

**BIOLOGY
STANDARD LEVEL
PAPER 1**

Tuesday 11 May 2004 (afternoon)

45 minutes

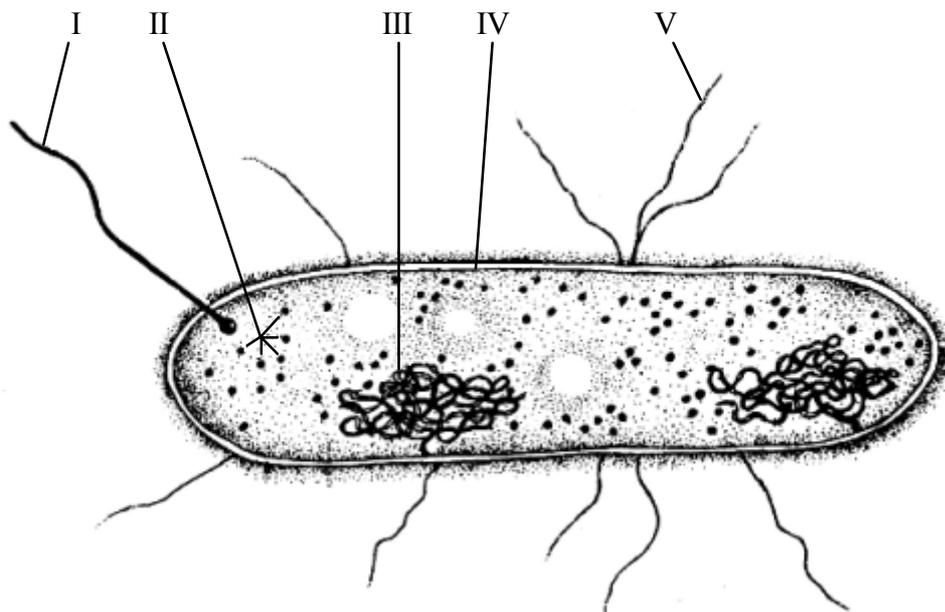
INSTRUCTIONS TO CANDIDATES

- 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 the term used to describe the minimum distance that two points can be distinguished as separate?
 - A. Compound
 - B. Magnification
 - C. Resolution
 - D. Nanometre

2. In which list are the items correctly ordered, from smallest to largest?
 - A. molecules, membrane thickness, viruses, bacteria
 - B. molecules, viruses, bacteria, membrane thickness
 - C. cells, viruses, organelles, membrane thickness
 - D. cells, organelles, viruses, membrane thickness

The following diagram of a prokaryote refers to questions 3 and 4.

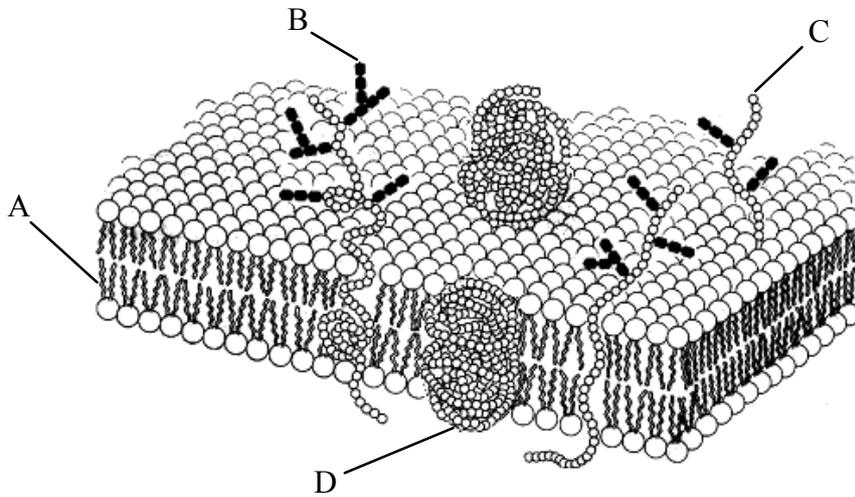


3. What is the function of structure II?
 - A. Passing of hereditary information to offspring
 - B. Movement of the organism
 - C. Regulation of the entry and exit of materials
 - D. Production of proteins

4. Which structures are found in **all** eukaryotic and prokaryotic cells?

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

5. Which structure may require ATP for its functioning?



6. Which feature does mitosis and meiosis have in common?

- A. Halving the chromosomes number from parent to daughter cell
- B. Splitting of centromeres
- C. Production of identical daughter cells
- D. A role in asexual reproduction

