



BIOLOGY
STANDARD LEVEL
PAPER 1

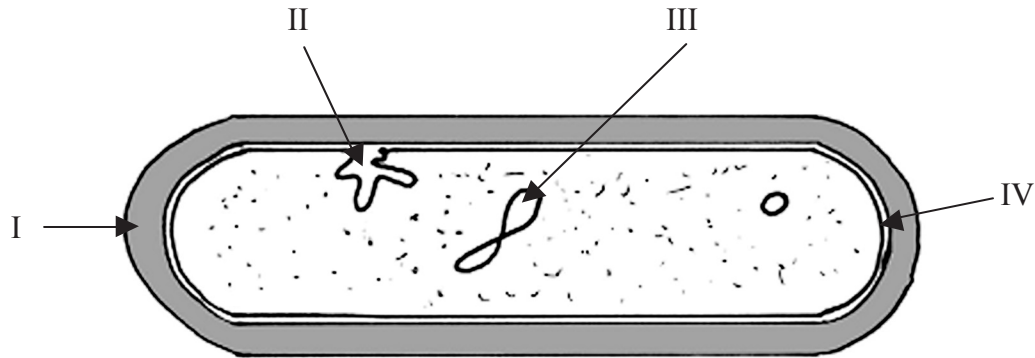
Thursday 4 May 2006 (afternoon)

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. Which of the labelled parts on the diagram of the prokaryote is the nucleoid?



- A. I
 - B. II
 - C. III
 - D. IV
2. How are all cells formed?
- A. By mitosis
 - B. By cell division
 - C. By meiosis
 - D. By fragmentation

3. Which pair of characteristics are correct for the cellular processes of exocytosis and endocytosis?

| | Exocytosis | Endocytosis |
|----|--|--|
| A. | Secretion of cellular materials | Vesicles are moved away from the plasma membrane |
| B. | Cell membranes fuse | Vesicles are moved towards the plasma membrane |
| C. | Infolding of plasma membrane | Vesicles are moved away from the plasma membrane |
| D. | Vesicles moved towards the plasma membrane | Plasma membrane increases in size |

4. Which of the following processes take place during interphase?

- I. Respiration
- II. Active transport
- III. Protein synthesis
- IV. Replication of DNA

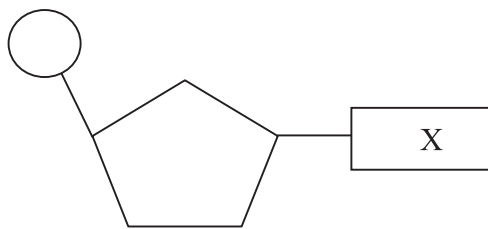
- A. I only
- B. I and II only
- C. I, II and III only
- D. I, II, III and IV

5. Which of the following is an important property of water for living organisms?

- A. Solute properties
- B. Source of energy
- C. Conductivity
- D. Thermal properties

6. What determines the specificity of an enzyme for its substrate?
- A. The temperature at which it is operating
 - B. The optimum pH of the enzymes
 - C. The concentration of the substrate
 - D. The structure of the enzyme molecule

7. The diagram below represents a DNA nucleotide. What could the part labelled X represent?



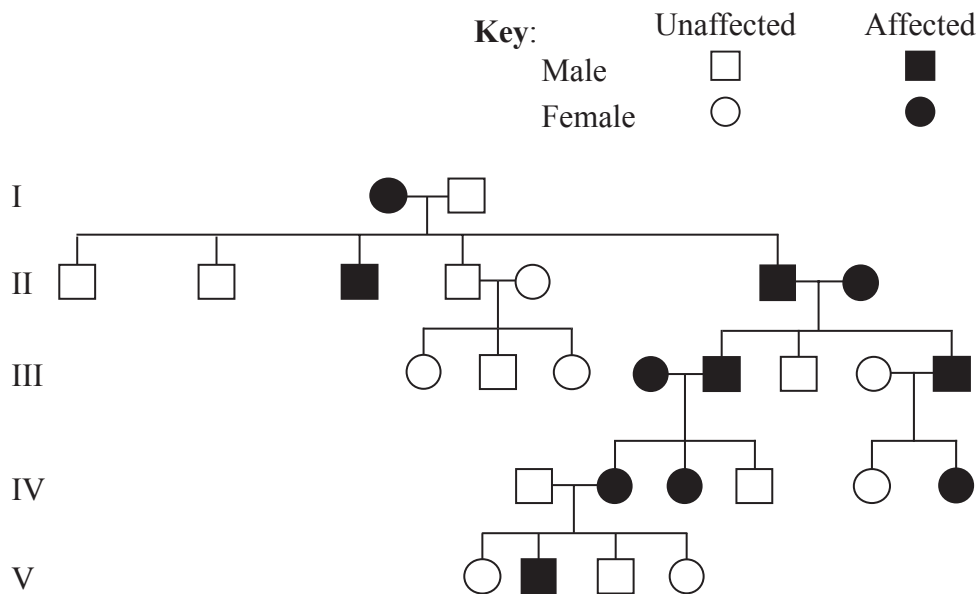
- A. Ribose
 - B. Uracil
 - C. Guanine
 - D. Phosphate
8. In the structure of DNA what binds with cytosine?
- A. Deoxyribose
 - B. Ribose
 - C. Thymine
 - D. Adenine

