



BIOLOGY

Standard Level

Tuesday 11 May 1999 (afternoon)

Paper 1

45 minutes

This examination paper consists of 30 questions.

Each question offers 4 suggested answers.

The maximum mark for this paper is 30.

INSTRUCTIONS TO CANDIDATES

Do NOT open this examination paper until instructed to do so.

Answer ALL questions.

For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.

Calculators are NOT permitted for this examination paper.

EXAMINATION MATERIALS

Required:

Optically Mark Read (OMR) answer sheet

Allowed:

A simple translating dictionary for candidates not working in their own language

1. The maximum resolution of a light microscope is 200 nm. What does this mean?
 - A. The maximum enlargement is 200 nm.
 - B. The minimum enlargement is 200 nm.
 - C. Objects smaller than 200 nm cannot be seen.
 - D. Two objects closer than 200 nm cannot be distinguished as separate.

2. What is the size range of most viruses?
 - A. 0.01–0.5 nm
 - B. 1–5 nm
 - C. 10–200 nm
 - D. 0.5–1 μm

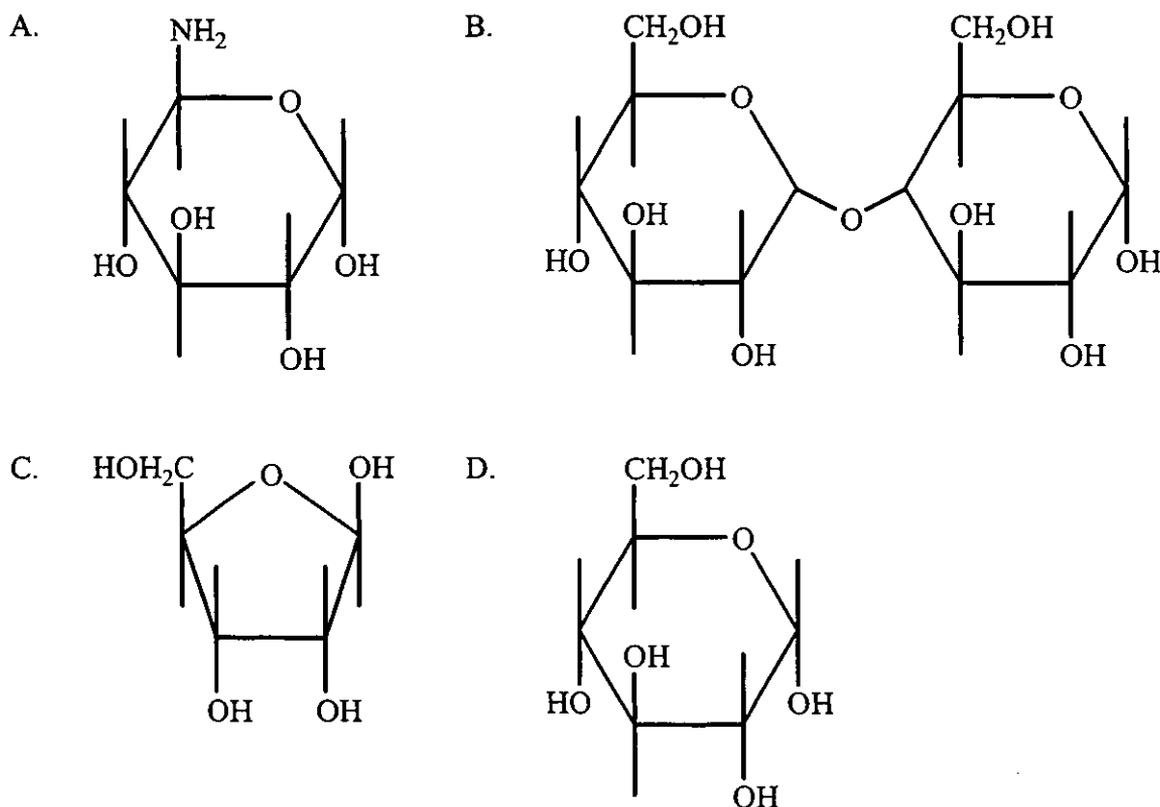
3. What is a function of the rough endoplasmic reticulum?
 - A. It provides a site for transcription.
 - B. It provides a surface for the reactions of the Krebs cycle.
 - C. It separates positive and negative charges in the cell.
 - D. It provides a site for protein synthesis.