7. Which feature of water determines its solvent properties?

- A. Peptide bonds
- B. Hydrophobic interactions
- C. Ionic bonds
- D. Polarity

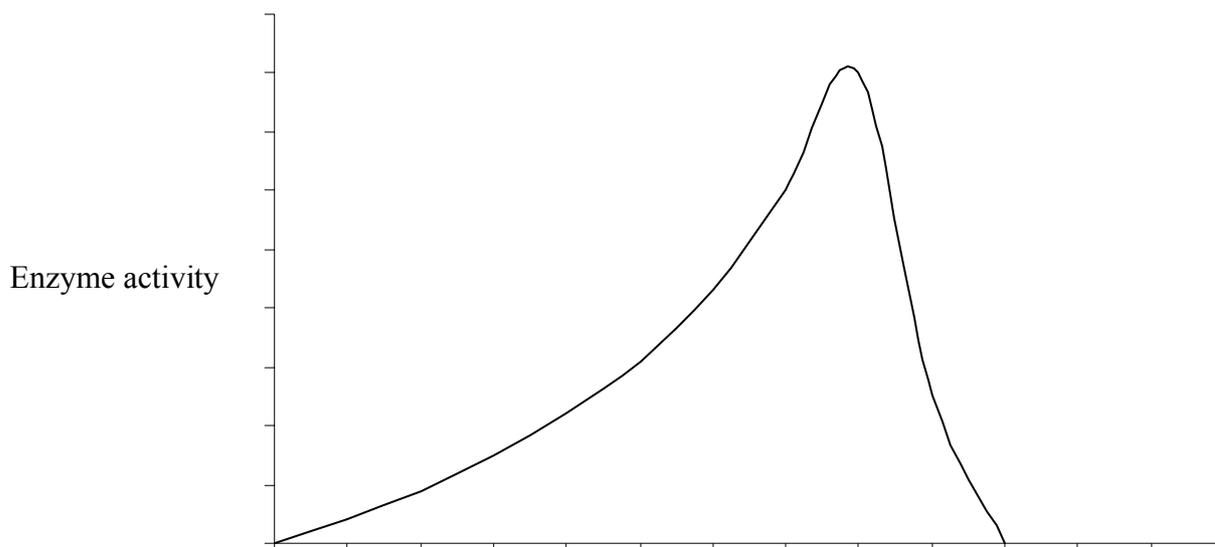
8. Which statement about atoms and ions is correct?
- A. Atoms are charged ions.
 - B. Ions are atoms or groups of atoms that are charged.
 - C. Neither atoms nor ions are charged.
 - D. Atoms can only be made from ions.
9. Which function(s) is/are carried out by lipids?
- I. Long-term energy storage
 - II. Active transport across membranes
 - III. Catalysing chemical reactions in the cell
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II and III
10. What is the enzyme that is used in commercial fruit juice production?
- A. Catalase
 - B. Helicase
 - C. Pectinase
 - D. Polymerase

11. Which statement(s) is/are correct regarding DNA and RNA nucleotides?

- I. Both consist of a sugar, phosphate and base.
- II. They have three bases in common.
- III. They contain the same type of sugar.

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

12. The graph below illustrates the effect of a factor on enzyme activity.

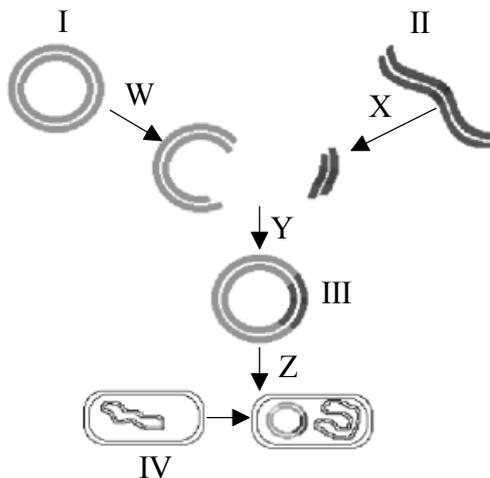


Which factor is most likely to have produced the graph illustrated?

- A. Time
- B. Substrate concentration
- C. Product concentration
- D. Temperature

13. What is the name given to the process of arranging chromosomes in pairs according to their structure?
- A. DNA profiling
 - B. Constructing a pedigree
 - C. Karyotyping
 - D. Phenotyping
14. What fact helped to explain Mendel's law of segregation?
- A. Dominance
 - B. Gametes
 - C. Mitosis
 - D. Meiosis
15. A gene has one dominant and one recessive allele. If two organisms heterozygous for this characteristic are crossed, what is the chance of the offspring having characteristics other than those of the parents?
- A. 0 %
 - B. 25 %
 - C. 75 %
 - D. 100 %
16. A couple have children of blood type O, AB and A. What are the genotypes of the couple?
- A. $I^A I^B$ and ii
 - B. $I^A I^B$ and $I^A I^B$
 - C. $I^A i$ and $I^B i$
 - D. $I^A I^A$ and $I^B I^B$

The following diagram illustrates gene transfer and refers to questions 17 and 18.



