

THE UNITED REPUBLIC OF TANZANIA  
NATIONAL EXAMINATIONS COUNCIL  
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION,  
MAY 1993

133/3

BIOLOGY PAPER 3  
(PRACTICAL)  
(For Both School and Private Candidates)

TIME: 3:15 Hours.

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IMPORTANT

The following instructions must be strictly adhered to.  
Failure to do so may lead to loss of marks.

1. Answer ALL questions.
2. Write your centre and index number on every page of your answer book.
3. Except for diagrams, all writing must be in blue or black ink/ball point pens.
4. Read each question carefully.

This paper consists of 4 printed pages.

1. Dissect specimen  $S_1$  to display the contents of the abdominal cavity. To be able to display clearly the various structures of your dissection

- (i) remove all the fat if present
- (ii) move the bulk of the intestines to YOUR right
- (iii) rearrange the parts so that they can be seen easily by tearing the mesentery holding them but taking care not to damage the blood vessels.

- (a) Make a large drawing of your dissection.
- (b) Label the following structures on your drawing

pancreas	duodenum
pancreatic duct	ileum
hepatic portal vein	bile duct
stomach	colon
liver	caecum

LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT AFTER THE EXAMINATION...

2. You have been provided with specimen  $S_2$ . Using the apparatus and reagents provided, carry out food tests to identify the food substances present in  $S_2$ . Leaving out the details of the procedure, copy the table below (Table 1) in your answer book. Follow the procedure for each step and record the observation and inference.

(a) Table 1

Step	Procedure	Observation	Inference
1	Add a drop of iodine solution to 2 drops of $S_2$ on a white tile.		
2	Boil $3\text{cm}^3$ of $S_2$ in a test-tube with Benedict's solution.		
3	Boil $3\text{cm}^3$ of $S_2$ with $2\text{cm}^3$ of dilute HCl and cool. Add NaOH/KOH solution until no effervescence occurs. Boil the resulting mixture with Benedict's solution.		

2. Discuss the structure and function of the epithelial tissue in plants and animals. Illustrate your answer.

SECTION B

3. (a) Explain why the spermatophyta are often referred to as the higher plants.  
(b) What is the economic importance of gymnosperms?
4. (a) (i) What do you understand by the term exoskeleton?  
(ii) Outline the advantages and disadvantages of exoskeleton in arthropods.  
(iii) How are these disadvantages overcome?  
(b) In what ways are insects harmful to man?

SECTION C

5. (a) In what ways are carbohydrates important in the metabolism and structure of plants?  
(b) Using examples, discuss the main adaptations of parasites.
6. Describe the various ways in which a terrestrial mammal such as a rat  
(a) reduces heat loss in a cold environment  
(b) increases heat loss in a hot environment.

SECTION D

7. A genetist who was verifying Mendell's First and Second laws of inheritance crossed 45 homozygous red-flowered plants with 45 homozygous white-flowered plants. The results of  $F_1$  offspring were 530 plants, all with pink flowers. He then selfed the 530 pink-flowered plants. The seeds obtained were planted and  $F_2$  offspring with the following phenotypes were obtained.
- |      |                            |
|------|----------------------------|
| 1292 | plants with red flowers    |
| 2570 | plants with pink flowers   |
| 1290 | plants with white flowers. |
- (a) Illustrate, using symbols, the crosses made and the results obtained in the experiment described above.
- (b) (i) What is the name given to the mode of inheritance of flower colour exhibited in the above experiment?  
(ii) How do the above observations differ from the results of Mendell's work which led him to formulate the 1st and 2nd laws of inheritance?

- (c) Describe the genetical test you would carry out to prove whether or not the appearance of pink flower colour in the above experiment is a true derivation from Mendel's principles of inheritance.
8. (a) Discuss the role of the following in an ecosystem
- (i) primary producers
  - (ii) decomposers
- (b) Write a brief essay on four activities of man that pollute the air and briefly discuss four measures which may be used to prevent further pollution.
9. (a) Using the theory of evolution as proposed by Jean Baptis Lamarck explain how ducks have developed webbed feet.
- (b) How could Charles Darwin, with his theory of natural selection, explain the development of webbed feet in ducks?
- (c) Mention the major errors in
- (i) Lamarck's and
  - (ii) Darwin's theories of evolution.
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