4. What is a similarity between eukaryotic and prokaryotic cells?
 - A. They both have chromosomes in their nuclei.
 - B. They both have a variety of membrane-bound organelles.
 - C. They both use DNA as their genetic material.
 - D. They both have mitochondria for producing ATP.

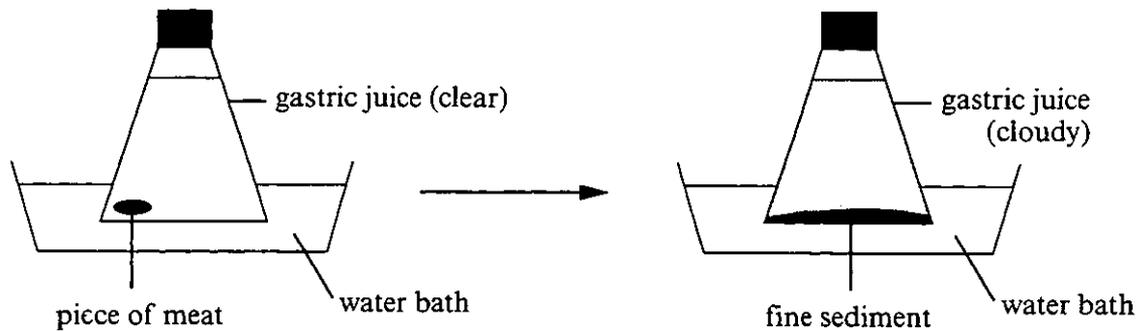
5. What are the three most common elements in living organisms?

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

6. Which is the ring structure of alpha-D-glucose?



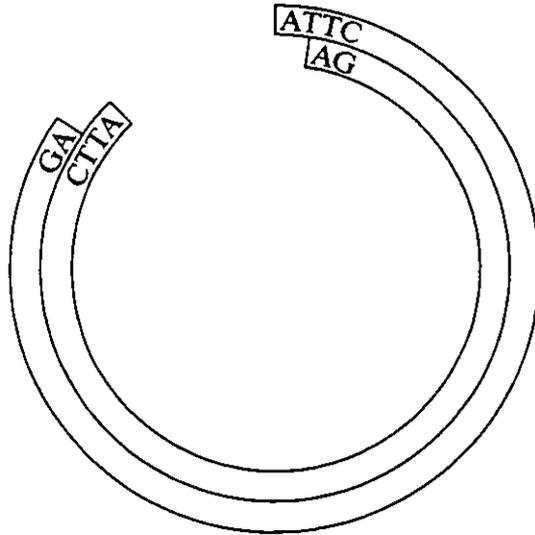
7. In 1833 an American doctor, William Beaumont, carried out the following experiment to study the digestion in the stomach.



At which temperature would the observed changes happen most rapidly?

- A. 0 °C
 - B. 10 °C
 - C. 40 °C
 - D. 100 °C
8. Which type of replication does DNA have?
- A. Semi-conservative because mutations may change part of the base sequence
 - B. Semi-conservative because DNA formed by replication has one old strand and one new strand
 - C. Conservative because the base sequence remains unchanged
 - D. Conservative because the DNA formed by replication contains one strand conserved from the parent DNA molecule

9. A bacterial plasmid (circular DNA) was cleaved with a restriction enzyme leaving the following DNA:



Which DNA can be used as a donor in making recombinant DNA?