17. At which step(s) are restriction enzymes (endonucleases) employed?

- A. W only
- B. X only
- C. W and X only
- D. Y and Z only

18. Which structure is a recombinant plasmid?

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

19. Which organisms externally digest dead organic matter and then absorb the nutrients?

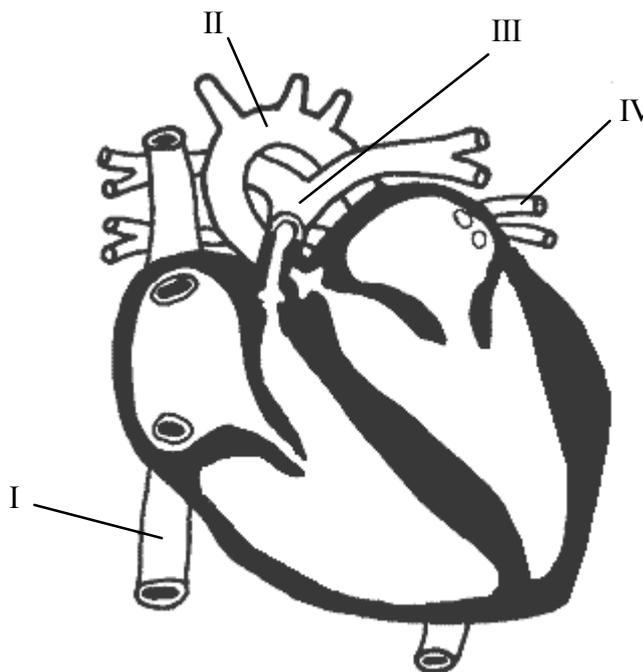
- A. Autotrophs
- B. Saprotrophs
- C. Heterotrophs
- D. Detritivores

20. What information is required in order to estimate a population using the capture-mark-release-recapture method?
- I. Number of individuals originally caught, marked and released
 - II. Number of individuals caught in a second sample
 - III. Number of individuals marked in the second sample
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II and III
21. Which factor(s) is/are essential for evolution to occur within a population?
- I. Inheritance of characteristics
 - II. Variation in the population
 - III. Natural selection
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II and III
22. Which series of groups contains organisms with increasing diversity?
- A. species → genus → family → order
 - B. phylum → order → family → genus
 - C. kingdom → genus → species → family
 - D. genus → family → order → species

23. Which of the following is correct regarding the enzymes listed in the table?

		Enzyme		
		Amylase	Lipase	Protease
A.	Substrate	polysaccharide	emulsified fat	dipeptide or polypeptide
B.	Substrate	emulsified fat	dipeptide or polypeptide	polysaccharide
C.	Product	amino acids	small polysaccharides or monosaccharides	fatty acids and glycerol
D.	Product	small polysaccharides or monosaccharides	amino acids	fatty acids and glycerol

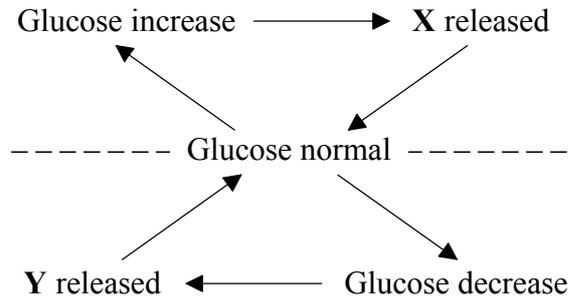
24. What are the vessels labelled in the diagram below?



	I	II	III	IV
A.	vena cava	aorta	pulmonary artery	pulmonary vein
B.	vena cava	aorta	pulmonary vein	pulmonary artery
C.	pulmonary vein	pulmonary artery	aorta	vena cava
D.	vena cava	pulmonary artery	aorta	pulmonary vein

25. How does the skin defend the body against pathogens?
- A. It is a physical barrier
 - B. It produces platelets
 - C. It ingests pathogens
 - D. It releases antibodies
26. What is the long-term effect of AIDS on the immune system?
- A. The number of lymphocytes is reduced
 - B. The number of lymphocytes is increased
 - C. The body loses its ability to produce antigens
 - D. The body loses its ability to produce platelets
27. Which action causes inspiration (breathing in)?
- A. The pressure of the chest cavity increasing
 - B. The volume of the chest cavity decreasing
 - C. The diaphragm relaxing
 - D. The external intercostal muscles contracting

28. The diagram shows how the body regulates glucose levels in the blood.



What is Y?

- A. Amylase
 - B. Insulin
 - C. Glucagon
 - D. Glycogen
29. What is the hollow ball of cells that is implanted in the human uterus following fertilization?
- A. Amniotic sac
 - B. Blastocyst
 - C. Fetus
 - D. Zygote
30. What is the process of removal of fluid from the area around the fetus using a hypodermic needle and syringe?
- A. Amniocentesis
 - B. Gene therapy
 - C. Induction
 - D. *In vitro* fertilization (IVF)