



BIOLOGY
STANDARD LEVEL
PAPER 1

Tuesday 10 November 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 size of the standard deviation indicate about data?
 - A. How accurately the data were measured
 - B. How widely the data are spread above and below the mean
 - C. Whether the mean is larger or smaller than it should be
 - D. Whether the reliability of the data is greater or less than 68 %

2. If a *Sequoia sempervirens* tree is 100 m tall and a drawing of it is 100 mm tall, what is the magnification of the drawing?
 - A. $\times 0.001$
 - B. $\times 0.1$
 - C. $\times 1.0$
 - D. $\times 1000$

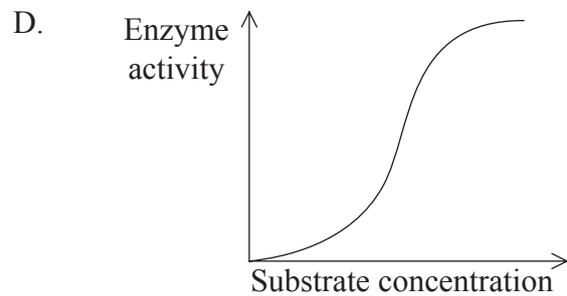
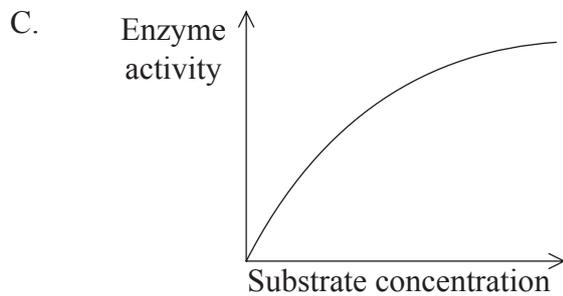
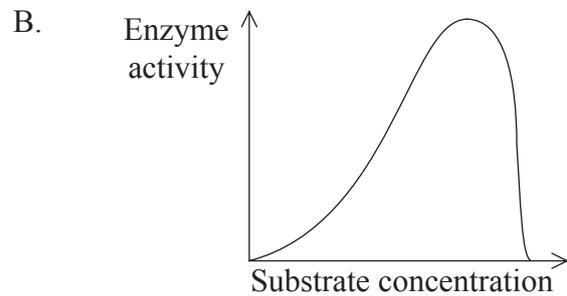
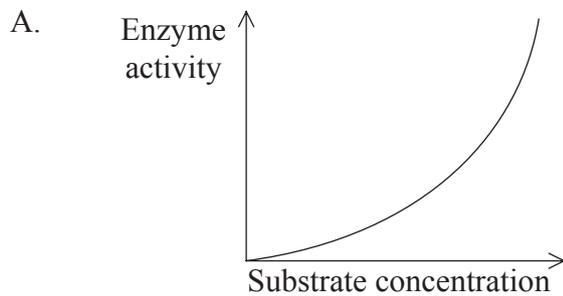
3. Which of the following structures does *Escherichia coli* have?
 - I. 70S Ribosomes
 - II. Pili
 - III. Nucleus
 - A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II and III

4. What feature do plant cells have but not animal cells?
- A. Plasma membranes
 - B. Mitochondria
 - C. Cell walls
 - D. 80S ribosomes
5. Cells in the adrenal gland produce the hormone epinephrine and store it in vesicles. To release epinephrine these vesicles are carried to the plasma membrane and fuse with it. What process is occurring?
- A. Expulsion
 - B. Exchange
 - C. Excretion
 - D. Exocytosis
6. During which stage of the cell cycle are the numbers of mitochondria increased in a cell?
- A. Cytokinesis
 - B. Interphase
 - C. Meiosis
 - D. Mitosis
7. Which of the following chemical elements are part of biochemical molecules in living organisms?
- A. nitrogen, sulfur, phosphorus and iron
 - B. lead, oxygen, carbon and phosphorus
 - C. helium, carbon, sulfur and nitrogen
 - D. silicon, helium, oxygen and iron

8. Which of the following is an organic compound made by all plants?

- A. Carbon dioxide
- B. DNA
- C. Lactose
- D. Oxygen

9. Which of the following graphs shows the relationship between substrate concentration and enzyme activity with a fixed concentration of enzyme?

