

THE UNITED REPUBLIC OF TANZANIA  
NATIONAL EXAMINATIONS COUNCIL  
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION  
MAY, 1990

133/3

BIOLOGY PAPER 3  
(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. Begin each answer on a fresh page.
3. Write your centre and index number on every page of your answer book.
4. Except for diagrams, all writing must be in ink or ball point pens.
5. Read each question carefully.

This paper consists of 4 printed pages.

1. Dissect specimen  $S_1$  provided to fully reveal and display the arterial system of the left side of the animal.  
Make a large drawing of your dissection and label fully.
  
2. You have been provided with four types of solutions namely A, B, C, and D. Using the chemicals and reagents provided carry out food test to identify the food substance present in each of the four types of solutions.  
For each food substance tested, record your procedure, observation and inference as shown in table 1. Summarise your results as shown in table 2.

Table 1

Food substance tested	Procedure	Observation	Inference

Table 2

Solution	Food substance present
A	
B	
C	
D	

3. With the help of the key provided below, identify specimens  $S_2$  and  $S_3$  by writing down the number for the positive statement until you arrive at the correct order for each specimen. Work with one specimen at a time.

Key to some insect orders

- 1a. Wingless ..... go to 2
- 1b. Winged ..... go to 8
  
- 2a. Antennae absent ..... PROTURA
- 2b. Antennae present (may be difficult to see)..... go to 3

- 3a. Abdomen with tubular, pincher-like or threadlike extension behind ..... go to 4
  - 3b. Abdomen without extensions behind ..... go to 5
  - 4a. Eyes absent ..... ENTOTROPHI
  - 4b. Eyes present and conspicuous ..... DERMAPTERA
  - 5a. Mouth parts tubular for sucking ..... go to 6
  - 5b. Mouth parts not tubular, for biting and chewing.. go to 7
  - 6a. Sucking tube long, straight and beaklike, body flattened from top to bottom, tips of feet with claws ..... HEMIPTERA
  - 6b. Sucking tube short and conical, body not flattened from top to bottom, tips of feet with pads..... THYSANOPTERA
  - 7a. Abdomen constricted and with a bead-like enlargement at connection with thorax ..... HYMENOPTERA
  - 7b. Abdomen broadly joined to thorax ..... ISOPTERA
  - 8a. Wings, 1 pair ..... DIPTERA
  - 8b. Wings, 2 pairs ..... go to 9
  - 9a. Front wings and hind wings similar in texture .. go to 10
  - 9b. Front wings and hind wings not alike in texture ..... go to 11
  - 10a. Wings much longer than body with numerous crossveins and held at an angle (rooflike) over body when at rest ..... NEUROPTERA
  - 10b. Wings not much longer than body, many longitudinal veins but few crossveins and held flat on back when at rest ..... TRICHOPTERA
  - 11a. Front wings leathery at base, membranous at tip, mouth parts in the form of a long sucking tube ..... HEMIPTERA
  - 11b. Front wings leathery or parchment-like throughout, mouth parts for biting and chewing.. go to 12
  - 12a. Front wings with veins, long, narrow, and parchment-like. Hind wings broad often fan-shaped. .... ORTHOPTERA
  - 12b. Front wings veinless, usually not parchment-like ..... go to 13
4. (a) You are provided with specimen  $S_4$ . Obtain one flower from a spikelet. Using a pin or dissecting needle, open up the flower by pushing the lemma and palea sideways.
- (i) Make an accurate labelled drawing of the flower.
  - (ii) Draw the floral diagram of the flower.

- (b) Place a small drop of the solution labelled  $S_5$  on a clean microscope slide. Put a cover slip on top and examine, first under low power, then under high power of the microscope.
- (i) Identify the organism(s)
  - (ii) Draw and label the organism(s)
  - (iii) From your observations suggest how the organisms form new individuals.
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