



**BIOLOGY
STANDARD LEVEL
PAPER 1**

Wednesday 6 May 2009 (afternoon)

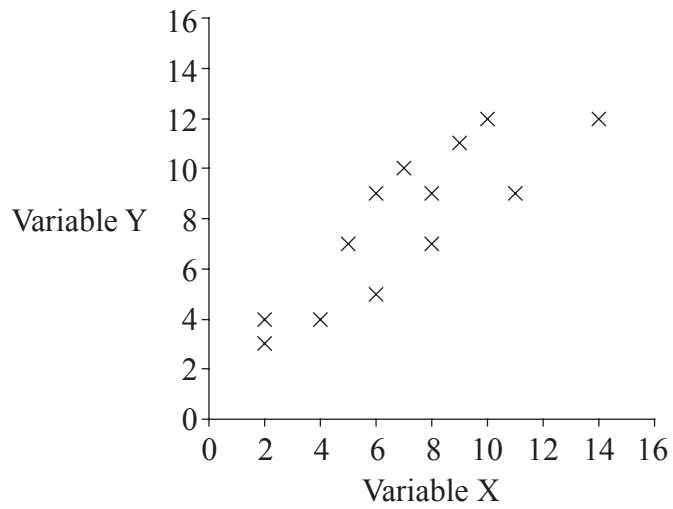
45 minutes

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.

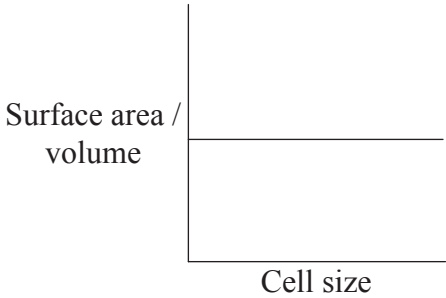
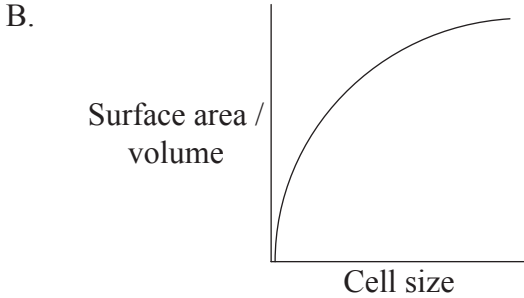
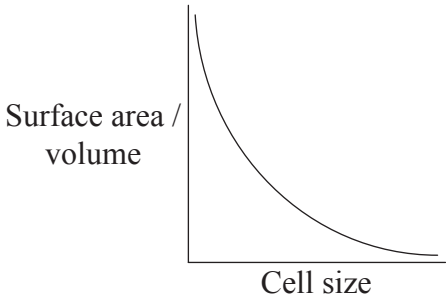
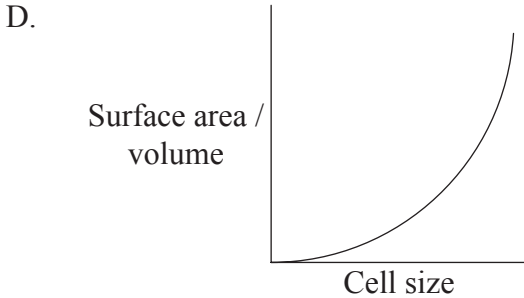


1. What does the following scatter graph show?



- A. No correlation between these variables
- B. Strong positive correlation between these variables
- C. Strong negative correlation between these variables
- D. Weak negative correlation between these variables

2. How does the surface area to volume ratio change with an increase in cell size?

- A. 
- B. 
- C. 
- D. 

3. How do prokaryotic cells divide?
- A. By mitosis
 - B. By meiosis
 - C. By budding
 - D. By binary fission
4. What can the extracellular matrix of cells be made of?
- I. Polysaccharide
 - II. Glycoprotein
 - III. Phospholipid
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II and III
5. During which phase of the cell cycle do chromosomes duplicate?
- A. G_1
 - B. S
 - C. G_2
 - D. Mitosis

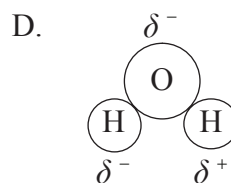
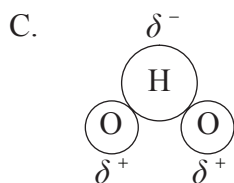
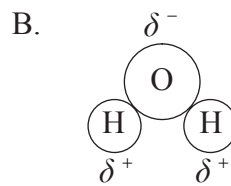
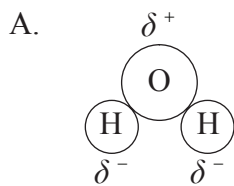
6. What is the difference between simple diffusion and facilitated diffusion?