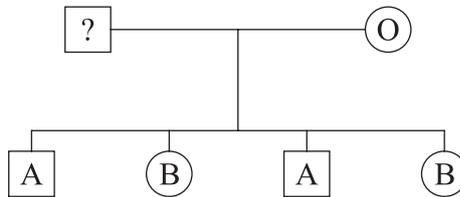


10. Oxygen is produced during photosynthesis. What is the source of this oxygen inside the plant?

- A. Air spaces in the leaf
- B. Carbon dioxide
- C. Glucose
- D. Water

11. What is the cause of sickle-cell anemia?
- A. A change to the base sequence of a hemoglobin gene
 - B. Mosquitoes acting as the vector for malaria
 - C. Iron deficiency due to the malaria parasite
 - D. Production of more white blood cells than red blood cells by bone marrow
12. During reproduction in flowering plants an embryo sac is produced, containing one haploid nucleus. This haploid nucleus divides by mitosis three times. What is produced?
- A. One diploid nucleus
 - B. Four diploid nuclei
 - C. Four haploid nuclei
 - D. Eight haploid nuclei

13. The blood groups of a mother and four children are indicated on the pedigree chart below.

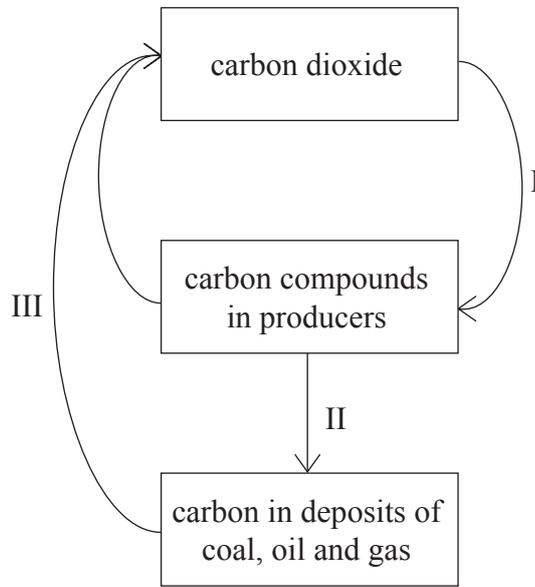


What are the possible blood groups of the father?

- A. Group A only
- B. Group A or B only
- C. Group AB only
- D. Group A, B or AB only

14. Boys can inherit the recessive allele (c) that causes red-green colour blindness from their mother, not from their father. The allele for normal red and green vision is C . Which of the following genotypes are possible in men?
- A. c only
 - B. C or c only
 - C. CC or cc only
 - D. CC , Cc or cc only
15. A small amount of a suspect's DNA is obtained from a crime scene. What techniques would be used to carry out DNA profiling?
- A. Gel electrophoresis and paternity testing
 - B. Paternity testing and the polymerase chain reaction (PCR)
 - C. Polymerase chain reaction (PCR) and gel electrophoresis
 - D. Test crossing and pedigree analysis
16. The Human Genome Project allowed the first accurate estimates of the number of different genes in the human genome. What was a typical estimate, based on the results of the Human Genome Project?
- A. 46
 - B. 64
 - C. 25 000
 - D. 1 000 000
17. *Zoophobas morio* is an insect. Its larvae feed on bat feces in caves in Guatemala. What type of organism is a *Zoophobas morio* larva?
- A. Autotroph
 - B. Consumer
 - C. Detritivore
 - D. Saprotroph

18. The diagram below shows some of the links in the carbon cycle.



What processes are taking place at I, II and III?

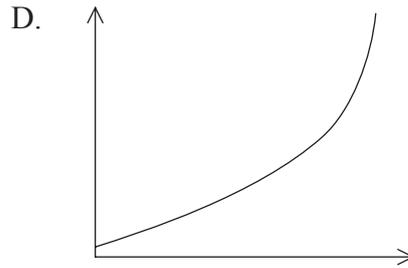
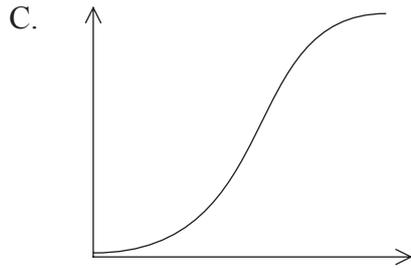
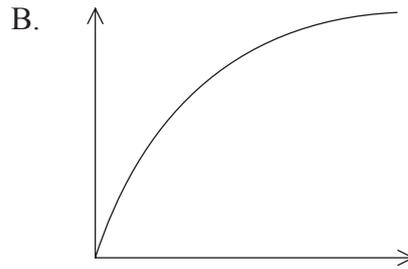
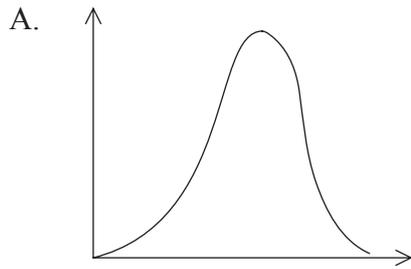
	I	II	III
A.	photosynthesis	fossilization	combustion
B.	cell respiration	fossilization	greenhouse effect
C.	photosynthesis	decomposition	combustion
D.	cell respiration	decomposition	greenhouse effect

