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

Friday 06 May 2003 p.m.

Instructions

1. **This paper consists of** 14 questions in sections A and B.
2. Answer **ALL** questions in section A and **FOUR (4)** questions from section B.
3. Read each question carefully.
4. Cellular phones are **not** allowed in the examination room.
5. Write your Examination Number on every page of your answer booklet(s).

This paper consists of 4 printed pages.

SECTION A

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

1. (a) What is the importance of biological keys?

   (b) Explain briefly the significance of scientific naming of organisms. **(08 marks)**

2. (a) Why is yeast classified as a fungi?

   (b) List the features, in each case, which place fungi in the plant and animal kingdoms. **(09 marks)**

3. (a) How is the epithelial lining of the ileum adapted for the function it performs?

   (b) Draw a single and large epithelial cell of the lining of ileum showing the features that adapt it to its function. **(08 marks)**

4. (a) In what two main ways is tricarboxylic acid cycle (TAC) important in respiration?

   (b) Explain briefly the two significant relationships between Kreb's cycle and electron transport system. **(07 marks)**

5. (a) Define homeostasis.

   (b) Describe briefly the homeostatic roles of

   (i) digestive system

   (ii) respiratory system

   (iii) the kidneys. **(07 marks)**

6. (a) State Mendel's laws of heredity.

   (b) In *Drosophila melanogaster* the gene for grey colour (+) is dominant over the gene for ebony colour (e).

   (i) What would the offspring phenotype be if both parents were heterozygous for body-colour?

   (ii) What would the offspring phenotype of a cross between homozygous grey male flies and heterozygous grey female flies be? **(07 marks)**

7. Summarise Darwin's theory of natural selection. **(07 marks)**

8. (a) What do you understand by a food chain?

   Leptomonas species is a parasitic flagellate protozoan. Thousands of the protozoan may parasitize a single flea. Construct a pyramid of numbers based on the food chain below:

   Grass → herbivorous mammal → flea → *leptomonas* sp

   In your diagram indicate the parasitic chain, the producers, the primary consumers, secondary and tertiary consumers.

   (b) How does deforestation increase atmospheric carbon dioxide levels? **(07 marks)**

SECTION B

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

9. Figure 1 below is a diagram of the "fluid mosaic model" of the cell membrane structure. Study the figure carefully and then answer the questions which follow it:

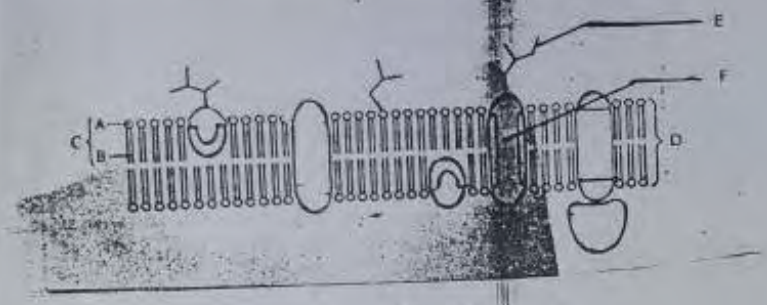

Figure 1

(a) Name the structures represented by labels A, B, C and D.

(b) Name the biochemical substance formed when E and F combine.

(c) What role does structure F play in the functions of a membrane?

10. (a) What is a phytohormone?

(b) In what ways are phytohormones important in plant growth and development?

11. Using the oxygen dissociation curve of a human adult and a foetal haemoglobin at rest and at 37 °C explain briefly how a mammalian foetus is adapted to oxygen uptake in its environment.

12. (a) Explain why it is important to employ active transport in the absorption of food stuffs like monosaccharides, dipeptides and amino acids.

(b) State the respiratory surface features common to all vertebrates and explain briefly the importance of each feature.

13. (a) Distinguish complete from incomplete metamorphosis.

(b) Explain the hormonal control of metamorphosis (moulting) in insects.

14. Figure 2 below represents a cross section of a human seminiferous tubule. Study the figure and answer the questions below it.

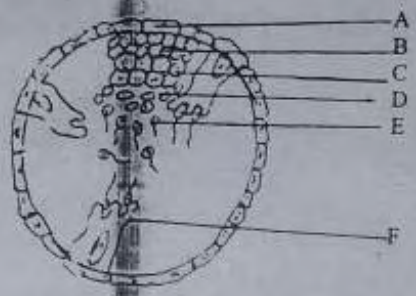

Figure 2

(a) Name the parts labelled A – F.

(b) Which structure forms the part labelled B?

(c) Which process is involved in the transformation of structure C to D?

(d) Explain the function of the structure labelled F.

(e) Define and point out the consequences of double fertilization.