

**THE UNITED REPUBLIC OF TANZANIA  
NATIONAL EXAMINATIONS COUNCIL  
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION**

133/1

**BIOLOGY 1**  
(For Both School and Private Candidates)

**Time: 2½ Hours**

**3 May 2001 p.m.**

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**Instructions**

1. This paper consists of 14 questions in sections A and B. Answer ALL questions in section A and any FOUR (4) questions from section B.
2. The mark allocation is indicated at the end of each question. Section A carries 60% and section B carries 40%.
3. Read each question carefully.
4. Except for diagrams, which must be drawn in pencil, all writing must be in blue or black ink/ball point pen.
5. Write your examination number on every page of your answer booklet.

This paper consists of 6 printed pages

SECTION A (60 marks)

Answer all questions in this section. You are advised to spend not more than 90 minutes on this section.

1. (a) List the seven major categories of the taxonomic hierarchy.  
(b) Give two merits and three demerits of the natural system of classification. (7 marks)
2. The illustrations shown in Figures 1A and 1B below represent two angiosperm seeds.

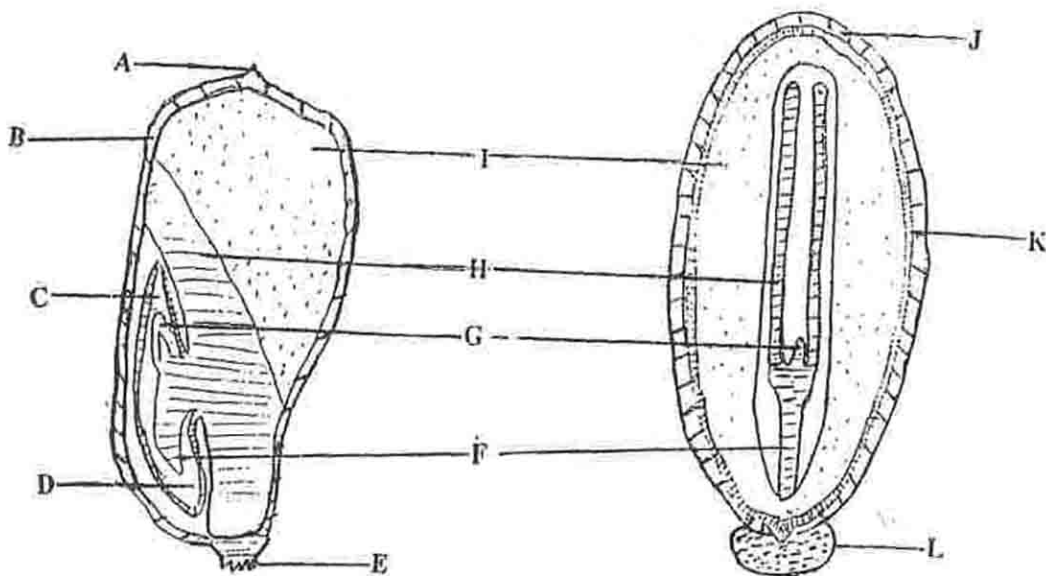


Fig. 1A

Fig. 1B

- (a) (i) Name the parts labelled A, B, C, D, E, F, G, H, I, J, K and L.  
(ii) Mention the class of plants to which each seed belongs.
  - (b) Give one major difference and one major similarity between the two seeds. (9 marks)
3. (a) What is probably wrong if a healthy person develops  
(i) ulcers?  
(ii) "heartburn" ?  
(b) Briefly describe how the conditions in (a) above can be counteracted. (8 marks)

4. (a) What is glycolysis?  
 (b) Summarise the essential features of glycolysis which lead to the release of energy from a molecule of glucose (flow chart is unnecessary).  
 (6 marks)
5. (a) Define the term homeostasis.  
 (b) Point out four adaptations of marine bony fish against dehydration.  
 (6 marks)
6. Albinism is an autosomal recessive genetic defect. The pedigree below (Figure 2) shows the inheritance of the defect in a certain family.

