



BIOLOGY
STANDARD LEVEL
PAPER 1

Monday 5 November 2001 (afternoon)

45 minutes

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.

1. What is produced as a result of mitosis?
 - A. Two cells, each containing half the number of chromosomes of the original cell
 - B. Two cells, each containing the same number of chromosomes as the original cell
 - C. Four cells, each containing the same number of chromosomes as the original cell
 - D. Four cells, each containing half the number of chromosomes of the original cell

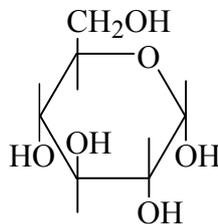
2. The DNA of a particular cell is damaged so that the cell continues to divide uncontrollably. What is the possible result?
 - A. Coronary heart disease
 - B. AIDS
 - C. Tumour formation
 - D. Down's syndrome

3. A structure is seen in an electron micrograph of an animal cell. Its membrane appears to be continuous with the nuclear membrane and resembles a series of flattened sacs. What is this structure?
 - A. The endoplasmic reticulum
 - B. The Golgi apparatus
 - C. A mitochondrion
 - D. A chloroplast

4. In viewing an electron micrograph of a cell, ribosomes, a slime capsule and a single circular chromosome are observed. What other structure is likely to be seen?
 - A. The rough endoplasmic reticulum (rough ER)
 - B. Mitochondria
 - C. A nuclear membrane
 - D. A plasmid

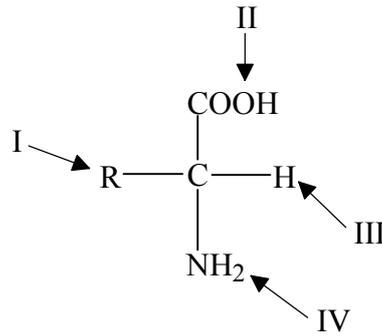
5. Colchicine disrupts microtubule assembly. What activity would be most affected by colchicine?
- A. Photosynthesis
 - B. Replication
 - C. Movement of chromosomes to the poles during mitosis
 - D. Active transport by membrane proteins

6. Which of the following terms correctly describe the molecule below?



- I. Monosaccharide
 - II. Glucose
 - III. Carbohydrate
- A. I
- B. I and III
- C. II and III
- D. I, II and III
7. What best describes the approximate relative energy content (per gram) of carbohydrate, lipid and protein?
- A. Carbohydrate > Lipid > Protein
 - B. Protein > Carbohydrate = Lipid
 - C. Carbohydrate \approx Protein > Lipid
 - D. Carbohydrate \approx Protein < Lipid

8. Which groups of an amino acid combine with another amino acid to form a dipeptide?



- A. I and IV
- B. II and IV
- C. II or III
- D. II or IV

9. Which of the following is classified as a polysaccharide?

- A. Cellulose
- B. Sucrose
- C. Glucose
- D. Ribose

10. Which are the **three** most common elements in cells?

- I. Hydrogen
- II. Nitrogen
- III. Oxygen
- IV. Carbon
- V. Sulfur

- A. I, III, IV
- B. II, III, IV
- C. III, IV, V
- D. I, IV, V

11. Which is **not** a function of a lipid?
- A. Protection
 - B. Energy storage
 - C. Hormone activity
 - D. Storage of hereditary information
12. What does the polymerase chain reaction (PCR) do?
- A. It produces multiple sets of chromosomes.
 - B. It produces large amounts of protein from minute quantities of mRNA.
 - C. It amplifies minute quantities of DNA.
 - D. It separates small fragments of polynucleotide.
13. Which of the following is involved in gene therapy?
- A. Repair of a mutation through naturally occurring repair enzymes
 - B. Replacement of a non-functional gene with a healthy gene
 - C. Removal of all mutated genes
 - D. The use of a vector to remove the non-functional gene
14. Eukaryotic cells are grown in a medium containing radioactive uracil. Where in the cell is radioactivity likely to be detected?
- A. The cell membrane
 - B. The ribosome
 - C. The Golgi apparatus
 - D. Lysosomes

15. If a man has blood type O and a woman has blood type AB, what is the probability that their child will be blood type O?
- A. 0 %
 - B. 25 %
 - C. 50 %
 - D. 100 %
16. Why is the occurrence of sex-linked recessive traits more frequent in human males than in human females?
- A. The X chromosome is inactive in males.
 - B. Males only have one copy of the allele.
 - C. The Y chromosome is inactive.
 - D. No portion of the Y chromosome is homologous to the X chromosome.
17. In what order would the following techniques be used to diagnose and treat a patient showing a family history of a genetic disorder
- I. Polymerase chain reaction (PCR)
 - II. Isolation of a sample of DNA
 - III. DNA profiling
 - IV. Gene therapy
- A. I, II, III, IV
 - B. III, I, II, IV
 - C. II, I, III, IV
 - D. II, III, I, IV

