

N86/410/S(1)

INTERNATIONAL BACCALAUREATE

BIOLOGY

Paper 1

Subsidiary Level

1 hour

Tuesday 11 November 1986 (morning)

INSTRUCTIONS

There are 40 questions in this paper and you should try to answer all of them.

For each question there are 4 suggested answers. Read each question carefully. When you have selected what you consider to be the best answer, mark your choice on the answer sheet.

Your mark for this paper will depend on the total number of correct answers you give. Work carefully and attempt as many questions as you can. If you do not know the answer to a question go on to the next one, but go back and attempt it if you have sufficient time.

ALL ANSWERS MUST BE GIVEN ON THE SPECIAL ANSWER SHEET

*THE QUESTION PAPER AND THE ANSWER SHEET MUST BE HANDED IN TO THE INVIGILATOR
AFTER THE EXAMINATION.*

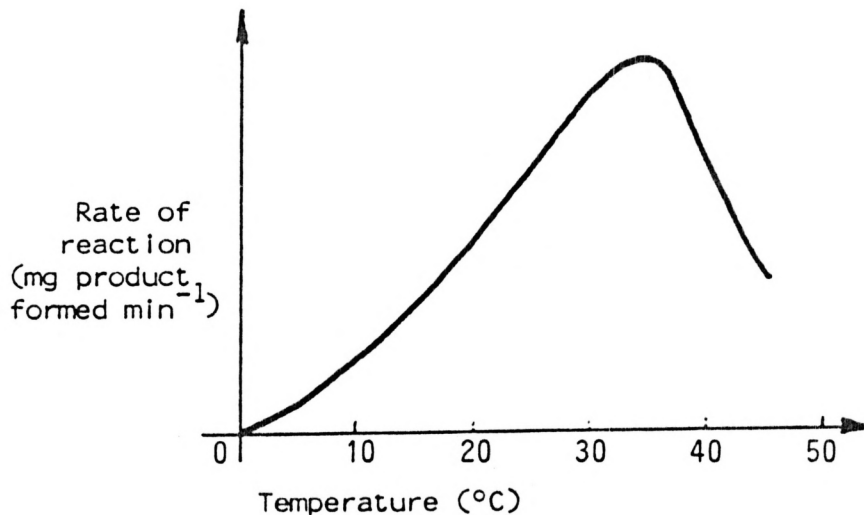
1. Which of the following bases occurs in RNA but not in DNA?
 - A. Adenine
 - B. Guanine
 - C. Thymine
 - D. Uracil

2. All nucleotides contain the same kind of
 - A. ribose sugar.
 - B. nitrogen base.
 - C. phosphate.
 - D. nucleoside.

3. Which of the following, if any, is a protein?
 - A. Lysine
 - B. Urea
 - C. Amylase
 - D. Amylose

4. All protein molecules contain
 - A. amino groups at both ends.
 - B. carboxyl groups at both ends.
 - C. amino and carboxyl groups at both ends.
 - D. an amino group at one end and a carboxyl group at the other.

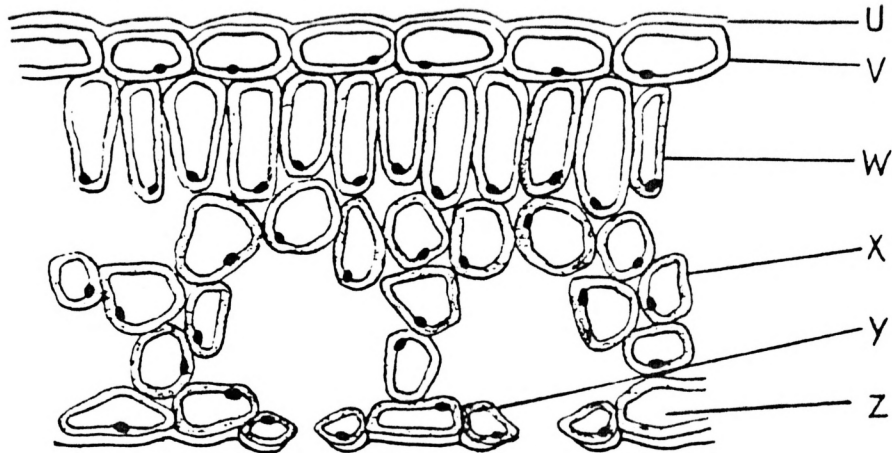
5. Which enzyme is correctly matched with its substrate?
- A. succinic dehydrogenase : succinic acid
 - B. carbonic anhydrase : carbon monoxide
 - C. maltase : starch
 - D. pepsin : hydrochloric acid
6. Vitamin A is an essential dietary component for the formation of
- A. rhodopsin.
 - B. NAD.
 - C. co-enzyme A.
 - D. ATP.
7. Anaerobic respiration is less efficient than aerobic respiration because
- A. hydrogen acceptors are not available.
 - B. the substrate is incompletely oxidised.
 - C. oxygen is not available.
 - D. toxic waste products are produced.