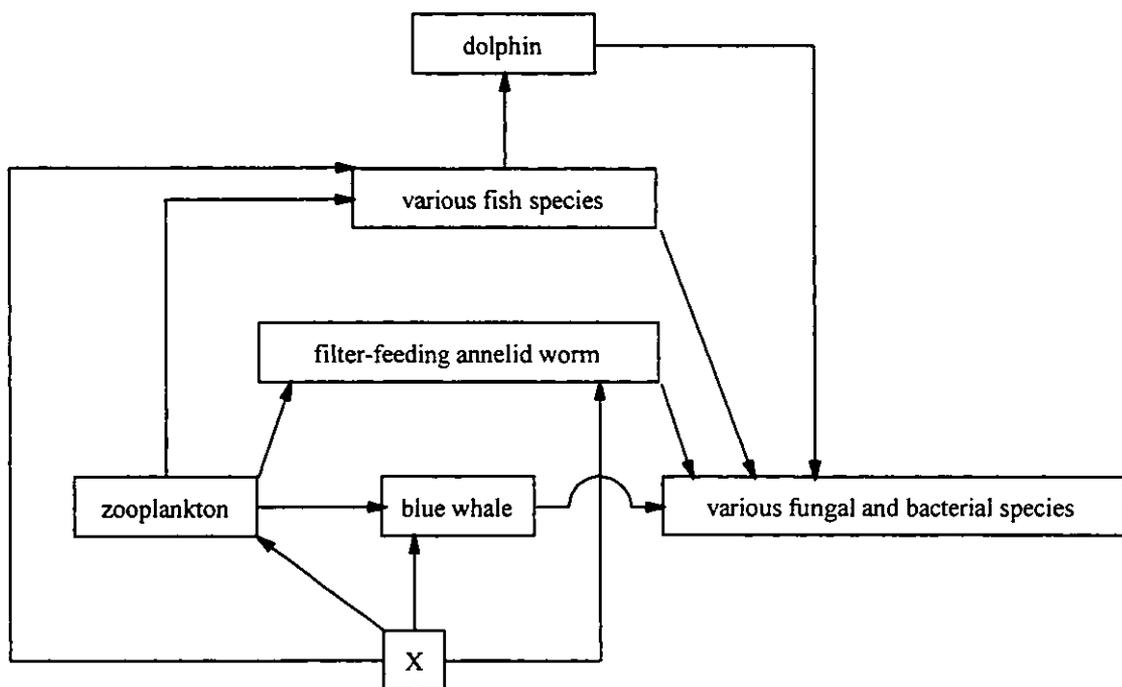
- A. B. C. D.

10. How is the PCR (polymerase chain reaction) used?
- A. To make many copies of a DNA molecule
 - B. To cut DNA at specific base sequences
 - C. To splice fragments of DNA together into a plasmid
 - D. To separate fragmented pieces of DNA based on their charge and size
11. What is the chemical composition of eukaryotic chromosomes?
- A. DNA only
 - B. DNA and RNA
 - C. DNA and phospholipid
 - D. DNA and protein

12. What is produced by mutation and essential for evolution to occur?
- A. Improvements in organisms
 - B. Additional DNA
 - C. A struggle for existence
 - D. Variation
13. Sickle cell anaemia is caused by a change to the base sequence in part of a DNA molecule. What is the change?
- A. A base substitution mutation of the DNA
 - B. The insertion of one DNA nucleotide
 - C. The deletion of one DNA nucleotide
 - D. The deletion of a triplet of DNA nucleotides
14. Compared to a diploid cell, how much genetic material would the nucleus of a haploid cell of the same organism contain?
- A. One quarter
 - B. Double
 - C. Half
 - D. The same amount
15. In poodles (a type of dog) the allele for black coat colour is dominant to the allele for white coat colour. If a pair of black poodles mate, one of which is homozygous for coat colour and the other heterozygous, what is the probable frequency of white coats in the offspring?
- A. 0
 - B. 0.25
 - C. 0.50
 - D. 1.0

16. The gene that codes for a protein needed for blood clotting (factor VIII) is found on the X chromosome. A woman who is homozygous for the recessive allele of this gene suffers from haemophilia and therefore her blood fails to clot properly. What are her chances of having a normal son?
- A. 0%
 - B. 25%
 - C. 50%
 - D. 100%

The diagram below shows a food web. It refers to question 17.

