



88056004

**BIOLOGY**  
**STANDARD LEVEL**  
**PAPER 1**

Thursday 10 November 2005 (afternoon)

45 minutes

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**INSTRUCTIONS TO CANDIDATES**

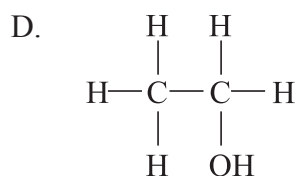
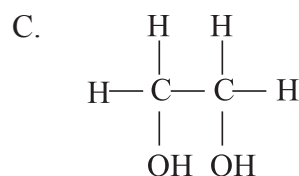
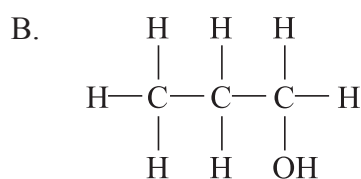
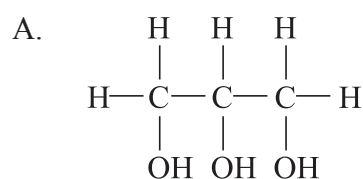
- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.

1. Which functions of life are carried out by unicellular organisms?
  - A. Nutrition but not reproduction
  - B. Nutrition and reproduction, but not excretion
  - C. Nutrition, reproduction and excretion but not transmission of nerve impulses
  - D. Nutrition, reproduction, excretion and transmission of nerve impulses
  
2. What is a function of the bacterial cell wall?
  - A. Absorption of glucose by active transport
  - B. Exchange of plasmids between cells
  - C. Increasing the surface area for oxygen diffusion
  - D. Preventing internal pressures from bursting the cell
  
3. What is a difference between prokaryotic and eukaryotic cells?
  - A. DNA in eukaryotes is associated with protein but in prokaryotes it is not.
  - B. Prokaryotic cells respire anaerobically using mitochondria but eukaryotic cells do not.
  - C. Prokaryotic cells have 80S ribosomes whereas eukaryotic cells have 70S ribosomes.
  - D. Eukaryotic cells have enzymes in their cytoplasm but prokaryotic cells do not.
  
4. Colchicine is a chemical substance that prevents the formation of microtubules. What stage of mitosis would be prevented, if dividing cells were treated with colchicine?
  - A. Breaking down of the nuclear membrane
  - B. Replication of DNA
  - C. Separation of genetically identical chromosomes (chromatids)
  - D. Supercoiling of chromosomes

5. What is a consequence of hydrogen bonding **between** water molecules?

- A. Water is able to evaporate easily.
- B. Water is transparent.
- C. Water can dissolve carbohydrates, lipids and proteins.
- D. Ice melts and water boils at relatively high temperatures.

