THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

133/3B **BIOLOGY 3B**

(ACTUAL PRACTICAL B)

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 1999**

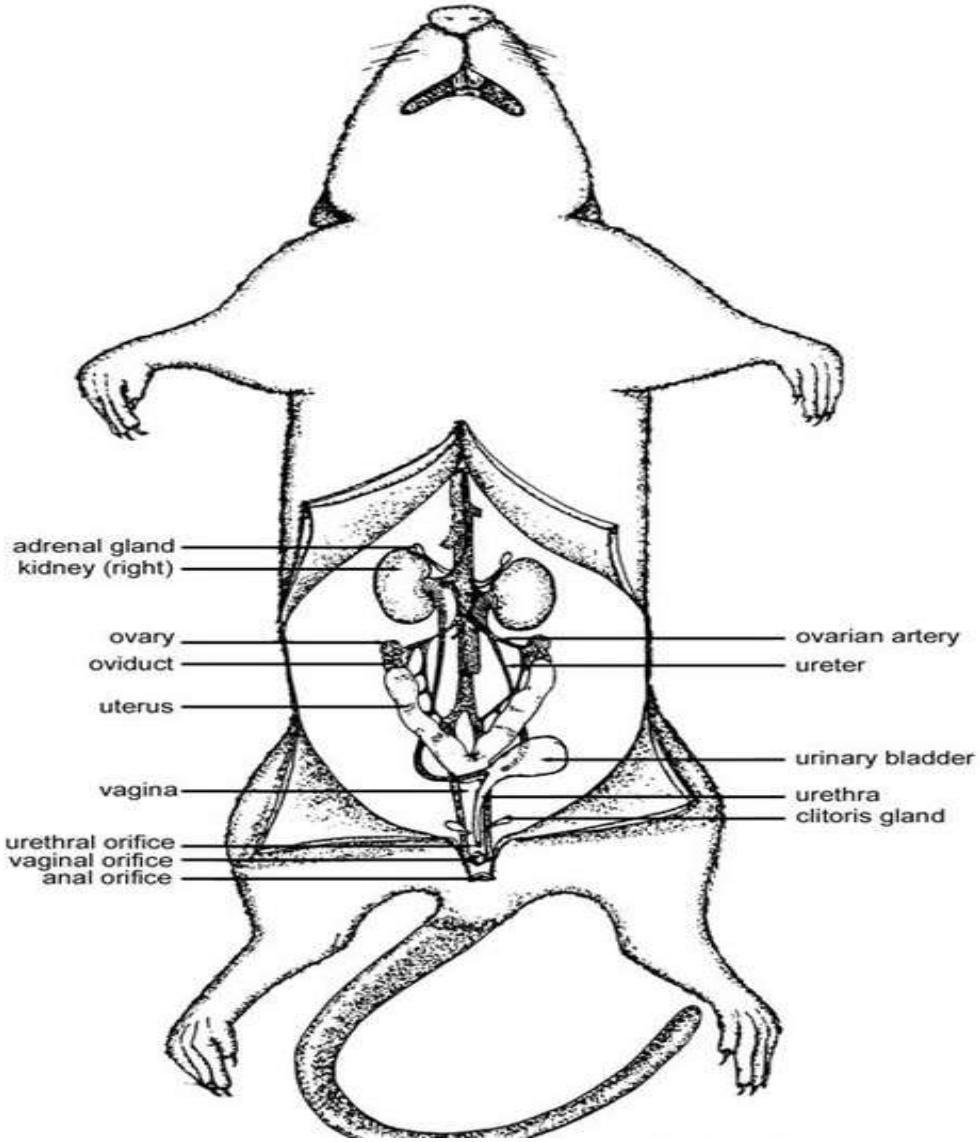
Instructions

1. This paper consists of three questions.

2. Answer all questions.

1. Dissect specimen S_1 in the usual way to display the urogenital system.

(a) Make a neat, large and well labelled diagram of your dissection.
The diagram should include:
- Kidneys
- Ureters
- Bladder
- Urethra
- Testes or ovaries
- Vas deferens or oviduct
- Accessory glands (e.g., seminal vesicle)



(b)(i) Identify the structures in the system you have displayed which have both reproductive and excretory roles. Name each of these structures.