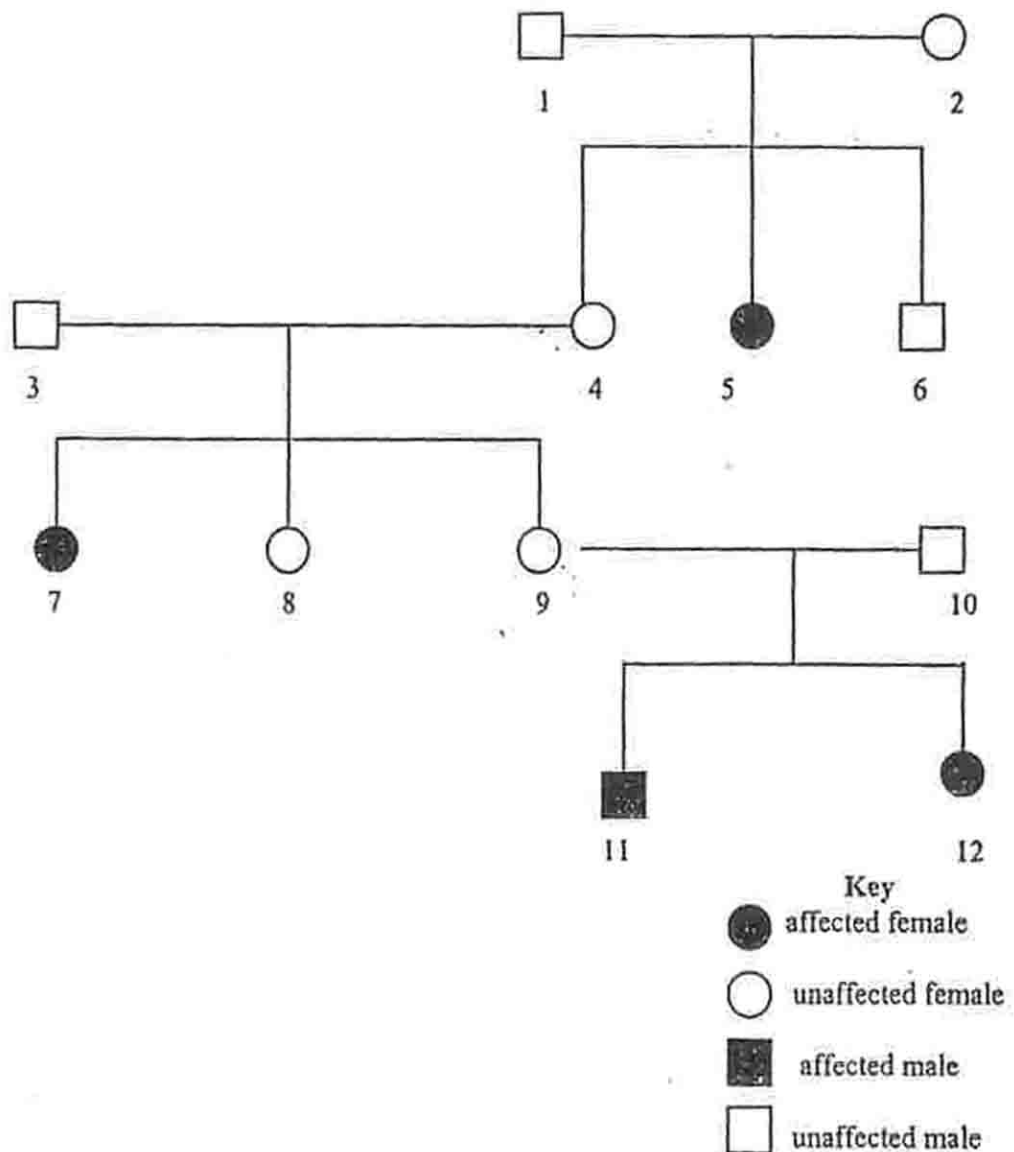


Figure 2

- (a) (i) State the numbers of all individuals who are definitely heterozygous for the gene controlling the defect.  
 (ii) What is the probability that individual 6 is heterozygous?

- (b) (i) How is the inheritance of albinism similar and yet different from that of haemophilia?  
(ii) Why are men more likely to be haemophiliacs than women?

(8 marks)

7. (a) What do you understand by the terms

- (i) continuous variations  
(ii) discontinuous variations?.

Give two examples for each

(b) State any four areas which provide evidence for evolution.

(8 marks)

8. (a) Briefly explain what is meant by natural resources. Give four examples.

(b) Point out three ways which are essential in order to achieve sustainable exploitation of natural resources.

(8 marks)

### SECTION B (40 marks)

Answer any FOUR questions from this section.

