

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

133/1 BIOLOGY I
(For Both School and Private Candidates)

Time: 2 Hours 30 Minutes **2009 February 13 Friday p.m.**

INSTRUCTIONS:

1. This paper consists of 15 questions in sections A and B.
2. Answer all questions in section A and two (2) questions from section B.

3. The mark allocation is indicated at the end of each question.
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 5 printed pages.

SECTION A (70 marks)

Answer all questions in this section.

1. (a) Define a taxonomic key.
(b) In what ways is scientific naming of organisms important?
(7 marks)
2. (a) What is the significance of classifying organisms?
(b) Outline the merits and demerits of using a common name for identifying a living organism.
(7 marks)
3. (a) Explain the roles of:
(i) ribulose diphosphate.
(ii) NADP in photosynthesis.
(b) (i) Why is photorespiration more common in C_3 plants than C_4 plants?
(ii) Why are C_4 plants more efficient in photosynthesizing than C_3 plants?
(7 marks)
4. (a) How does the electron transport chain system release ATP molecules?
(b) Explain why the electron transport systems are important in living organisms.
(7 marks)
5. Explain the roles of the mammalian hypothalamus in temperature regulation.
(6 marks)
6. Define the following genetical terms:
(a) Genotype.
(b) Phenotype.
(c) Homozygous.
(d) heterozygous.
(8 marks)
7. Explain the process of natural selection in relation to:
(a) peppered moth
(b) bacterial resistance to antibiotics.
(7 marks)
8. (a) Explain briefly the following:
(i) ecological succession
(ii) ecological niche.

- (b) Describe the possible damages that result from absorption of smoke and fumes from factories and motor vehicles into rain water. (7 marks)
9. The structure in figure 1 below represents the molecular structure of a part of the DNA molecule.
- (a) Study the diagram and answer the questions which follow:

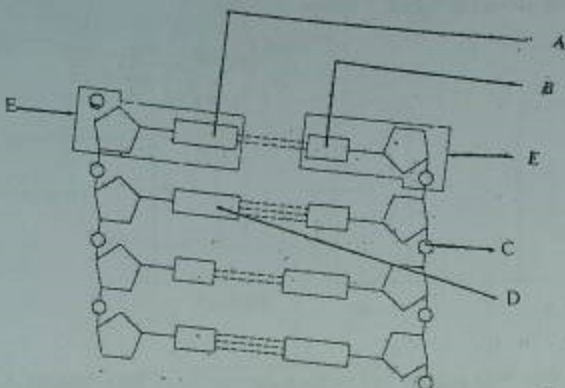


Fig. 1

- Name the structures labelled A to E.
- (b) Compare DNA and RNA structures on basis of; sugars, bases, strands and helices. (7 marks)
10. (a) Define speciation.
- (b) Explain how geographical isolation may bring about speciation. (7 marks)

SECTION B (30 marks)

Answer two (2) questions from this section.

11. (a) By means of labelled diagrams only, show the differences between motor and sensory neurons.

- (a) In a phototropic experiment, thin pieces of mica were inserted into three tips of coleoptiles as shown in figure 2 below.

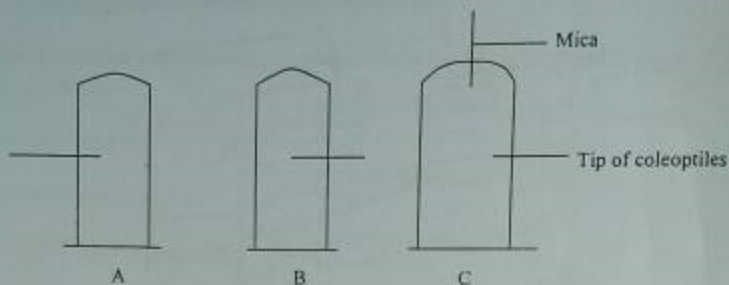


Fig. 2

Use the auxin theory to predict and explain the results of experiments A, B and C.

(15 marks)

12. (a) What is ATP?

- (b) Outline the respiratory pathway using lipid and protein substrates.

(15 marks)

13. (a) How is the phloem tissue adapted for the transport of materials?

- (b) Give the function and location of Casparian strip.

14. (a) (i) Define metamorphosis.

(15 marks)

- (ii) Give the significance of metamorphosis.

- (b) Explain why small mammals have higher metabolic rate than big ones.

(15 marks)

15. In figures 3.(a) and 3.(b) below, label structures A-H. What is the main function of each structure? (15 marks)

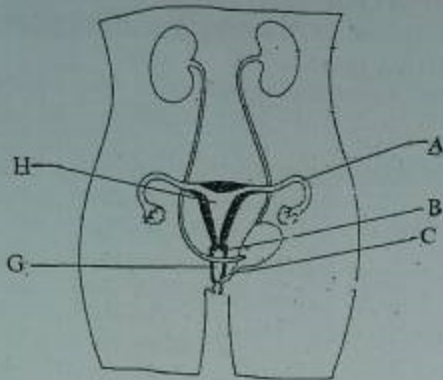


Fig.3.(a)

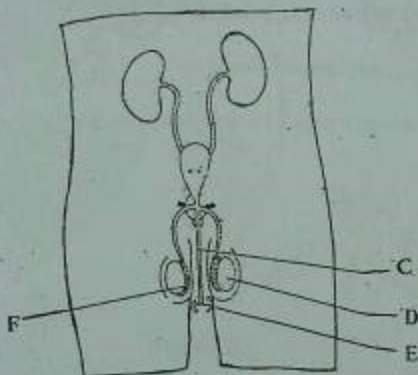


Fig. 3.(b)