

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

133/3A

**BIOLOGY 3A
ALTERNATIVE A PRACTICAL
(For Both School and Private Candidates)**

Time: 3 Hours

9 May 2001 a.m.

Instructions

1. This paper has THREE (3) questions.
2. Answer ALL questions.
3. Read each question carefully.
4. The mark allocation is indicated at the end of each question.
5. Except for diagrams which must be drawn in pencil, all writing must be in black or blue ink/ball point pen.
6. Write your examination number on every page of your answer booklet.

This paper consists of 3 printed pages.

7a. Body shape flattened dorso-ventrally	DYCTYOPTERA
7b. Body shape not flattened dorso-ventrally	8
8a. Mouth parts: a proboscis adapted for sucking	HEMIPTERA
8b. Mouth parts of mandibles adapted for biting	ISOPTERA

- (b) (i) Slice the onion provided in two, lengthways and take out one of the fleshy leaves. Using a forceps, peel off the thin lining from the inner surface of the leaf. Cut out a small piece of the thin lining and place it on a slide. Add a drop of solution S₅.
- (ii) Cut out another piece of the thin lining and place it on another slide. Add a drop of solution S₆.
- (iii) Label each slide clearly, place a cover slip over the cells and examine the slides under the microscope, first under low power, then high power.
- (iv) Make sketches of the appearance of the cells in each of the two solutions (S₅ and S₆).
- (v) With the aid of the sketches in (iv) above, describe the appearance of the cells in each of the two solutions.
- (vi) Account or give reasons for the observed difference in appearance of cells as sketched in (iv) above.
- (vii) Draw up solution S₆ from one side of the cover slip with a piece of filter paper and, at the same time, add a drop or two of distilled water to the other side of the cover slip using a pipette. View the slide again under the microscope. Explain what happens to the cells.
- (viii) Suggest the aim of step (vii).

(15 marks)

1. You have been provided with specimen S₁.
 - (a) Identify the sex of your specimen.
Dissect specimen S₁ in the usual way to fully display the EXCRETORY SYSTEM.
 - (b) Draw a large, neat diagram of your dissection and label only the excretory structures and blood vessels associated with the system.
 - (c) State one function of any **four** of the excretory structures labelled in (b) above.
 - (d) LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT.
(20 marks)

2. You have been provided with solutions S₂ and S₃, each of which contains one pure food substance. You have also been provided with an onion bulb. Prepare solution S₄ as described below.
 - (a)
 - (i) Remove the dry scale leaves from the onion.
 - (ii) Cut the onion into small pieces and mash it up with a pestle and mortar.
 - (iii) Add a little water, stir and then decant to obtain a suspension. Label it S₄.
 - (b) Design and carry out tests to identify the carbohydrates present in S₂, S₃ and S₄.
 - (c)
 - (i) Which of the two solutions, S₂ and S₃, contains a food substance similar to that present in the onion bulb?
 - (ii) Suggest the name of the carbohydrate stored in onion bulbs.
(15 marks)

3. (a) With the help of the key given below, identify specimens P and Q by writing down the sequence of the numbers of the leads which direct you to the correct order of the specimen.

KEY TO SOME INSECT ORDERS

1a. Wings absent	MALOPHAGA
1b. Wings present	2
2a. Number of conspicuous wings two	DIPTERA
2b. Number of conspicuous wings four	3
3a. Limbs six, two being larger than the rest	ORTHOPTERA
3b. Limbs six, all of the same size	4
4a. Outer wings hardened into elytra, inner ones soft and membranous	COLEOPTERA
4b. Both outer and inner wings soft and membranous	5
5a. Scales present on wings	LEPIDOPTERA
5b. Scales absent on wings	6
6a. Body covered with hair	HYMENOPTERA
6b. Body smooth, not covered with hair	7