The graph above shows how the rate of reaction for an enzyme catalysed reaction proceeds with increasing temperature. Use this information to answer questions 8 and 9.

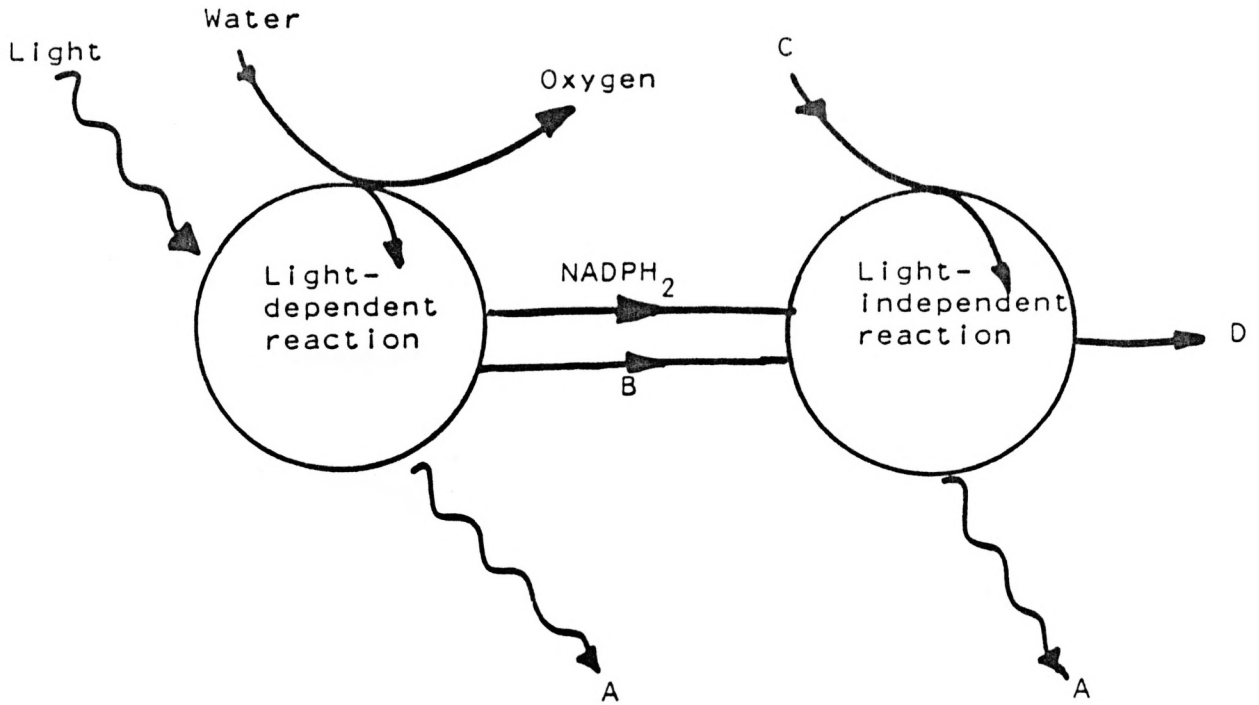
8. Why does the rate of reaction increase between 0 and 40°C?
- A. The enzyme is temperature sensitive.
 - B. The substrate molecules become more unstable.
 - C. The kinetic energy of the reacting molecules increases.
 - D. The activation energy of the substrate is lowered.
9. Why does the rate of reaction fall after about 40°C?
- A. The reaction is incomplete.
 - B. The substrate becomes more inert.
 - C. The enzyme's active site is progressively utilised.
 - D. The enzyme molecule is progressively denatured.
10. Which of the following substances is found only in animal cells?
- A. Starch
 - B. Lipids
 - C. Cellulose
 - D. Glycogen
11. Which of the following statements is least necessary to a coherent cell theory?
- A. All cells are derived from cell ancestors.
 - B. The cell is the functional unit of life.
 - C. All plants and animals are composed of cells.
 - D. The nucleus is the control centre of the cell.

