

**BIOLOGY
STANDARD LEVEL
PAPER 1**

Thursday 9 May 2002 (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 pair of statements about light and electron microscopes is correct?

	Light microscope	Electron microscope
A.	Greater resolution	Higher magnification
B.	Lower magnification	Smaller resolution
C.	Higher magnification	Greater resolution
D.	Smaller resolution	Higher magnification

2. Which is mainly responsible for maintaining the structure of a cell membrane?

- A. Water
- B. Phospholipids
- C. Triglycerides
- D. Proteins

3. Which processes occur during interphase?

- I. DNA replication
- II. DNA transcription
- III. Separation of replicated DNA molecules

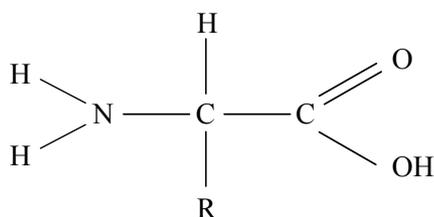
- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

4. Which are the three most common elements in living organisms?

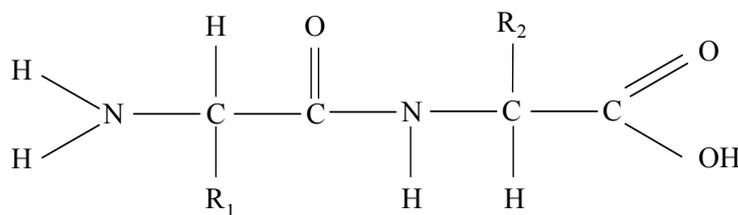
- A. Oxygen, hydrogen and carbon
- B. Nitrogen, carbon and oxygen
- C. Oxygen, hydrogen and nitrogen
- D. Carbon, hydrogen and nitrogen

5. Which structures represent a generalised amino acid and glycerol?

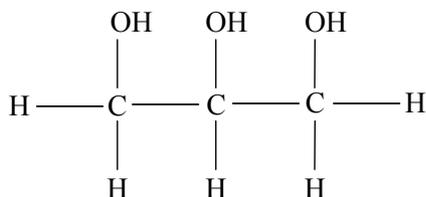
I.



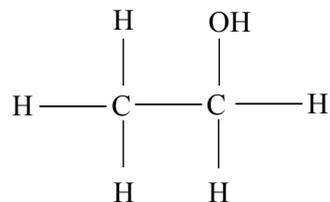
II.



III.

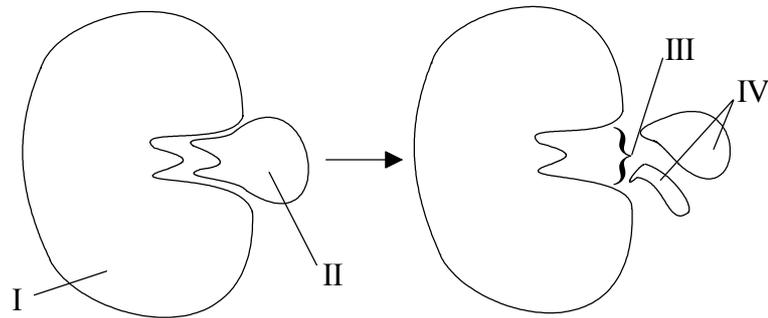


IV.



	Amino acid	Glycerol
A.	I	IV
B.	II	III
C.	I	III
D.	II	IV

6. The figure shows the “lock-and-key” model of enzyme action on a substrate. Which part acts as a key?



- A. I
B. II
C. III
D. IV
7. What is the arrangement of nucleotides in a single DNA strand?

S = sugar, P = phosphate group, B = organic base

- A.
$$\begin{array}{c} \text{S} \text{---} \text{P} \text{---} \text{S} \text{---} \text{P} \\ | \qquad \qquad | \\ \text{B} \qquad \qquad \text{B} \end{array}$$
- B.
$$\begin{array}{c} \text{P} \text{---} \text{S} \text{---} \text{P} \text{---} \text{S} \\ | \qquad \qquad | \\ \text{B} \qquad \qquad \text{B} \end{array}$$
- C.
$$\begin{array}{c} \text{B} \text{---} \text{S} \text{---} \text{B} \text{---} \text{S} \\ | \qquad \qquad | \\ \text{P} \qquad \qquad \text{P} \end{array}$$
- D.
$$\text{B} \text{---} \text{S} \text{---} \text{P} \text{---} \text{B} \text{---} \text{S} \text{---} \text{P}$$

