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: $2^1/_2$ Hours **Friday 03 May 2002 p.m.**

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. Read each question carefully.
3. Cellular phones are **not** allowed in the examination room.
4. Write your Examination Number on every page of your answer booklet.

This paper consists of 7 printed pages.

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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) What is Binomial Nomenclature?

   (b) Give any **three (3)** rules followed in naming organisms scientifically. (7 marks)

2. Study the diagram below (figure 1) and answer the questions which follow.

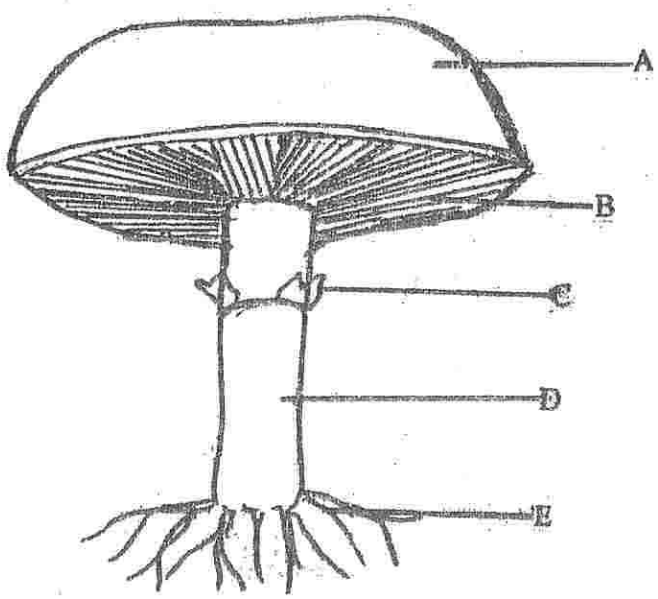

Fig. 1

   (a) (i) Identify structures A, B, C, D and E.

   (ii) Name the kingdom, phylum and genus to which the organism in figure 1 belongs.

   (b) State any **two** ways in which the kingdom to which the organism in figure 1 belongs is of economic importance. (6 marks)

3. (a) State any **two** differences between non-cyclic and cyclic photophosphorylation.

   (b) (i) What are the two types of products of the Brunner's glands of the small intestine?

   (ii) State the roles of the products in (i) above. (8 marks)

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4. The diagram below (figure 2) shows a detailed structure of a small portion of the lung.

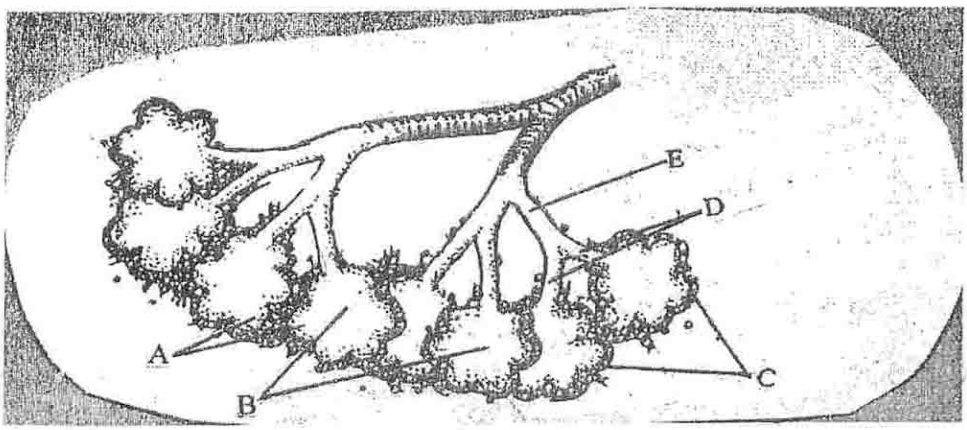

Fig. 2

(a) Name the parts labelled A, B, C, D and E.

(b) Explain **two** ways by which the structures labelled A are able to perform their functions efficiently. (9 marks)

5. (a) Give a brief explanation of how the loop of Henle operates as a "counter - current multiplier system. "

(b) What would happen if our kidneys stopped working? (10 marks)

6. (a) Give **two** differences between the X and Y chromosomes of humans.

(b) Why are there more colour blind individuals than haemophiliacs in the population when the alleles for both defects are inherited in the same fashion, that is, sex linked? (5 marks)

7. (a) Define convergent evolution.

(b) Jean Baptist Lamark proposed the theory of inheritance of acquired characteristics.

(i) What were Lamark's ideas on this theory?

(ii) How are these ideas explained by modern ideas? (7 marks)

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8. (a) Study the food web shown in figure 3 and answer the questions below it.