12. In which of the following tissues would the highest mitochondrion density be likely?
- A. Insect flight muscle
 - B. Human skin epidermis
 - C. Human leg muscle
 - D. Human cartilage



The diagram above is a section of a leaf as viewed under the microscope. Use it to answer questions 13 and 14.

13. In which cell is most carbon dioxide fixed?
- A. V
 - B. W
 - C. X
 - D. Y
14. Which of the structures is responsible for preventing most water loss from the leaf?
- A. U
 - B. V
 - C. Y
 - D. Z



The above partly-labelled diagram shows photosynthesis as a two stage process. Wavy lines represent energy flows and solid lines represent material flows. Study the diagram to answer questions 15 - 17.

15. What does flow A represent?

- A. Light
- B. Heat
- C. Electrons
- D. Carbohydrate

16. What does flow B represent?

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

17. Which flow contains the most stored energy?

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

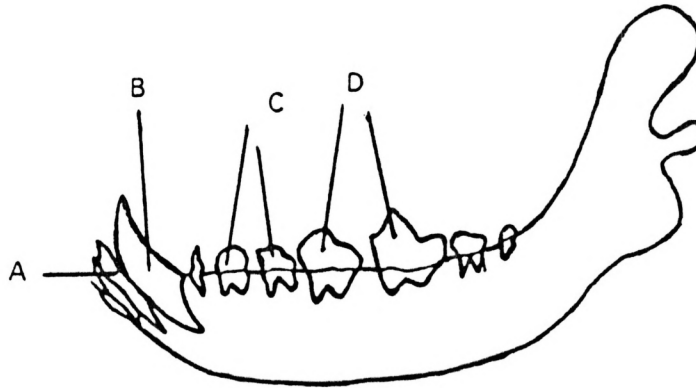
In an experiment gerbils were fed 100 g dry weight of barley only. During the period of the experiment they produced 5 g of urine, lost 3 g of water in their faeces and used 14 g of water to cool their bodies. Consider these figures and answer questions 18 and 19.

18. Which of the following do you think is most responsible for water loss?

- A. Lungs
- B. Kidneys
- C. Intestine
- D. Skin

19. From the evidence presented, what do you think is the most likely explanation for the water budget?

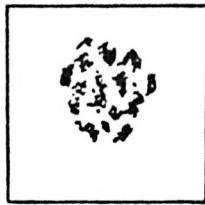
- A. The gerbils have become dehydrated.
- B. Gerbils are able to survive on metabolic water.
- C. Gerbils can utilise moisture in their food.
- D. Gerbils do not need water.



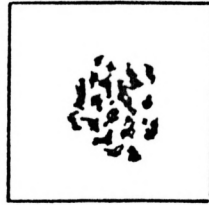
20. Which of the teeth labelled in the jaw above is/are responsible for slicing and cutting food?
- A. Teeth A
 - B. Teeth B
 - C. Teeth C
 - D. Teeth D
21. Into which part of the human alimentary canal is most amylase secreted?
- A. Mouth
 - B. Stomach
 - C. Small intestine
 - D. Colon
22. Which alternative best represents the route taken by blood from the left arm and back again?
- A. arm lungs heart arm
 - B. arm heart lungs kidney arm
 - C. arm brain heart lungs arm
 - D. arm heart lungs heart arm

23. In order to identify a person's ABO and rhesus blood groups it is necessary to take a sample of blood and carefully mix it with the appropriate anti-serum. The results of such a test are shown below. What is the person's blood group?