	Simple diffusion	Facilitated diffusion
A.	Rate decreases with increasing concentration gradient	Rate increases with increasing concentration gradient
B.	Faster movement of molecules	Slower movement of molecules
C.	Always involves a membrane	Never involves a membrane
D.	Uses any part of a membrane	Uses channels in the membrane

7. Which of these processes require mitosis?

- A. Embryological development
- B. Reducing surface area to volume ratio
- C. Maintaining cell size
- D. Cell growth

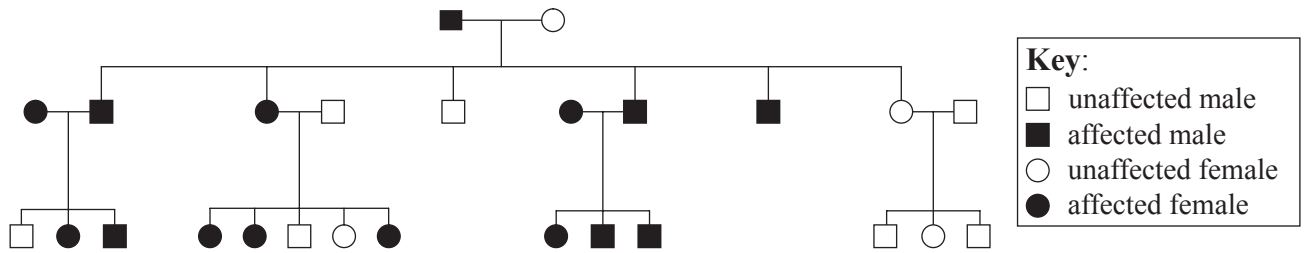
8. Which diagram represents the polarity of a water molecule?



9. Which of these molecules is a disaccharide?
- A. Galactose
 - B. Sucrose
 - C. Cellulose
 - D. Ribose
10. What is a codon?
- A. A sequence of nucleotides on rRNA that corresponds to an amino acid
 - B. A sequence of nucleotides on mRNA that corresponds to an amino acid
 - C. A sequence of nucleotides on tRNA that corresponds to an amino acid
 - D. A sequence of nucleotides on DNA that corresponds to an amino acid
11. What happens as an enzyme becomes denatured?
- A. The enzyme works faster.
 - B. The enzyme works slower.
 - C. The enzyme can perform a new role.
 - D. The enzyme can make the reverse reaction proceed faster.
12. What happens during the pathway of glycolysis?
- A. Glucose is broken down into pyruvate.
 - B. Carbon dioxide is produced.
 - C. More ATP is consumed than is produced.
 - D. Lactic acid is produced.

13. What is light energy used for during photosynthesis?
- A. To produce carbon dioxide
 - B. To produce water molecules
 - C. To produce ATP
 - D. To break down sugar molecules
14. What is the set of alleles that an individual possesses?
- A. A gene
 - B. A genotype
 - C. A genome
 - D. A genus
15. Which phase of cell division is photographed in order to make a karyotype?
- A. Anaphase of mitosis
 - B. Anaphase I of meiosis
 - C. Metaphase of mitosis
 - D. Metaphase II of meiosis

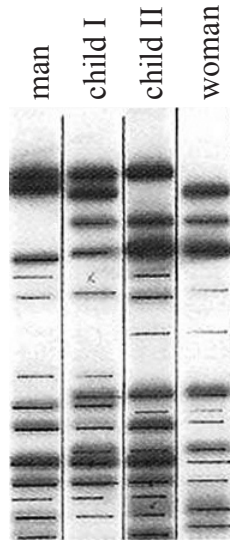
16. What evidence is given in the pedigree chart below to establish that the condition is caused by a dominant allele?



- A. Two unaffected parents have unaffected children.
 - B. Two affected parents have affected children.
 - C. An affected parent and an unaffected parent have affected children.
 - D. Two affected parents have an unaffected child.
17. Which process is used in polymerase chain reaction (PCR)?