9. During aerobic respiration in the cytoplasm of a muscle cell what does glucose produce?
- I. Pyruvate
 - II. CO₂
 - III. ATP
 - IV. Lactic acid
- A. I and II only
- B. I and III only
- C. II and III only
- D. II and IV only
10. What would be the effect of increasing temperature on the rate of photosynthesis in a green plant?
- A. It increases constantly.
- B. It increases up to a point and then remains constant.
- C. It increases up to a point and then decreases.
- D. It remains constant.
11. What are the chromosomes of fungi made of?
- A. DNA only
- B. DNA and protein only
- C. DNA and RNA only
- D. DNA, RNA and protein

12. What is a sex-linked gene?
- A. A gene whose locus is on the X chromosome only.
 - B. A gene whose locus is on the X or Y chromosomes.
 - C. A gene whose locus is on the both X and Y chromosomes.
 - D. A gene whose locus is on the Y chromosome only.

13. What happens during the first division of meiosis?
- A. Alleles for a gene are separated.
 - B. Identical haploid cells are formed.
 - C. Diploid cells showing genetic variation are formed.
 - D. Alleles for a gene fuse.

14. The pedigree chart below shows the inheritance of a genetic disease in a family. What is the nature of the allele that causes this disease?

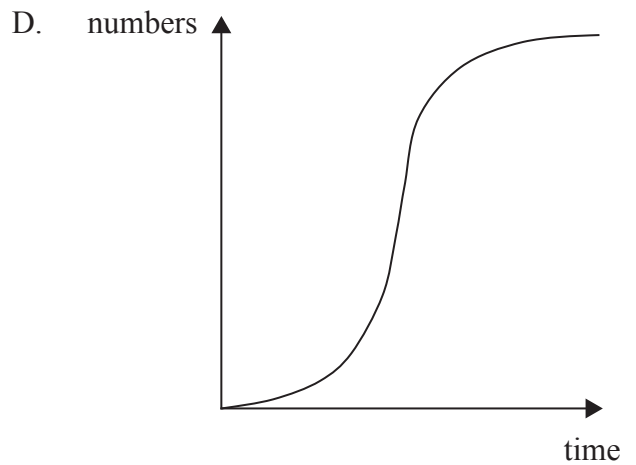
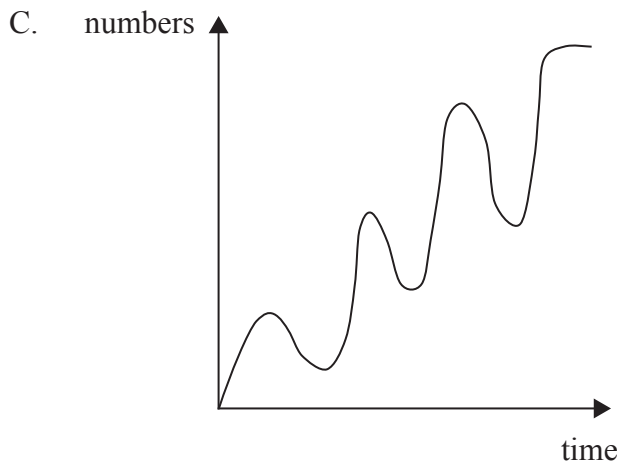
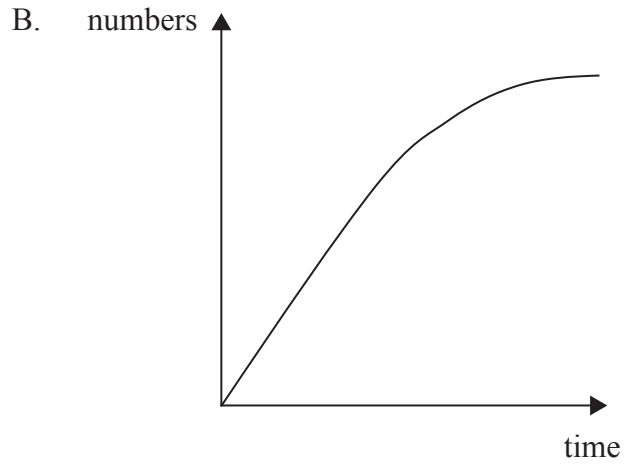
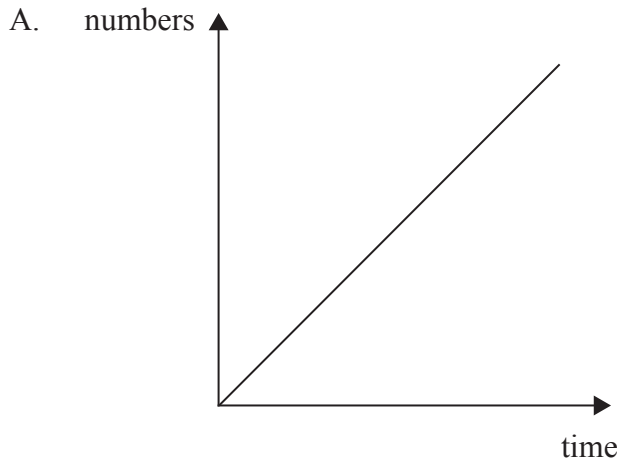