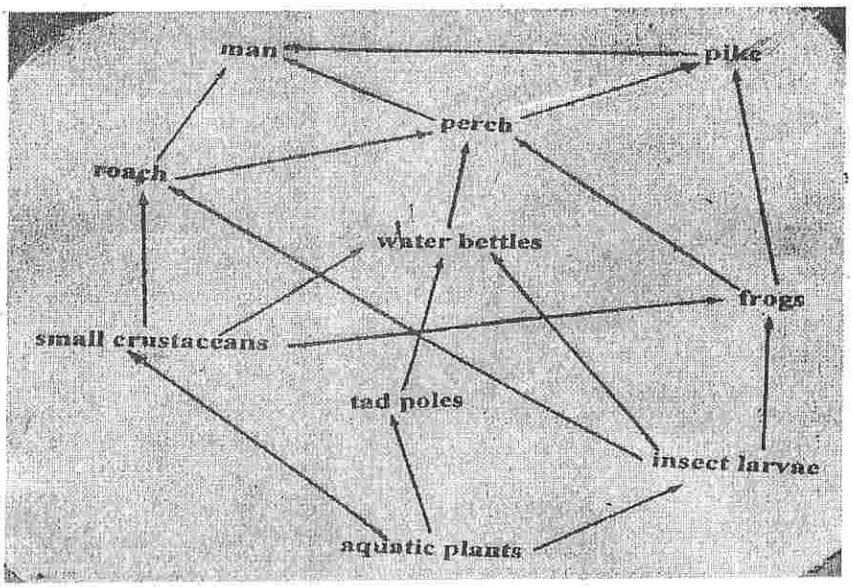

Fig. 3

(i) How many trophic levels are shown in this food web? Name them and give one example of an organism for each trophic level.

(ii) Name one animal in this food web which feeds at three trophic levels.

(iii) Write down the longest food chain shown in the food web.

(b) Write short notes on

(i) density dependent factors

(ii) interspecific competition. (8 marks)

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SECTION B (40 marks)

Answer any **FOUR (4)** questions from this section.
Each question carries 10 marks.

9. **Below (Fig.4) is a diagram of an acinar cell of a pancreas involved in the synthesis and secretion of an inactive enzyme (zymogen).**

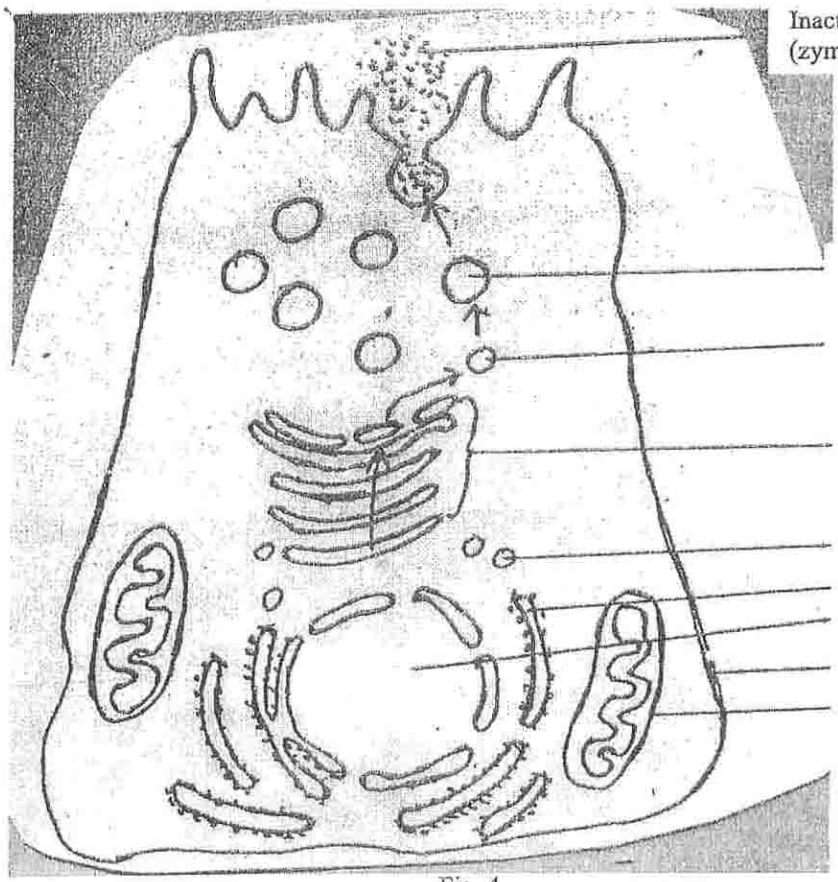

Fig. 4

(a) Name the parts labeled A, B, C, D, E, F, G and H.