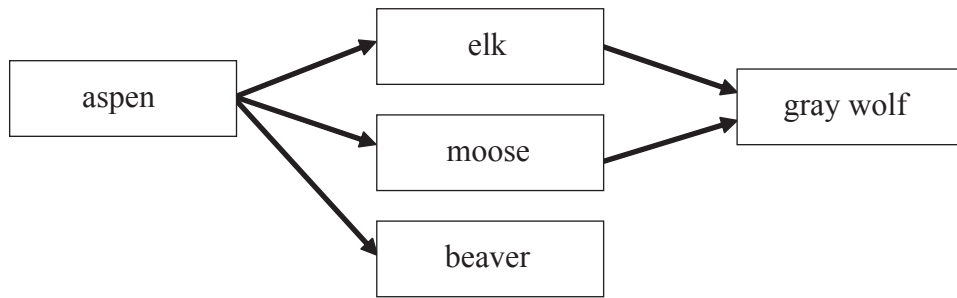
- A. Transcription
- B. Translation
- C. Replication
- D. Mutation

18. What conclusion can be made from the following evidence from an analysis of DNA fragments?



- A. Both children are related to both parents.
- B. Child I is related to the man but child II is not.
- C. Both children are unrelated to either of the parents.
- D. Child II is related to the man but child I is not.

19. The following diagram shows part of a food web from Yellowstone Park.



What would be the short-term effects on the populations of the other species if the gray wolf were exterminated?

	Beaver	Moose	Elk	Aspen
A.	Increase	Decrease	Increase	Increase
B.	Decrease	Decrease	Decrease	Decrease
C.	Increase	Increase	Decrease	Increase
D.	Decrease	Increase	Increase	Decrease

20. Slime moulds (*Acrasiomycota*) are protocists. They feed on decaying organic matter, bacteria and protozoa.

Which of the terms describes their nutrition?

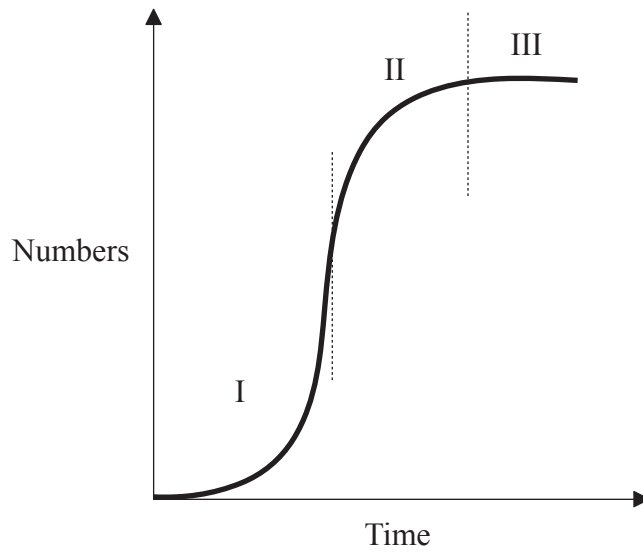
- I. Detritivore
 - II. Autotroph
 - III. Heterotroph
- A. I only
 - B. I and II only
 - C. I and III only
 - D. I, II and III

- 21.** Why do food chains in an ecosystem rarely contain more than five organisms?
- A. Nutrients are recycled by the decomposers back to the producers.
 - B. Nutrients are lost from the ecosystem when organisms die.
 - C. The conversion of food into growth by an organism is not very efficient.
 - D. Energy is recycled by the decomposers back to the producers.
- 22.** Several greenhouse gases occur in the atmosphere. Carbon dioxide (CO_2) is one of them but so are methane (CH_4) and oxides of nitrogen (NO_x).

Why are oxides of nitrogen classed as greenhouse gases?

- A. They trap some of the long-wave radiation emitted by the Earth's surface.
- B. They prevent short-wave radiation from reaching the Earth's surface.
- C. They dissolve in rainwater to produce acid rain.
- D. They are only produced by human activity whereas CO_2 and CH_4 are also produced naturally.

23. Population growth, as shown by the curve below, is the result of changes in mortality, natality, immigration and emigration. Which of the following statements about population growth is correct?



- A. In phase I there is no mortality.
 - B. In phase II mortality equals natality and immigration equals emigration.
 - C. In phase II mortality and emigration are less than natality and immigration.
 - D. In phase III mortality and emigration are less than natality and immigration.
24. Which of the organisms A–D, identified by the key below, represents an Annelid?

