THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

ADVANCED CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

133/3A **BIOLOGY 3**

(ACTUAL PRACTICAL)

(For Both School and Private Candidates)

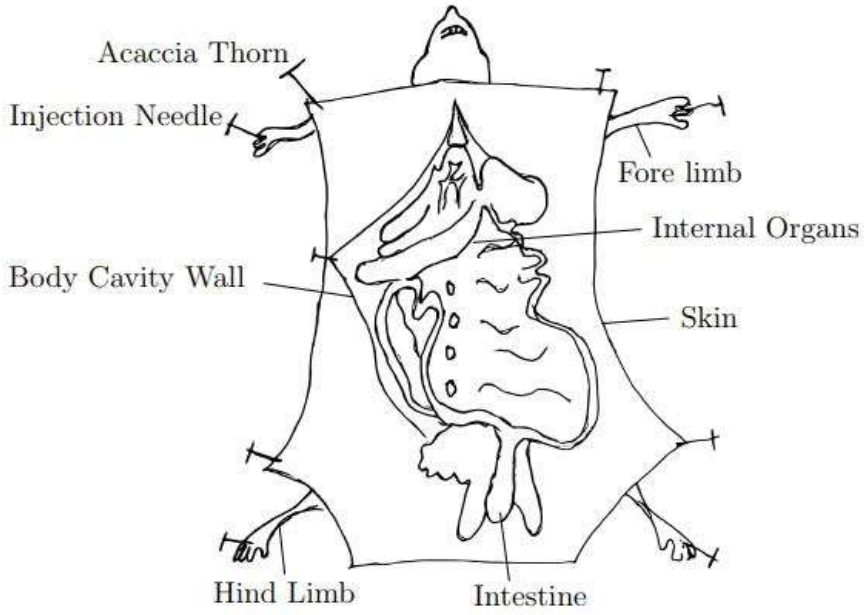
Time: 2:30 Hours **ANSWERS** **Year: 1991**

Instructions

1. This paper consists of three questions.

2. Answer all questions.

1. Dissect specimen S_1 provided to fully display all veins posterior to the heart.
Make a large drawing of your dissection and label fully.
LEAVE YOUR DISSECTION PROPERLY DISPLAYED FOR ASSESSMENT AFTER THE EXAMINATION.



2. You are provided with test-tubes L, M and N containing starch, sucrose and a protein. You are also provided with an enzyme capable of digesting a carbohydrate and Benedict's solution. Rinse your mouth with water to remove food particles. Collect about 5 cm^3 of saliva in a clean test-tube, dilute it with a little amount of water and label it SALIVA solution.

(a) Carry out experiments using only the materials provided and the saliva solution to determine the contents of the tubes L, M and N. Record your procedure, observations and inference as shown in table 1. Summarise your results as shown in table 2.

Table 1

Substance Tested	Procedure	Observation	Inference
L	Add saliva and warm. Then test with iodine solution	Blue-black color disappears	Starch was broken down
M	Add saliva and warm. Then test with Benedict's solution	Brick-red precipitate formed	Reducing sugar present (sucrose broken to glucose/fructose)
N	Add saliva and warm. Then test with Biuret solution or Millon's reagent	No color change	Protein not digested by saliva

Table 2

Test-tube	Substance present
L	Starch
M	Sucrose
N	Protein

(b) What general conclusion about enzymes can be drawn from the experiments?
Explain your answer on the basis of your experiments in Q.1(a) above.

Enzymes are specific in action. The saliva (which contains amylase) was only able to digest starch into reducing sugars and had no effect on protein. This demonstrates that enzymes work on specific substrates.

3. (a) Examine specimens S_2 and S_3 carefully. Identify the specimens using the key provided by writing down the number for the positive statement until you arrive at the correct group name for the specimen.
N.B. Work with one specimen at a time.

KEY TO SOME COMMON FRUITS:
1a Fruits dry – go to 3
1b Fruits succulent – go to 2
2a 2 to many-seeded; seeds embedded in fleshy pericarp – BERRY
2b 1-seeded; seed enclosed in a hard inner layer of pericarp – DRUPE
3a Dehiscent – go to 4
3b Indehiscent – go to 6
4a Formed from 2 or more carpels – CAPSULE
4b Formed from 1 carpel – go to 5
5a Having 2 lines of dehiscence – LEGUME
5b Having 1 line of dehiscence – FOLLICLE
6a Formed from 1 carpel – go to 7
6b Formed from more than 1 carpel – go to 9
7a Breaking into 1-seeded portions at maturity – LOMENTUM
7b Not breaking into 1-seeded portions at maturity – contains only 1 seed – ACHENE
8a Pericarp winged – SAMARA
8b Pericarp not winged – ACHENE
9a Pericarp winged – SAMARA
9b Pericarp not winged – go to 10
10a Seed free within pericarp, pericarp woody – NUT
10b Seed fused to pericarp – CARYOPSIS

(b) Give a floral diagram and formula of specimen S_4.

Br ⊕ K(5) C(5) A∞ G(5)_
Where:
Br – Bracteate
⊕ – Actinomorphic
K – Calyx
C – Corolla
A – Androecium
G – Gynoecium (inferior or superior)

4. (a) An animal has the following diagnostic features: mouth parts suctorial, have a bulbous sponging enlargement at the end of a proboscis; larvae have very small heads, legless and have no eyes; forewings transparent, few veins; hind wings form halteres; diurnal and artist plumed to tip.

(i) Which one of specimens X, Y and Z fits best to these features?

Specimen Z (likely a housefly)

(ii) Give the scientific name of the specimen you have selected in Q.4(a)(i) above.

Musca domestica

(iii) Name the phylum, class, order and family to which the specimen you have selected in Q.4(a)(i) belongs.

Phylum: Arthropoda
Class: Insecta
Order: Diptera
Family: Muscidae

(b) Study specimens S_5 and S_6 carefully. Give three observable features which make the specimens differ from each other.

S_5: Longer legs, hard exoskeleton, presence of wings
S_6: Shorter limbs, absence of wings, softer body structure
Other differences may include type of antennae, color, or presence/absence of visible segmentation.