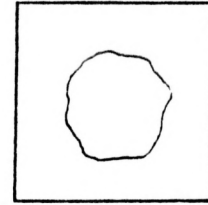
Appearance after 10 minutes



BLOOD +
ANTI-A



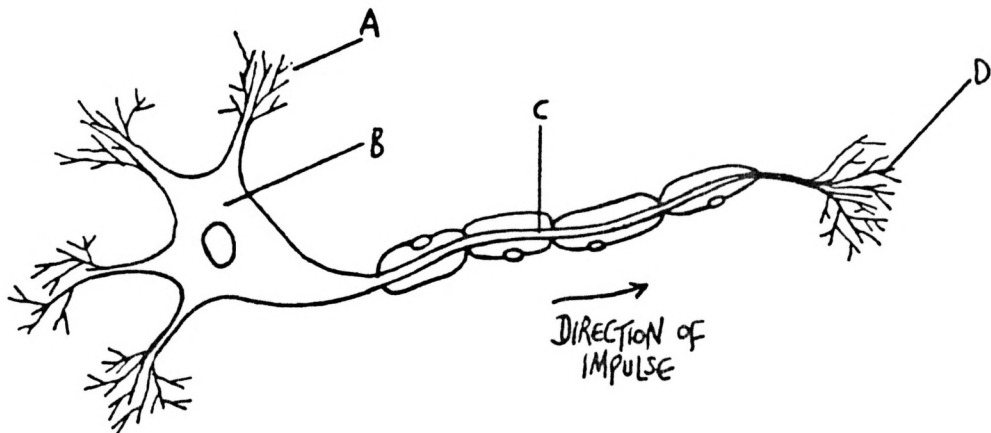
BLOOD +
ANTI-B



BLOOD +
ANTI-RHESUS

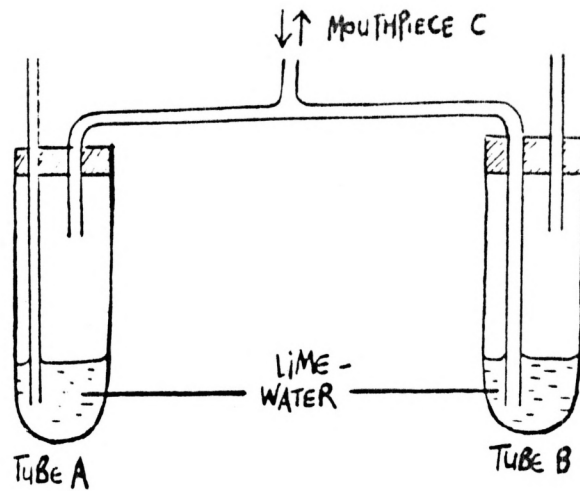
- A. A+
- B. O-
- C. AB-
- D. AB+

24.



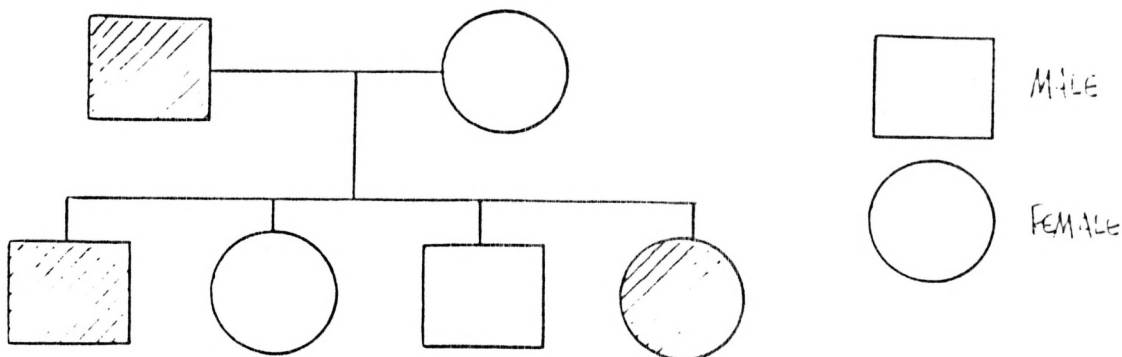
The above is a diagram of a nerve cell. Which part of the cell is secretory?