8. Which group of three molecules make up one RNA nucleotide?
- A. Phosphate, ribose, uracil
 - B. Phosphorus, ribose, adenine
 - C. Uracil, deoxyribose, phosphorus
 - D. Guanosine, deoxyribose, phosphate
9. Which property of the genetic code allows the transfer of genetic material between species?
- A. Helical
 - B. Degenerate
 - C. Universal
 - D. Non-overlapping
10. Which techniques of recombinant DNA technology (genetic engineering) require the use of plasmids?
- I. Gene therapy
 - II. DNA profiling
 - III. Gene transfer by gene cloning
- A. I and II only
 - B. II and III only
 - C. I and III only
 - D. I, II and III
11. Which mating represents a test cross? (T is the dominant allele and t is the recessive allele.)
- A. $Tt \times tt$
 - B. $tt \times tt$
 - C. $TT \times Tt$
 - D. $Tt \times Tt$

12. Which response summarises meiosis?

	Pairing of chromosomes	Number of divisions	Result
A.	No	One	Two diploid cells
B.	No	Two	Four diploid cells
C.	Yes	One	Two haploid cells
D.	Yes	Two	Four haploid cells

13. Which inheritance traits are shown by ABO blood groups?

- I. Sex-linkage
- II. Codominance
- III. Multiple alleles

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

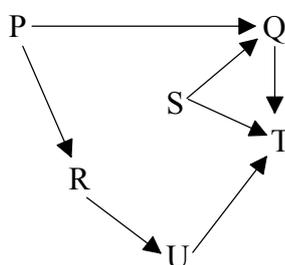
14. A father is heterozygous for blood group A while the mother is heterozygous for blood group B. What is the probability of a child being born with the mother's blood group?

- A. 0.00
- B. 0.25
- C. 0.50
- D. 0.75

15. What is a *clone*?

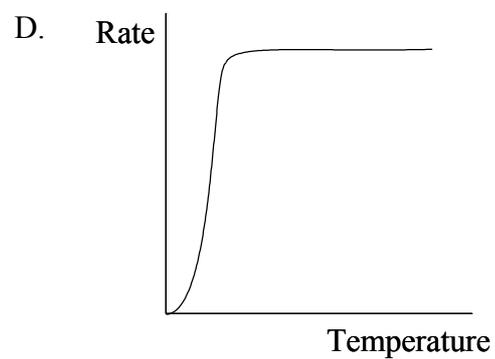
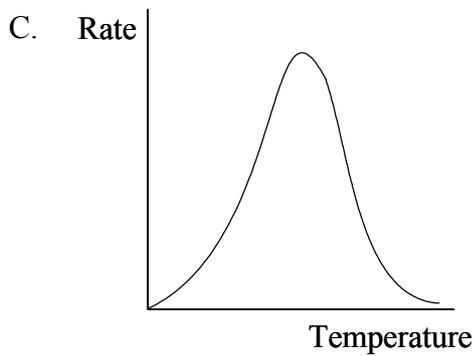
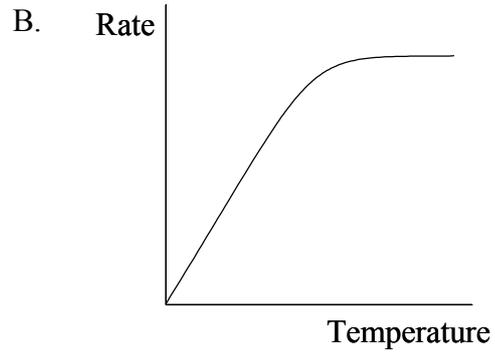
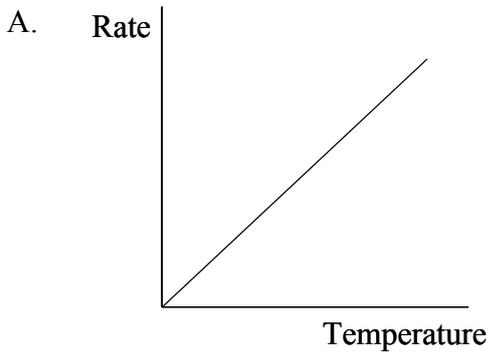
- A. A group of organisms which could interbreed and produce fertile offspring
- B. A group of cells descended from two parent cells
- C. A group of organisms of the same species living together and interbreeding
- D. A group of organisms with identical genotype