19. Global warming threatens the survival of Arctic foxes. Which of the following factors could be involved?

- I. Competition with other fox species spreading north
- II. Reduction in numbers of prey species of Arctic foxes
- III. Decrease in oxygen availability to Arctic foxes

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

20. Which graph shows the sigmoid population growth curve?



21. Charles Darwin used domesticated animals to provide evidence for evolution by natural selection. What is this evidence?

- A. Differences between breeds show that selection can cause species to change.
- B. The ancestors of domesticated animals can be found in the fossil record.
- C. Some domesticated animals die because the environment cannot support them all.
- D. Variation in domesticated animals is due to sexual reproduction.

22. Ants, bees and wasps are classified in the same **order**. What can be deduced about these animals?

- A. They are classified in the same class.
- B. They are classified in different phyla.
- C. They are classified in the same family.
- D. They are classified in different kingdoms.

23. *Pseudolarix amabilis* produces seeds but not flowers. *Physcomitrella patens* has leaves but not roots. To which groups do they belong?

	<i>Pseudolarix amabilis</i>	<i>Physcomitrella patens</i>
A.	coniferophyta	filicinophyta
B.	filicinophyta	angiospermophyta
C.	coniferophyta	bryophyta
D.	angiospermophyta	coniferophyta

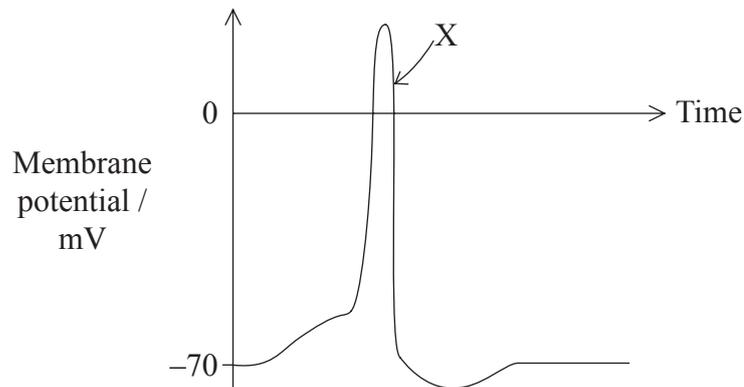
24. What route does blood follow to supply oxygen to heart muscle?

- A. pulmonary vein → left atrium → left ventricle → aorta → coronary artery
- B. pulmonary vein → right atrium → right ventricle → aorta → coronary artery
- C. pulmonary artery → left atrium → left ventricle → aorta → coronary artery
- D. pulmonary artery → right atrium → right ventricle → aorta → coronary artery

25. Which part of the brain has a role in the control of the heartbeat and how are messages passed from this part of the brain to the heart?

	Part of the brain	Type of message
A.	hypothalamus	hormone
B.	hypothalamus	nerve
C.	medulla	hormone
D.	medulla	nerve

26. What stimulates the production of antibodies?
- A. AIDS
 - B. Antibiotics
 - C. Anticodons
 - D. Antigens
27. What change occurs to the pressure and volume of the lungs when the external intercostal muscles contract?
- A. Both pressure and volume increase.
 - B. Pressure increases and volume decreases.
 - C. Pressure decreases and volume increases.
 - D. Both pressure and volume decrease.
28. The graph below shows changes in membrane potential in an axon during the passage of an action potential. What is causing the decrease in membrane potential at point X?



- A. Sodium ions entering the axon
- B. Potassium ions entering the axon
- C. Sodium ions leaving the axon
- D. Potassium ions leaving the axon

- 29.** What is a role of the hypothalamus in homeostasis?
- A. Monitoring body temperature
 - B. Monitoring blood glucose concentration
 - C. Secretion of glucagon
 - D. Secretion of sweat
- 30.** What is the sequence of operations during IVF treatment?
- A. egg collection → FSH injections → fertilization
 - B. egg collection → fertilization → FSH injections
 - C. FSH injections → egg collection → fertilization
 - D. FSH injections → fertilization → egg collection
-