18. What is the sequence used to clone farm animals?

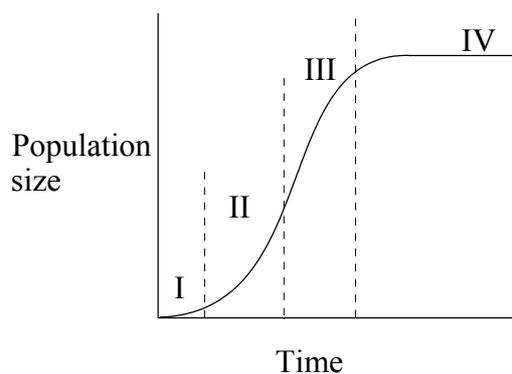
- I. Early embryo cells are separated.
- II. *In vitro* fertilisation.
- III. Zygote divides three times.
- IV. 8 cells develop into 8 embryos.

- A. I, II, III, IV
- B. II, I, III, IV
- C. I, IV, II, III
- D. II, III, I, IV

19. If natality exceeds mortality and immigration exceeds emigration, what will happen to the size of a population?

- A. It will grow
- B. It will decline
- C. It will stabilize
- D. More information is needed to compare the impact of migration relative to births and deaths

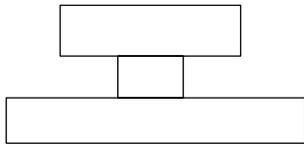
20. During which phase does a population reach the carrying capacity of the environment?



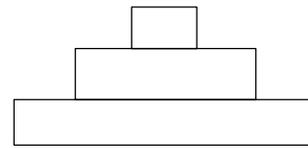
- A. I
- B. II
- C. III
- D. IV

21. Which diagram best illustrates the flow of energy through a community with **three** trophic levels?

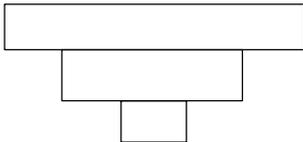
A.



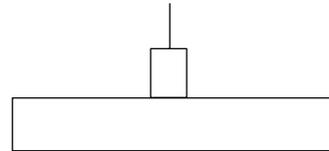
B.



C.



D.



22. What is the initial energy source for most biological communities?

- A. The soil
- B. The sun
- C. Plants
- D. Producers

23. Which trophic level in a community fixes light energy into chemical energy?

- A. Decomposers
- B. Producers
- C. Primary consumers
- D. Secondary consumers

24. In what form is energy finally released by most living communities?

- A. Light
- B. Heat
- C. Carbon dioxide
- D. Chemical

25. Which of the following activities would help to reduce global warming?
- A. Using gasoline as a fuel in cars
 - B. Using coal to generate electricity
 - C. Planting trees
 - D. Raising livestock for food
26. If the heart of a vertebrate is removed and placed in a solution of nutrients, it will continue to beat for many hours. Related to this, which of the following is true?
- A. The heart beat originates in the muscle cells of the heart.
 - B. The heart beat is independent of the endocrine system.
 - C. The heart beat is independent of the nervous system.
 - D. The beating of the heart after removal is caused by the nutrient solution.
27. What are the characteristic features of arteries?

	Blood pressure	Blood carried	Blood velocity
A.	High	Oxygenated	Fast
B.	Low	Deoxygenated	Slow
C.	High	Either oxygenated or deoxygenated	Fast
D.	Low	Either oxygenated or deoxygenated	Slow

28. Atherosclerosis is a condition where arteries become progressively blocked and lose their ability to stretch. Which of the following is **least** likely to occur as a result of this condition?
- A. Occasional reduced oxygen supply to the brain
 - B. A build up of metabolic waste products in the tissues
 - C. Higher blood pressure
 - D. Reduced blood flow to the heart
29. What is the first result of the mitotic divisions during early embryo development?
- A. The number of chromosomes per cell increases.
 - B. Each cell increases in size.
 - C. The amount of cytoplasm per cell decreases.
 - D. Growth in the size of the embryo.
30. What is the membrane that surrounds and protects the developing fetus called?
- A. The placenta
 - B. The uterus
 - C. The amnion
 - D. The oviduct
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