney cells
C. Bone cells D. Sperm cells

46. One of the following sources of evidence provides a more direct support to the process of Charles Darwin's theory of evolution. (1)

A. Physiology B. Anatomy
C. Genetics D. Geographical distribution

47. Which animal behaviour pattern is best illustrated by the famous Pavlov's dog? (1)

A. Associative learning B. Latent learning
C. Instinctive behaviour D. Habituation

48. Through which of the following methods can blood be separated into its cellular and fluid parts? (1)

A. Separating funnel B. Fractional distillation
C. Centrifuging D. Simple distillation

49. The most abundant inorganic molecule in the atmosphere that traps heat is: (1)

A. H_2S B. O_2
C. H_2O D. CO_2

50. Which of the following statements is NOT correct about the effect of temperature on enzymes. (1)

A. Raising the temperature increases the kinetic energy of molecules.
B. A ten degree centigrade increase in temperature may increase the activity of most enzymes by 50% to 100%.
C. Most enzymes are insensitive to temperature at low pH.
D. Most enzymes are denatured at 40 Degree Centigrade.

51. Organelles in the cytoplasm that are known as 'power house' of the cell are: (1)

A. mitochondria B. chloroplast
C. ribosome D. cellulose

52. Which of the following is NOT a function of lysosomes? (1)

A. Autophagy B. Autolysis
C. Digestion D. Synthesis

53. The different steps for complete aerobic respiration are: (1)

A. Glycolysis and oxidative phosphorylation.
B. Glycolysis and Krebs cycle.
C. Glycolysis. Krebs cycle and terminal oxidation.
D. Krebs cycle and terminal oxidation.

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- 54.** Which of the following processes indicate the process of photosynthesis? (1)
- A. Reductive, exergonic and catabolic B. Reductive, endogenic and catabolic
C. Reductive, exergonic and anabolic D. Reductive, endergonic and anabolic
-
- 55.** The active sludge method of Sewage treatment is based on the principle of (1)
- A. decomposition and removal of organic matter.
B. removal of polluting organic matter through filtration.
C. denitrification.
D. anaerobic respiration.
-
- 56.** When an organism containing a gene which does NOT belong to it and is derived from Somewhere else, the organism is said to be: (1)
- A. hybrid. B. transgenic.
C. mutant. D. clonal.
-
- 57.** When is reverse transcriptase a useful enzyme? When: (1)
- A. nutrients are scarce. B. there are no host cells present
C. spikes are forming in the new virus. D. an RNA virus converts its RNA to DNA.
-
- 58.** If you were to travel from the Arctic Circle to the Equator, what sequence of biomes would you most likely pass through? (1)
- A. Tundra, temperate forest, taiga, tropical rain forest
B. Taiga, tundra, temperate forest, tropical rain forest
C. Tundra, taiga, temperate forest, tropical rain forest
D. Tropical rain forest, temperate forest, taiga, tundra
-
- 59.** The fact that Ethiopia is a regional center of biological diversity which of the following diversity is expressed? (1)
- A. The many mountain, valleys, rivers and scenic beauty.
B. High number of endemic wild and domestic plant species.
C. Wide range of altitude and climate.
D. The number of different biomes in the country.
-
- 60.** Under ideal conditions and unlimited resources, continuous population growth pattern is known as: (1)
- A. density dependent growth B. logistic growth
C. exponential growth D. population distribution growth
-
- 61.** If colour blindness is sex linked and a colour-blind man marries the daughter of a colour-blind person, which of the following is their progeny? (1)
- A. None of her daughters are colour-blind B. All her sons are colour-blind
C. All her daughters are colour-blind D. Half of her sons are colour-blind
-
- 62.** Transfer of a gene or genes through a virus is called: (1)
- A. transformation B. transduction
C. genetic engineering D. conjugation

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- 63.** Which of the following concept is attributed to Charles Darwin? (1)
- A. Use and disuse of organs is of great importance in evolution.
 - B. Every cell must come from a pre-existing cell.
 - C. In the struggle for existence, the fittest would survive.
 - D. The gametes will carry only one of a pair of contrasting characters.
-
- 64.** "Skinner box" is used for experiments in: (1)
- A. operant conditioning
 - B. classical conditioning
 - C. migration
 - D. taxis
-
- 65.** Which of the following factors affects enzyme activity without denaturing the enzyme molecule? (1)
- A. High temperature
 - B. Low temperature
 - C. High pH
 - D. Low pH
-
- 66.** Which of the following can reverse or reduce an allosteric enzyme inhibition? (1)
- A. Adding more substrate
 - B. Adding more end products
 - C. Depleting the substrate
 - D. Depleting the end product
-
- 67.** In what way do retro viruses differ from the other RNA viruses? (1)
- A. Their genetic material is RNA.
 - B. They are parasitic.
 - C. They copy RNA to DNA.
 - D. They are smaller in size.
-
- 68.** As an ecological succession passes from a lower to a higher seral stage, which of the following will NOT happen? (1)
- A. The community gets more complex
 - B. Ecological niches increase
 - C. Species get more diverse
 - D. Soil nutrient is depleted
-
- 69.** What is the population growth phase of the current world population? (1)
- A. Exponential phase
 - B. Lag phase
 - C. Decline phase
 - D. Static phase
-
- 70.** If allowed to self-pollinate, which of the following pea genotype would produce progeny with 9 : 3 : 3 : 1 phenotypic ratio? (1)
- A. RRYy
 - B. RrYY
 - C. RRYy
 - D. RrYy
-
- 71.** How many nucleotides are needed to form codons for a protein that is 100 amino acids long? (1)
- A. 100 nucleotides
 - B. 200 nucleotides
 - C. 300 nucleotides
 - D. 640 nucleotides
-
- 72.** Which of the following is the common idea held by all the creationists? (1)
- A. Life is eternal.
 - B. Life was created by a supernatural being.
 - C. All life was created in six days.
 - D. Life came to earth from elsewhere in the universe.