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



25. Tubes A and B above both contain limewater. A person breathes gently through the mouthpiece C for 2 minutes. What result do you predict?
- A. A will be much more milky than B.
 - B. B will be much more milky than A.
 - C. A and B will both be equally milky.
 - D. Neither A nor B will be milky.
26. On examination of the retina of a certain mammal it is found that there is a high proportion of cone cells. Which of the following might the retina be from?
- A. Monkey
 - B. Horse
 - C. Dog
 - D. Bat
27. The flowering plants and the mammals are alike in that
- A. mobile sperm are present in both groups.
 - B. both groups have internal fertilisation and embryonic development.
 - C. both groups have double fertilization.
 - D. both groups supply the embryo with stored food.

28. Menstrual flow in a woman is induced by
- A. declining levels of progesterone in the blood.
 - B. rising levels of oestrogen in the blood.
 - C. the presence of new FSH.
 - D. all of the above.
29. Variability in a plant population is promoted most by which of the following processes?
- A. Meiosis
 - B. Cross-pollination
 - C. Placentation
 - D. Insect pollination
30. In which part of the mammalian reproductive system does meiosis take place?
- A. Seminiferous tubules
 - B. Interstitial cells of the testis
 - C. Epididymis
 - D. Sperm duct (Vas deferens)
31. "Continuous skin peeling" is a rare recessive trait in humans that is not sex-linked. A man with the condition marries a normal woman. What is the probability that their first child will have the disease?
- A. 0 (impossible)
 - B. $\frac{1}{4}$ (1 in 4)
 - C. $\frac{1}{2}$ (1 in 2)
 - D. 1 (certain)



32. The above diagram shows a pedigree for a condition known as "spotted nails", in which white spots appear in both toe and finger nails; affected individuals are shaded. Which statement best interprets the data?
- A. The gene responsible is sex-linked.
 - B. The gene responsible is autosomal.
 - C. It may be an environmentally induced condition.
 - D. All the above are possible; further investigation is necessary.
33. Before meiosis a pair of chromosomes carry the alleles Ab and aB. How can an AB gamete be explained?
- A. Crossing over
 - B. Segregation
 - C. Fertilisation
 - D. Independent assortment
34. Mrs Lee, who is blood group O, has a group B baby. Mr Lee, who is blood group AB, believes someone else is the father. On the evidence of blood group, which statement is most correct?
- A. Mr Lee cannot be the father.
 - B. Mr Lee must be the father.
 - C. Mr Lee may or may not be the father.
 - D. The probability of Mr Lee being the father is $\frac{1}{2}$ (1 in 2).

35. Mutations can be considered as a basis for evolutionary change because
- A. they increase the fitness of populations.
 - B. their occurrence is independent of environmental influence.
 - C. they promote heritable variability.
 - D. they affect all individuals.
36. The "fittest" individuals in a population are those which
- A. are the strongest.
 - B. are the fastest.
 - C. cause least environmental damage.
 - D. produce the most viable offspring.
37. On the average, what percentage of the energy entering a trophic level is passed on to the next trophic level?
- A. 10%
 - B. 20%
 - C. 30%
 - D. 40%
38. In an ecosystem, matter differs from energy in that it can be
- A. recycled.
 - B. changed.
 - C. consumed.
 - D. destroyed.

39. Which of the following biomes is likely to contain the least number of animal species?
- A. Tropical rain forest
 - B. Temperate deciduous forest
 - C. Coniferous forest
 - D. Tundra
40. If a predator population had increased its numbers, which of the following is also likely to be true?
- A. Conservation measures had been introduced.
 - B. There had been a decrease in predator parasites.
 - C. Its prey had increased in numbers.
 - D. Its prey had decreased in numbers.
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