16. The diagram below shows a food web. Which organisms in the food web are only primary consumers?



- A. P and S
- B. Q and R
- C. T and U
- D. R and T

17. Which graph shows the effect of temperature on the rate of photosynthesis?



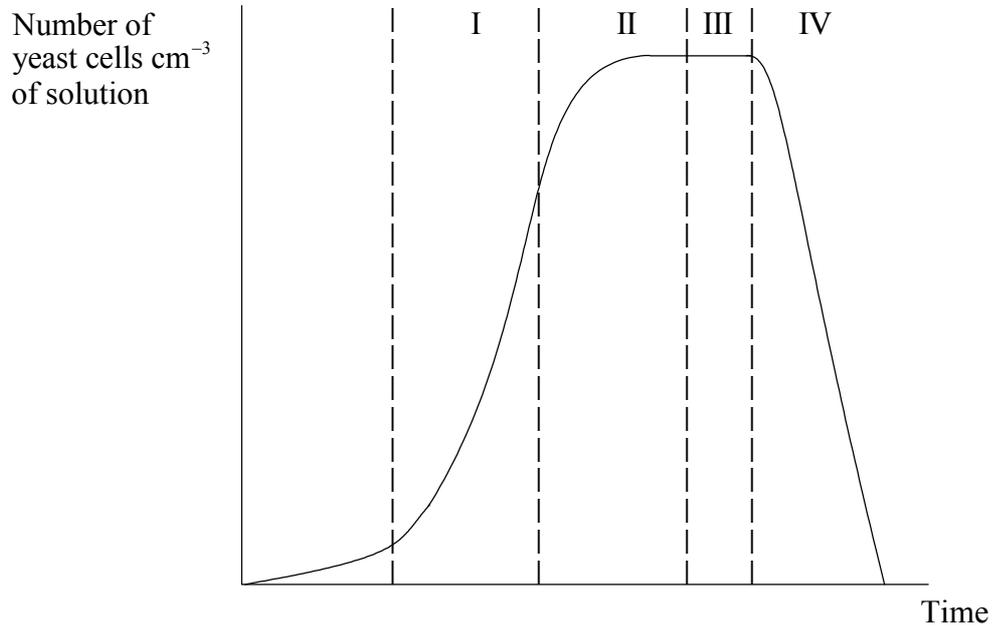
18. Which chemicals are used to fix carbon dioxide to make organic molecules by photosynthesis?

- A. Oxygen and water
- B. Hydrogen and ATP
- C. Water and ADP
- D. Oxygen, hydrogen and ATP

19. Which processes release the carbon dioxide fixed by photosynthesis?

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

20. Yeast cells were added to a flask containing a nutrient solution. The graph below shows the population growth curve of the yeast culture.



During which phase does one or more of the nutrients start to run out?

- A. I
 - B. II
 - C. III
 - D. IV
21. Which characteristics apply to all evolving populations?
- I. Overproduction of offspring
 - II. There are differing genotypes in the population
 - III. Different chances of survival
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

22. The data below shows the height of two populations of bean seedlings.

Height of Population I / cm	Height of Population II / cm
10	8
11	9
12	9
13	10
13	10
14	10
15	14
16	15
17	16
$\bar{x} = 13.4$	$\bar{x} = 11.2$
$s = 2.3$	$s = 2.9$

Which conclusion is supported by the data?

- A. The median values are 13.4 for I and 11.2 for II.
- B. The median and the mode values for II are the same.
- C. 95 % of the values in I are within 2.3 cm of the mean.
- D. The variability in height is greater for I than for II.

23. Which products are formed by the action of the following enzymes?

	Protease	Amylase
A.	Amino acids	Maltose
B.	Dipeptides	Disaccharides
C.	Proteins	Starch
D.	Polypeptides	Glucose

24. What are the states of the valves when the ventricles are relaxed?

	Atrio-ventricular valves	Semilunar valves in the arteries
A.	Open	Open
B.	Open	Closed
C.	Closed	Open
D.	Closed	Closed

25. What is a function of some leucocytes?

- A. Transport of gases
- B. Production of antigens
- C. Ingestion of disease-causing organisms
- D. Coagulation of the blood

26. Which of the following are features of the wall of an alveolus?

- A. Thin, cilia and dry
- B. Thick, cilia and moist
- C. Thin, no cilia and moist
- D. Thick, no cilia and dry

27. Which systems are involved in homeostasis?

(× = no, ✓ = yes)

	Nervous	Endocrine
A.	×	✓
B.	✓	×
C.	×	×
D.	✓	✓

28. Which features of puberty are shared by both sexes?

- I. Considerable muscular development
- II. Rapid increase in height
- III. Secretion of sex hormones

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

29. Chorionic villus sampling is a prenatal test. What is the sample?

- A. Tissue from the amnion
- B. Fluid from the amniotic sac
- C. Blood from the umbilical artery
- D. Tissue from the placenta

30. What changes occur prior and during labour?

(↑ = increase, ↓ = decrease)

	Nerve impulses from the cervix	Levels of blood progesterone	Levels of blood oxytocin
A.	↑	↓	↑
B.	↓	↓	↓
C.	↑	↑	↑
D.	↓	↑	↓