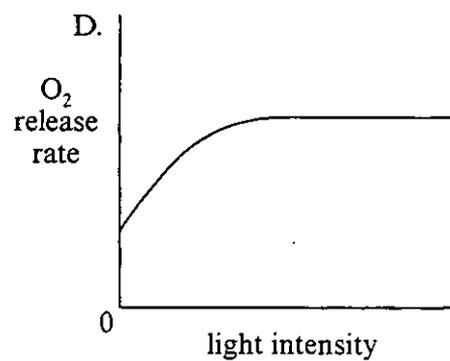
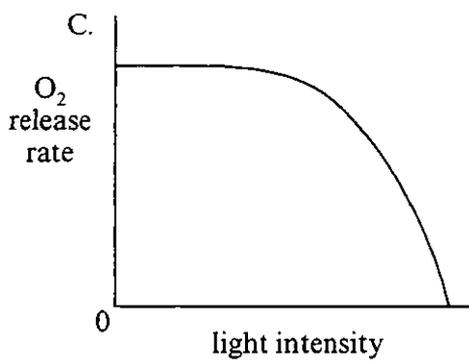
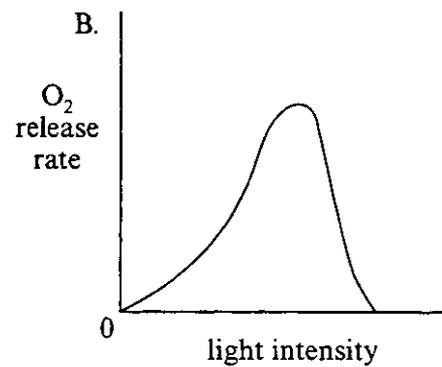
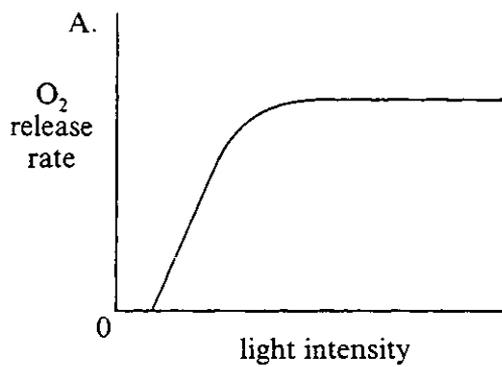


17. What is species X in the ecosystem?
- A. A detritivore
 - B. An autotroph
 - C. A heterotroph
 - D. A saprotroph

18. From which substance is oxygen released during photosynthesis?

- A. Water
- B. Carbon dioxide
- C. Sugar
- D. ATP

19. Which graph represents the relationship in photosynthesis between light intensity and the rate of oxygen release?



20. What describes the movement of energy and nutrients in a typical ecosystem?
- A. Both energy and nutrients are recycled
 - B. Energy can be recycled but nutrients cannot
 - C. Energy cannot be recycled but nutrients can
 - D. Neither energy nor nutrients can be recycled
21. An increase in the greenhouse effect will have many effects on the Earth. Which effects are most probable?
- A. Less ozone, a warmer atmosphere, more UV irradiation
 - B. A warmer atmosphere, lower sea level, increased cloudiness, more stratospheric ozone
 - C. A warmer lower atmosphere, change in weather patterns, higher sea level
 - D. Drier conditions world wide, higher sea level, greater likelihood of cancer
22. Woodlice are terrestrial crustaceans that live under logs and stones in damp soil. To assess the population of woodlice in an area, students collected as many of the animals as they could find, and marked each with a drop of fluorescent paint. A total of 303 were marked. 24 hours later, woodlice were collected again in the same place. This time 297 were found, of which 99 were seen to be already marked from the first time. What, approximately, is the estimated population of woodlice in this area?
- A. 30 000
 - B. 900
 - C. 9000
 - D. 100