9. Figure 3 below shows an ultrastructure of a cell.

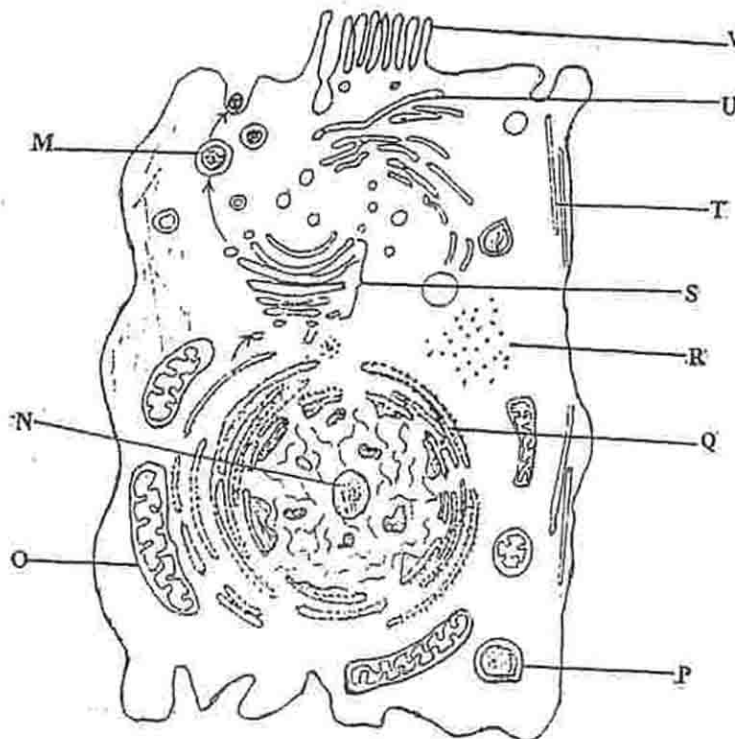


Fig. 3

- (a) (i) Giving reasons, state whether the cell is prokaryotic or eukaryotic.  
(ii) Give the names of the structures labelled M, N, O, P, Q, R, S, T, U and V.
- (b) State one function of each of the structures N, R, S and T. (10 marks)
10. Using acetylcholine as a neurotransmitter, explain how an impulse is transmitted across a synapse. (10 marks)
11. (a) Explain the meaning of basal metabolic rate (BMR).  
(b) Compare alcohol fermentation by yeast cells with lactic acid fermentation in a vertebrate muscle cell during a vigorous exercise. (10 marks)
12. (a) Differentiate between an open blood system and a closed blood system. Give one example for each.  
(b) How is the structure of xylem tissue suited to its function of water transport? (10 marks)
13. (a) A yeast colony was grown in a nutrient medium for a period of 20 hours. At regular intervals of time, the cells were counted and the rate of a cell division determined. The results were presented graphically as shown below (Figure 4).

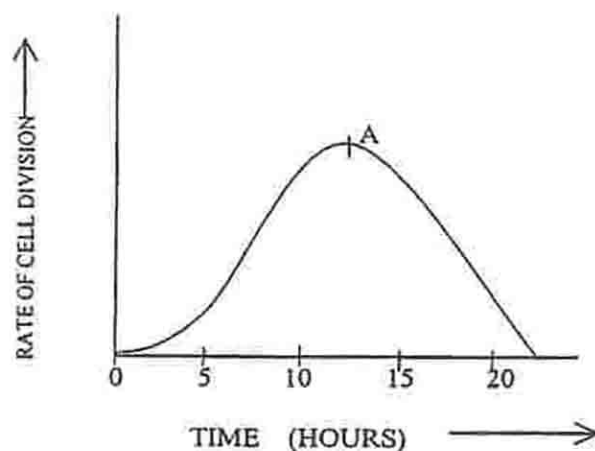


Fig. 4

- Suggest three possible reasons for the fall in growth rate after point A.
- (b) State two external factors which influence growth in plants and mention one effect of each. (10 marks)

14. (a) (i) Draw a large diagram of the human sperm. Label on your diagram the following parts head, neck, middle piece, main piece, flagellum spiral mitochondria, acrosome, nucleus and centrioles.
- (ii) Show how the structure of the human sperm is related to its function.
- (b) In a certain species of flowering plants, the chromosome number of each cell in the radicle is 16. State the chromosome number in any **four** of the following:
- (i) Pollen tube nucleus
  - (ii) Antipodal cell
  - (iii) Endosperm cell
  - (iv) Pollen mother cell
  - (v) Integument cell.

(10 marks)