- Urethra -----> Common pathway for urine and semen in males
- Cloaca (if bird/reptile) -----> Passage for urine, feces, and gametes
- Vas deferens (in some species) -----> May join with excretory ducts

(ii) Name the structures in the urogenital system of S_1 which have a strong storage capacity and state the substances stored in each structure.
- Bladder -----> Stores urine
- Seminal vesicles -----> Store semen/sperm
- Epididymis -----> Stores sperm before ejaculation

LEAVE YOUR DISSECTION WELL DISPLAYED FOR ASSESSMENT (20 marks)

2. You are provided with 20% yeast suspension, 5% glucose solution and 0.05% methylene blue solution – a dye whose blue color disappears when reduced.

(a)(i) Label test-tubes X, Y, and Z
(ii) Using beakers, prepare 3 water baths at 10°C, 40°C, and 70°C:
- 10°C -----> Add ice to cold water
- 40°C -----> Mix cold and hot water
- 70°C -----> Add hot water slowly

(iii) Place $2cm^3$ of yeast suspension in each of the test-tubes X, Y, and Z
(iv) Add $2cm^3$ of 5% glucose to each test-tube, shake well
(v) Place test-tubes X, Y, Z in 10°C, 40°C and 70°C water baths respectively
(vi) Add 5 drops of methylene blue and cork the tubes
(vii) Note the time taken for the blue color to disappear

Tabulate your results:

Test-tube	Temperature (°C)	Time taken for blue colour to disappear
X	10	Long time / no change
Y	40	Shortest time / quickly disappears
Z	70	No change / dye persists

(b)(i) What is the aim of the experiment?
To investigate the effect of temperature on the rate of yeast respiration

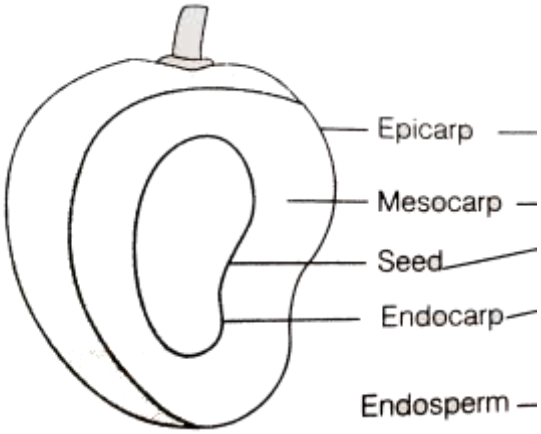
(ii) Give explanations for the results in test-tubes X, Y and Z.
- X (10°C): Low enzyme activity -----> Slow respiration
- Y (40°C): Optimum temperature -----> Fastest respiration
- Z (70°C): Enzymes denatured -----> Respiration halted

(iii) What is the role of yeast in the experiment?
Yeast respires and reduces methylene blue

(iv) What would be the possible effects of increasing the concentration of glucose?
Faster respiration rate until saturation point

3. (a) Specimen S_3 was obtained from an angiosperm plant.

(i) Make a longitudinal section (L.S) and draw and label the internal structure.
Labels:
- Pericarp
- Seed
- Endocarp
- Mesocarp
- Epicarp



(ii) Name the subclass to which S_3 belongs and state observable features.
Subclass: Dicotyledonae
Features:
- Two seed leaves
- Net-veined leaves
- Floral parts in 4s or 5s

(iii) From what part of a plant did S_3 develop?
Ovary

(iv) Outline the functions of the parts of S_3 named in your diagram.
- Seed -----> Propagates new plant
- Pericarp -----> Protects seed
- Endocarp -----> May form hard seed covering
- Mesocarp -----> Fleshy, edible portion

- Epicarp -----> Outer covering (skin)

(b) Using a hand lens study specimen S_5 carefully.

(i) Draw and label S_5
(Drawing should include outer wall, inner chambers, seeds)

(ii) What stage of life-cycle does S_5 represent?
Fruit (mature ovary)

(iii) State the natural habitat of S_5.
On trees or plants in fields/farms/forests

4. (a) Use the key to identify group of fruits to which specimens S_3 and S_5 belong.

S_3:
1a. Fruit is fleshy
4a. One carpel and hard stony endocarp -----> Order U

S_5:
1a. Fruit is fleshy
4b. Indehiscent with two or more carpels, with a fleshy endocarp -----> Order T

(b) Use a sharp scalpel or razor blade to make a longitudinal section through the middle region of S_5 and draw a large labelled diagram.
Labels should include:
- Epicarp
- Mesocarp
- Endocarp
- Seeds
- Locules
- Style remnant