6. Which is the structure of glycerol?



7. Which substance is a base that is found in DNA?

- A. Adenosine
- B. Cytokinin
- C. Guanine
- D. Uracil

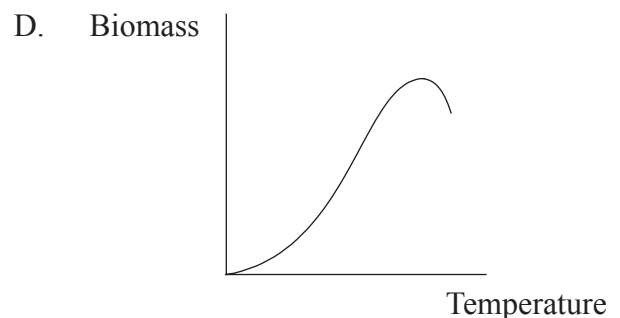
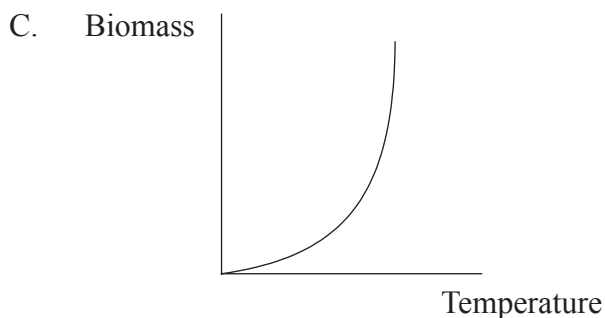
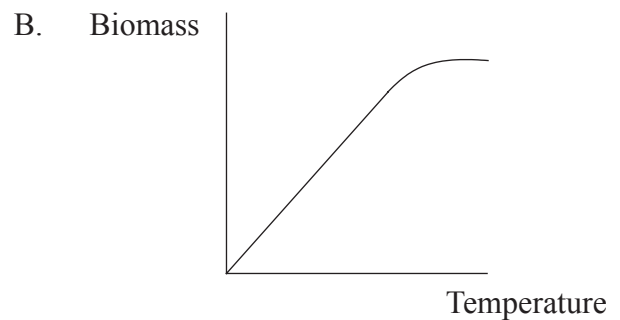
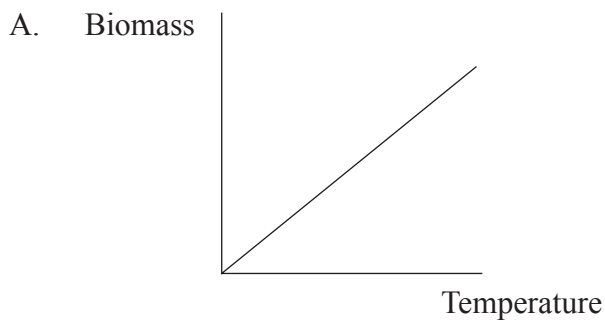
8. Which two processes involve the unwinding (uncoiling) of the DNA double helix and its separation into two strands of nucleotides?

- A. Replication and telophase of mitosis
- B. Telophase of mitosis and translation
- C. Translation and transcription
- D. Transcription and replication

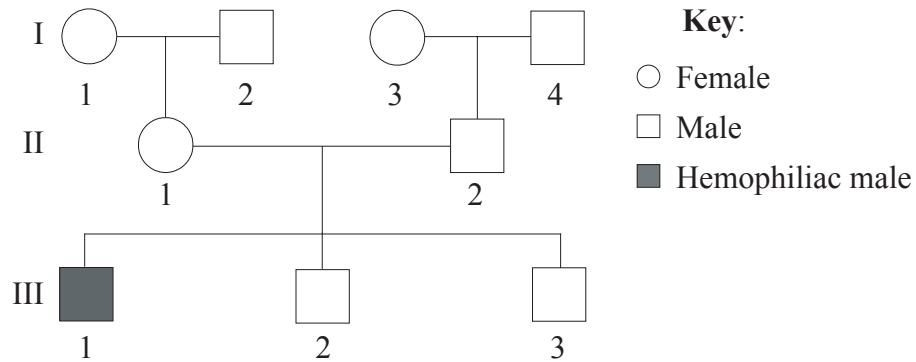
9. What is a possible consequence of two base substitution mutations occurring in the same gene?
- A. Two amino acids coded for by the gene are changed.
  - B. Amino acids in two polypeptides coded for by the gene are changed.
  - C. All of the codons between the two mutations are changed.
  - D. All of the codons from the first mutation onward are changed.
10. Aerobic respiration involves conversion of glucose into pyruvate and conversion of pyruvate into carbon dioxide and water. Where do these processes occur in a eukaryotic cell?

	Where glucose is broken down into pyruvate	Where pyruvate is broken down into carbon dioxide and water
A.	Cytoplasm	Cytoplasm
B.	Cytoplasm	Mitochondrion
C.	Mitochondrion	Cytoplasm
D.	Mitochondrion	Mitochondrion

11. If identical batches of plants are grown at different temperatures and then harvested to measure the increase in biomass, which graph shows the expected relationship between the temperature and the biomass?