73. Among the following, which one had the cranial capacity of about the same size as that Of Homo sapiens? (1)

- A.** Homo habilis **B.** Homo erectus
C. Lucy **D.** The Neanderthal man

74. One of the following behavioral pattern of human babies is more or less similar to the imprinting of newly hatched goose? (1)

- A.** Fixed action pattern **B.** Attachment-formation
- C.** Habituation **D.** Breast suckling

75. In the human body, which conditions are generally considered optimum for most enzymes? (1)

- A. 37°C and pH 1.0
B. 90°C and pH 7.0
C. 5°C and pH 9.0
D. 37°C and pH 7.0

76. Which of the following has the highest water potential than all the other? (1)

- A.** Animal cells **B.** Different solutions
- C.** Pure liquid water **D.** Different suspensions

77. Which of the four stages in the aerobic respiration of glucose does NOT produce ATP? (1)

- A.** Glycolysis
- B.** The link reaction
- C.** Krebs cycle
- D.** Electron transport & chemiosmosis

78. In an experiment to study photosynthesis, a plant was provided with radioactive carbon dioxide as a metabolic tracer and the radioactive carbon was incorporated first into oxaloacetate. Which one of the following would best characterize this plant?

- A. C4 plant
B. C3 plant
C. CAM plant
D. Heterotrophic plant

79. Which of the following is a correct statement about the difference between a bacterium and a virus? (1)

- A. DNA is present in the former, but absent in the latter.
- B. The former is cellular, but the latter is a cellular.
- C. Protein is absent in the former, but present in the latter.
- D. The former causes malaria, but the latter causes cholera.

80. Which of the following statements about transgenic organisms is correct? (1)

- A. A bacterium that contains genes from another organism.
- B. A plant that has been cross-pollinated with another plant.
- C. An animal that has been reared in isolation in the laboratory.
- D. Any organism in which a foreign gene is added to its genome.

81. If a radioactive substance that weighs 5,600 grams and has a half-life of 100 years is left with 700 grams, for how long has the decaying activity been undergoing? (1)

- A. 100 years
B. 200 years
C. 300 years
D. 500 years

82. What is the survival value of a social behaviour in which some birds move in large groups? (1)

- A.** Protection of a territory **B.** Protection from predators
C. Technique for trapping prey **D.** Displaying courtship activities

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- 83.** What is the biome of the world where succulent plants are commonly found? (1)
- A. Hot deserts
B. Thorn forests
C. Deciduous forests
D. Temperate grasslands
-
- 84.** Which of the following statements is NOT correct? (1)
- A. Employers may not dismiss an employee because of his/her HIV status.
B. HIV-positive people are forced by law to disclose their HIV status.
C. There is no medication that can reduce your chances of contracting HIV.
D. Mothers can give their babies HIV by means of breastfeeding.
-
- 85.** Lipids to become sphingolipids must contain: (1)
- A. Glycerol
B. Nitrogen
C. Alcohol
D. Triglycerides
-
- 86.** If other conditions were to remain constant, which one of the following changes would explain a reduced rate of activity in an enzyme-controlled reaction? Increase in (1)
- A. concentration of end-product.
B. substrate concentration.
C. enzyme concentration.
D. temperature towards the optimum.
-
- 87.** Which of the following statements best describes an induced fit-model? (1)
- A. an active site alters shape such that it is ready to accept a substrate.
B. a substrate adopts the correct binding conformation before entering an active site.
C. a substrate binds to an active site and alters the shape of the active site.
D. an active site alters the shape of the substrate such that it can adopt the necessary active conformation for binding.
-
- 88.** Which of the following happens if a nucleolus is missing in a cell? (1)
- A. Nuclear pores will be blocked
B. Endoplasmic reticulum will be unfolded
C. DNA synthesis will be enhanced
D. Ribosomal functions will be disrupted
-
- 89.** Which one is first inhibited if a cell contains excess of ATP? (1)
- A. Krebs cycle
B. Oxidative phosphorylation
C. Glycolysis
D. Electron transport
-
- 90.** Which of the following results in the production of oxygen during photosynthesis? (1)
- A. Reducing NADP+
B. Splitting of the water molecules
C. Electron transfer system of photosystem I
D. Electron transfer system of photosystem II
-
- 91.** Which one of the following happens during integration of viruses in host cells? (1)
- A. The virus takes over the host cell machinery.
B. The viral DNA enters the host cell.
C. The virus attaches to a host cell receptor.
D. The viral DNA is inserted into the host DNA.

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- 92.** The following statements are correct regarding ecological succession EXCEPT: (1)
- A. Ecological succession is a random process.
 - B. The food chain relationship becomes more complex.
 - C. The role of decomposers becomes more and more important.
 - D. Species diversity increases as succession proceeds
-
- 93.** Which one of the following phenomena supports Darwin's concept of natural selection in organic evolution? (1)
- A. Development of transgenic animals
 - B. Production of 'Dolly', the sheep by cloning
 - C. Prevalence of pesticide resistant insects
 - D. Development of organs from 'stem cells' for organ transplantation
-
- 94.** One of the following is NOT true about operant conditioning. (1)
- A. It is based on innate behaviors.
 - B. It is based on reward and punishment.
 - C. It is concerned with learnt behavior.
 - D. It is based on consequences of actions.

— END OF EXAMINATION —

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