1. Shows bilateral symmetry	go to 2
Does not show bilateral symmetry	Cnidaria
2. Has a segmented body	go to 3
Does not have a segmented body	go to 4
3. Has jointed legs	A
Does not have jointed legs	B
4. Has a shell	C
Does not have a shell	D

25. Which of the following parts of the digestive system secrete proteases?

	Stomach	Small Intestine	Large Intestine
A.	Yes	Yes	Yes
B.	Yes	No	Yes
C.	Yes	No	No
D.	No	No	No

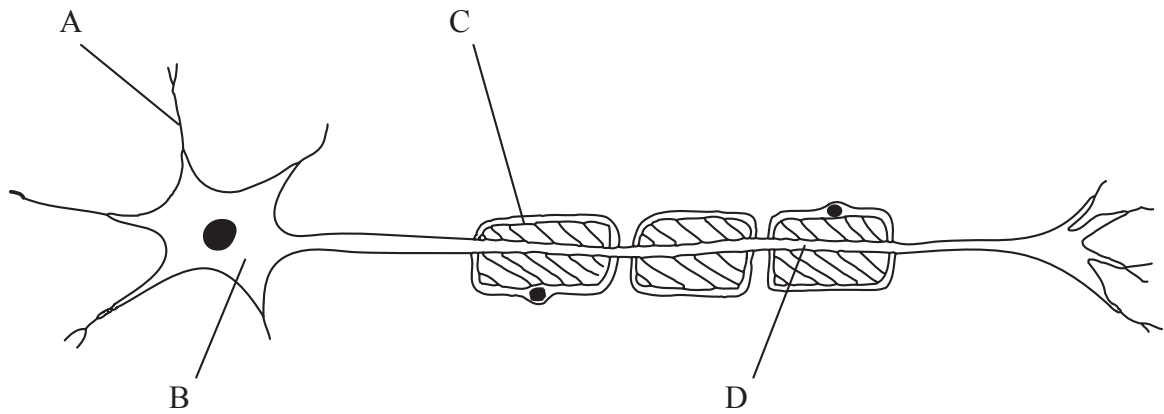
26. Why are antibiotics effective against bacteria but not viruses?

- A. Viruses can hide inside host cells.
- B. Bacteria are recognized as pathogens but viruses are not.
- C. The enzymes of bacteria can be inhibited by antibiotics.
- D. Viruses are resistant to antibiotics.

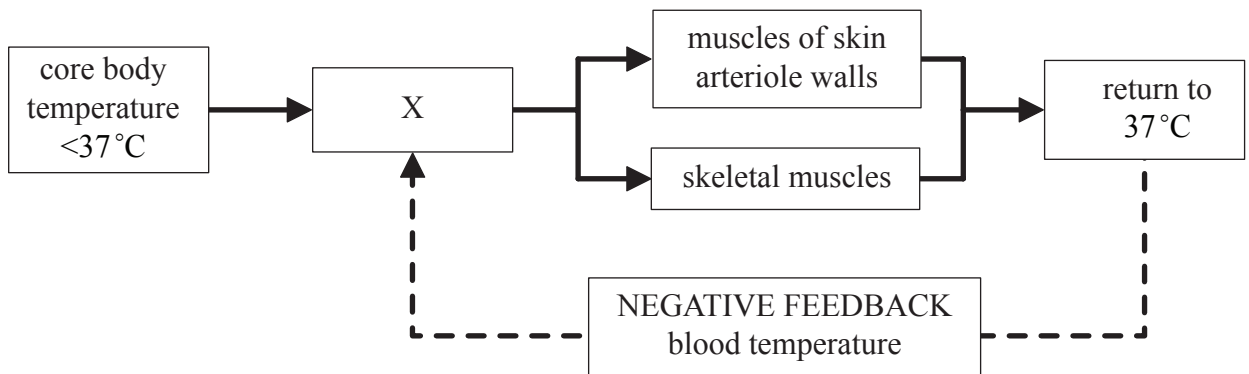
27. What feature of alveoli adapts them to efficient gas exchange?

- A. They have muscles which pump air in and out regularly.
- B. Their membranes are more permeable to gases than water.
- C. A constant blood supply flows through them.
- D. A dense network of capillaries surrounds them.

28. On the diagram of the motor neurone shown below, which label identifies a dendrite?



29. The diagram below represents the homeostatic control of body temperature. What does the part labelled X represent?



- A. Heart
- B. Kidney
- C. Pituitary
- D. Hypothalamus

30. What is the correct sequence of events used in IVF?

- A. collection of oocytes and sperms → stimulation of ovarian follicles → incubation of oocytes and sperms → implantation
- B. stimulation of ovarian follicles → collection of oocytes and sperms → incubation of oocytes and sperms → implantation
- C. stimulation of ovarian follicles → incubation of oocytes and sperms → collection of oocytes and sperms → implantation
- D. collection of oocytes and sperms → incubation of oocytes and sperms → stimulation of ovarian follicles → implantation
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