- A. Dominant and sex linked
- B. Dominant and non-sex linked
- C. Recessive and sex linked
- D. Recessive and non-sex linked

15. What permits gel electrophoresis to separate fragments of DNA?
- A. Differences in the sizes of DNA fragments only
 - B. The number of negative charges on the fragments only
 - C. The net charge (negative or positive) on the fragments only
 - D. The size and the net charge (positive or negative) on the fragments
16. Which characteristics are used to identify chromosomes when constructing a karyotype?
- I. The length of the chromosome.
 - II. The position of the centromere on the chromosome.
 - III. The pattern of bands on the chromosome.
 - IV. The position of the chromosome on the spindle.
- A. I only
 - B. I and II only
 - C. I, II and III only
 - D. I, II, III and IV
17. What is a foodweb?
- A. A diagram which shows the interactions between members of a population.
 - B. A diagram which shows the interactions between ecosystems.
 - C. A diagram which shows the interactions between a community of species.
 - D. A diagram which shows the interactions between the abiotic factors.

- 18.** Tropical savannah is where large herds of herbivores live. It has been estimated that this ecosystem could be covered in a layer of animal faeces 5 cm thick in 24 hours. What stops this happening?
- A. The faeces are broken down by decomposers.
 - B. Heavy rainfall washes it away.
 - C. The faeces are absorbed by the vegetation.
 - D. Local farmers collect it to use as a fertilizer.
- 19.** When estimating the size of a plant population in an area a random sample is often used. What is a random sample?
- A. A sampling method that covers every part of the area being investigated.
 - B. A sampling method that ensures that each part of the area being sampled has an equal chance of being measured.
 - C. A sampling method that systematically visits evenly spaced sites in the area being investigated.
 - D. A sampling method that only visits the parts of the area where the species is growing.

20. Which graph below best predicts the change in numbers of a population which arrives in an unoccupied habitat?



21. In the binomial system of nomenclature which two names are used to identify a type of organism?

| | | |
|----|--------|---------|
| A. | Family | Species |
| B. | Genus | Species |
| C. | Family | Genus |
| D. | Genus | Order |

22. Which human activities may increase or decrease the greenhouse effect?

| | Increases greenhouse effect | Decreases greenhouse effect |
|----|------------------------------------|------------------------------------|
| A. | Deforestation | More use of fossil fuels |
| B. | Reforestation | More use of solar power |
| C. | Less use of air conditioning | Less use of public transport |
| D. | More cattle farming | Reforestation |

23. Which of the following molecules does not need digesting?

- A. Ribose
- B. Polynucleotides
- C. Polypeptides
- D. Disaccharides

24. What are the characteristics of blood flowing in arteries and veins?

| | Arteries | Veins |
|----|-------------------|----------------|
| A. | Slow velocity | Fast velocity |
| B. | High pressure | Low pressure |
| C. | Deoxygenated | Oxygenated |
| D. | Greater than 37°C | Less than 37°C |

25. *Plasmodium vivax* is one of the protozoans that causes malaria. Malaria kills over 2 million people each year. What is this protozoan?
- A. A pathogen
 - B. An antigen
 - C. A fibrinogen
 - D. A mutagen
26. What makes the skin a barrier to infectious diseases?
- A. Impermeable cells which are frequently replaced.
 - B. Patrolling phagocytes.
 - C. Cells coated in antibody molecules.
 - D. Cells which secrete lysozyme enzyme.
27. Which is the correct sequence of events during the phagocytosis of a bacterium by a leucocyte?
- I. Food vacuole forms
 - II. Plasma membrane receptors detect antigen on the surface of the bacterium
 - III. Lysosomes fuse with the food vacuole
 - IV. Engulfs bacterium
- A. II → I → IV → III
 - B. II → I → III → IV
 - C. II → IV → I → III
 - D. I → II → IV → III

28. What conditions are necessary for air to be exhaled from the lungs?
- A. Air pressure in the alveoli must become greater than the air pressure in the mouth.
 - B. Air pressure in the alveoli must become lower than the air pressure in the mouth.
 - C. Air pressure in the alveoli must become the same as the air pressure in the mouth.
 - D. There is no change in the air pressure of the alveoli or the mouth.
29. Under what conditions is glucagon secretion increased?
- A. After fasting for a long period
 - B. While resting
 - C. After a meal rich in carbohydrates
 - D. When the temperature falls
30. What changes will take place in the composition of urine produced on a hot summer's day after playing sports for an hour?

| | Volume of urine flow | Salt excretion | Urea concentration |
|----|-----------------------------|-----------------------|---------------------------|
| A. | Decreases | Increases | Increases |
| B. | Decreases | Decreases | Increases |
| C. | Increases | Increases | Increases |
| D. | Decreases | Increases | Decreases |
