THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION
MAY 1997

133/3A

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

TIME : $3\frac{1}{4}$ Hours

IMPORTANT

1. Answer ALL questions.
2. Write your centre and index number on every page of your answer book.
3. Except for diagrams, which must be drawn in pencil, all writing must be in blue or black ink/ball point pen.
4. Read each question carefully.
5. The mark allocation is indicated at the end of each question.

This paper consists of 4 printed pages.
1. Dissect specimen $S_1$, in the usual way, to fully display the spinal nerves and the sympathetic nervous system.

(a) Make a large and neat drawing of your dissection. (8 marks)

(b) Label on your drawing the following:

- hypoglossal nerve
- branchial nerve
- sympathetic cord
- sympathetic ganglion
- ramus communicans
- spinal nerves 7, 8, 9 & 10
- sciatic plexus
- sciatic nerve (22 marks)

NOTE: In order to be able to display the above structures clearly, it is best to remove the stomach, lungs, heart, kidneys and any overlying tissue; but take care not to cut the aorta.

(c) LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT. (10 marks)

(Total 40 marks)

2. You are provided with specimens $S_2$ and $S_3$, each in powder and solution forms. Specimens $S_2$ and $S_3$ were obtained from ungerminated and germinated grains of finger millet respectively.

(a) Using the apparatus and reagents provided, carry out similar biochemical tests for carbohydrates to both specimens $S_2$ and $S_3$.

Tabulate your procedure, observations and inferences as shown below.

<table>
<thead>
<tr>
<th>Specimen</th>
<th>Food Substance tested</th>
<th>Procedure</th>
<th>Observation</th>
<th>Inference</th>
</tr>
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</table>

(11 marks)
(b) (i) Name the biochemical process by which the type of carbohydrate in specimen S₃ was converted to the type of carbohydrate in specimen S₄. 
(2 marks)

(ii) Write a word equation to represent the biochemical process named in (b) (i) above. 
(5 marks)

(iii) What is the biological significance of this process in living organisms? 
(2 marks)
(Total 20 marks)

3. Study specimen S₄ carefully.

(a) (i) Detach one young circinate leaf from the plant and examine it using a hand lens. Draw and label the young leaf. (6 marks)

(ii) What phase of the life cycle does specimen S₄ represent? 
(2 marks)

(b) Classify the specimen up to class level and give one observable distinctive feature for each of the classification ranks mentioned. 
(12 marks)
(Total 20 marks)

4. Carefully study the external features of the six animals labelled "SPECIMENS FOR Q.4" using a hand lens.

(a) Identify the specimens using the key provided below by writing down systematically, the numbers and letters of the lead which directed you to the letter of the specimen. 
(11 marks)

**KEY FOR THE IDENTIFICATION OF THE SIX ANIMALS**

1a wings _________________________________ 2
1b no wings ______________________________ 3
2a abdomen with cerci ______________________ E
2b abdomen without cerci ____________________ C
3a 3 distinct body divisions ___________________ B
3b 2 distinct body divisions __________________ 4
4a antenna ________________________________ 5
4b no antenna ______________________________ A
5a walking legs 1 pair per body somite ________ D
5b walking legs 2 pairs per body somite ________ F

(b) Give common names for specimens A - F.  

(c) Classify specimen C by naming its phylum, class and order.  

(d) Name the respiratory organs for specimens A and E.  

(Total 20 marks)