(b) Briefly explain how organelles A, C, D and H are involved in the synthesis and secretion of the inactive enzyme.

10. (a) (i) Classify receptors into five categories on the basis of the stimuli they respond to.

(ii) Name the stimulus in each case.

(b) Tabulate **four (4)** differences between rods and cones.

11. (a) Describe **three (3)** ways of obtaining gaseous oxygen in terrestrial flowering plants.

(b) Briefly explain why the oxidation of fats liberates more than double the energy of the same quantity of carbohydrate.

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12. (a) The concentration of sodium ions (Na^+) inside most cells is lower than the concentration outside the cells. Although the cell membrane is somewhat permeable to sodium ions, simple diffusion does not result into an equal concentration of sodium ions on the two sides of the membrane.

(i) What process is responsible for maintaining a lower concentration of sodium inside the cell?

(ii) Explain your answer in 12.(a)(i) above.

(b) What do you understand by the term guttation?

13. (a) The diagram below (Fig.5) represents the growth curve of an arthropod. Study it and answer the questions below it.

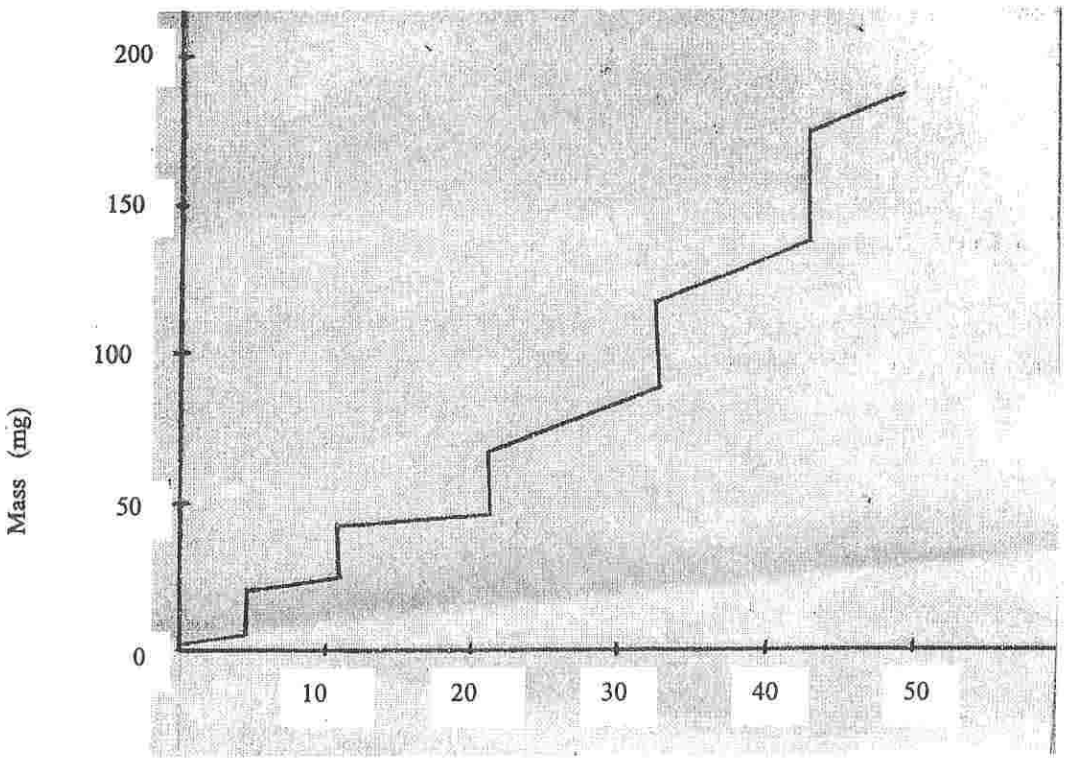

Fig. 5

(i) What type of growth does this curve show?

(ii) Explain the cause for such type of growth curve.

(b) Giving one example in each case, explain what is meant by

(i) allometric growth

(ii) isometric growth.

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14. (a) Draw a large diagram of an unfertilized ovule of a flowering plant. Label on your diagram the following parts:

(i) micropyle

(ii) nucellus

(iii) integuments

(iv) embryo sac

(v) pollar nuclei

(vi) female nucleus.

(b) With reference to a maize plant

(i) describe double fertilization

(ii) explain the importance of double fertilization. (12 marks)

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