12. If a person inherited an allele with the same base substitution mutation from both parents, what sequences could be altered from normal in the person's cells.
- A. One mRNA base sequence only
  - B. Two mRNA base sequences only
  - C. One mRNA base sequence and one polypeptide amino acid sequence only
  - D. Two mRNA base sequences and two polypeptide amino acid sequences only
13. What is Mendel's Law of Segregation?
- A. Alleles of a gene become separated from each other during gamete formation.
  - B. The number of chromosomes in a cell is halved during meiosis.
  - C. Male and female gametes are kept apart at the time of fertilization.
  - D.  $F_1$  and  $F_2$  plants must be grown separately during crossing experiments.
14. Hemophilia is caused by an X-linked recessive allele. In the pedigree shown below which **two** individuals in the pedigree must be carriers of hemophilia?



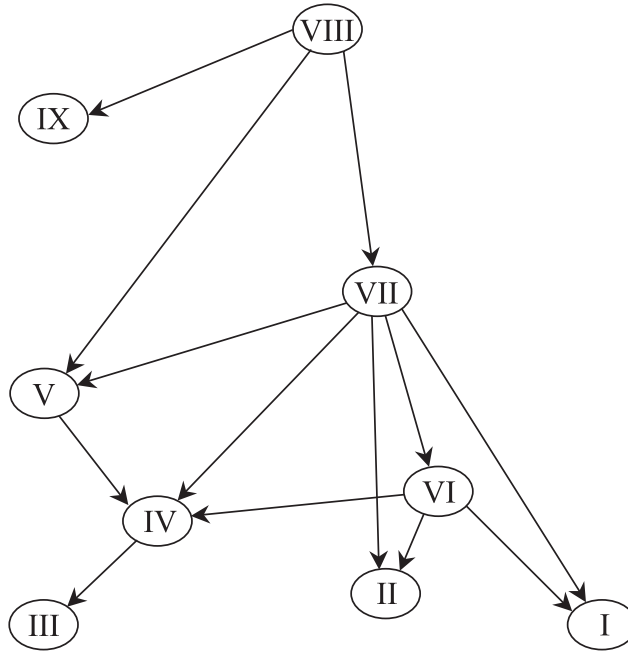
- A. I-1 and II-1
- B. I-4 and II-2
- C. II-1 and II-2
- D. III-2 and III-3

15. A single gene in humans causes blood to be either rhesus positive (dominant allele) or rhesus negative (recessive allele). A woman with rhesus negative blood has already had a child with rhesus positive blood. There could be complications during pregnancy if she has another child with rhesus positive blood.

What is the probability of this, if the father is the same, and if his mother is known to have rhesus negative blood?

- A. 25 %
  - B. 50 %
  - C. 75 %
  - D. 100 %
16. DNA profiling involves the technique of gel electrophoresis. What is separated by this technique?
- A. Plasmids from different bacteria
  - B. Chromosomes of different types
  - C. Pieces of DNA of different length
  - D. Mixtures of DNA and protein
17. What features must a group of humans have for them to be described as a clone?
- I. Identical genes
  - II. Identical intelligence
  - III. Identical behaviour
- A. I only
  - B. I and II only
  - C. I and III only
  - D. I, II and III

18. The diagram below is a simplified version of a food web from Chesapeake Bay. The arrows indicate the direction of energy flow and the numbers indicate species within the food web.



At which trophic level or levels does species II function?

- A. 2nd and 3rd consumer
  - B. 3rd consumer
  - C. 3rd and 4th consumer
  - D. Producer
19. What is an advantage of estimating plant populations by random sampling using quadrats?
- A. Accurate estimates can be obtained more quickly than if every plant in the population is counted.
  - B. Random samples can be taken from the most convenient parts of the habitat.
  - C. Numbers of plants in each quadrat can be estimated quickly.
  - D. Marking and recapture of plants is not necessary.