23. Why are vitamins required in the human diet?

- A. They are amino acids which the body cannot synthesise but which are required for making proteins.
- B. They ensure a sufficiently high intake of fresh fruit and vegetables.
- C. They can be made in small amounts by the body but, because they are a type of enzyme, they are continually used up.
- D. They are essential for many biochemical reactions but cannot be made by the body.

24. What type of blood do the four chambers of the heart collect and pump?

	left atrium	right atrium	left ventricle	right ventricle
A.	oxygenated	oxygenated	deoxygenated	deoxygenated
B.	deoxygenated	deoxygenated	oxygenated	oxygenated
C.	oxygenated	deoxygenated	oxygenated	deoxygenated
D.	deoxygenated	oxygenated	deoxygenated	oxygenated

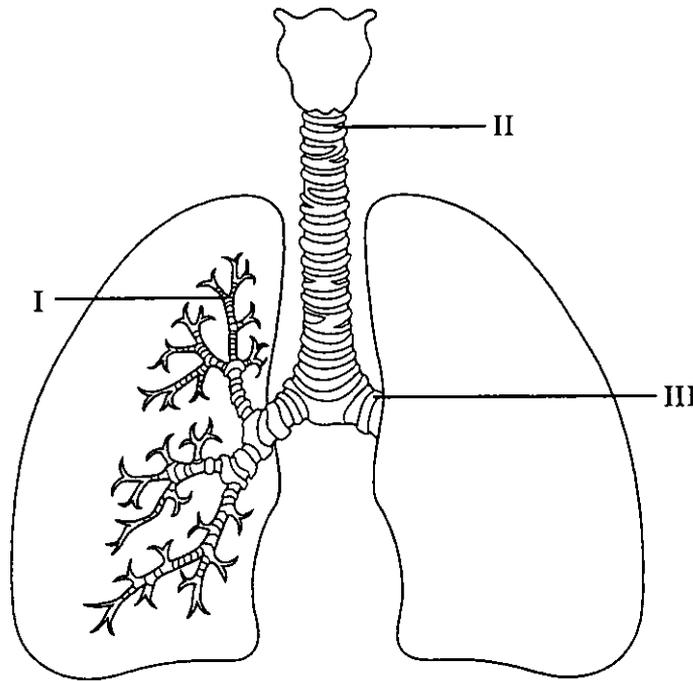
25. Which of the following is transported by the blood?

- A. Gametes
- B. Glycogen
- C. Heat
- D. Starch

26. What is a characteristic of antigens?

- A. They are produced by phagocytic leucocytes.
- B. They are produced in the bone marrow.
- C. They are only found in white blood cells.
- D. They may stimulate the formation of antibodies.

The drawing below represents the human gas exchange system. It refers to question 27.



27. What is represented by each label?

- | | I | II | III |
|----|------------|------------|------------|
| A. | bronchus | bronchiole | trachea |
| B. | bronchus | trachea | bronchiole |
| C. | bronchiole | bronchus | trachea |
| D. | bronchiole | trachea | bronchus |

28. What are the two main functions of the kidney in mammals?

- A. Osmoregulation and excretion
- B. Excretion and egestion
- C. Osmoregulation and adrenaline production
- D. Excretion and sodium chloride production

29. Which organ secretes FSH (follicle-stimulating hormone)?

- A. Ovary
- B. Testis
- C. Pituitary gland
- D. Placenta

30. What process is carried out by the placenta?

- A. Oxygen passes from fetal to maternal blood.
 - B. Materials are exchanged between fetal and maternal blood.
 - C. Maternal blood is converted into fetal blood.
 - D. Maternal blood is transported to the umbilical cord.
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