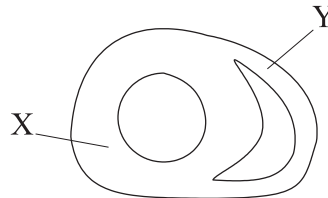
20. The percentage of bacteria showing antibiotic resistance in *Neisseria gonorrhoeae* and other species of disease-causing bacteria has risen considerably since antibiotics were introduced. What has caused this increase?
- A. When a bacterium detects an antibiotic, it changes its metabolism so that it becomes resistant.
  - B. When people do not complete courses of antibiotic, bacteria that were partly resistant become more resistant.
  - C. When a bacterium is treated with an antibiotic, it increases its resistance to the antibiotic and passes on increased resistance to its offspring.
  - D. When an antibiotic is used, only bacteria that are resistant to it survive and these bacteria pass on resistance to their offspring.
21. *Parus major* is a species of bird which is widely distributed throughout Europe and Asia. If a population of this species migrated to a small, isolated island and over many generations became a different species, what would be a suitable name?
- A. *Parus majorette*
  - B. *Imparus major*
  - C. *Imparus minor*
  - D. *Parus major insulae*
22. Attempts are being made in some countries to reduce the impact of global warming in the future by building wind turbines for electricity generation. How could wind turbines reduce the impact of global warming?
- A. Wind is a renewable resource.
  - B. Wind turbines have a cooling effect.
  - C. Less fossil fuel needs to be burned to generate electricity.
  - D. Wind turbines disperse greenhouse gases and so reduce the greenhouse effect.



23. What sequence of organs do substances pass through, as they move through the human digestive system?

- A. mouth → stomach → pancreas → small intestine → liver → large intestine → anus
- B. mouth → stomach → small intestine → pancreas → liver → large intestine → anus
- C. mouth → esophagus → stomach → small intestine → large intestine → anus
- D. mouth → esophagus → stomach → large intestine → small intestine → anus

24. The diagram below shows a section through the lower part of the heart, with two of the heart's four chambers visible.



Labels X and Y show the walls of two chambers of the heart. Which two chambers are they?

	X	Y
A.	Right ventricle	Right atrium
B.	Left atrium	Right atrium
C.	Left ventricle	Right ventricle
D.	Right ventricle	Left ventricle

25. AIDS has developed in a wide variety of people. What factor links all of these people?

- A. They are from economically deprived areas.
- B. HIV is present in their blood system.
- C. They have had more than one sexual partner.
- D. They have touched someone infected with HIV.

26. How do skin and mucous membranes act as barriers to infection?

	<b>Skin</b>	<b>Mucous membranes</b>
A.	Skin is tough and forms an effective physical barrier.	Mucous membranes are thick and elastic so pathogens are repelled.
B.	Phagocytes on the skin surface trap pathogens.	Mucus is moved out of the body by the beating of hair-like cilia.
C.	Skin is tough and forms an effective physical barrier.	Pathogens are trapped by sticky mucus.
D.	Phagocytes on the skin surface trap pathogens.	The acidity of mucus kills harmful bacteria.

27. Arterioles in the skin contain muscle fibres which contract. What is the function of these fibres?

- A. To move capillaries further from the skin when the body is too cold
- B. To reduce blood flow to the skin when the body is too cold
- C. To move capillaries closer to the skin when the body is too warm
- D. To increase blood flow to the skin when the body is too warm

28. What is the importance of excretion to a living organism?

- A. It prevents waste products from accumulating in the environment around the organism.
- B. It ensures that recycling of nitrogen continues in the organism's ecosystem.
- C. It prevents feces from accumulating in the digestive system of the organism.
- D. It ensures that the organism is not poisoned by its own waste products.

29. In the menstrual cycle in humans, which hormone causes the wall of the follicle to develop after ovulation and to secrete more progesterone?
- A. Estrogen
  - B. FSH
  - C. LH
  - D. Oxytocin
30. How does the amniotic fluid help the fetus during pregnancy?
- I. Supplies food to allow the fetus to grow rapidly
  - II. Supports the fetus so that no part of it is under excess pressure
  - III. Protects the fetus by acting as a shock absorber
- A. I and II only
  - B. I and III only
  - C. II and III only
  - D. I, II and III
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