THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

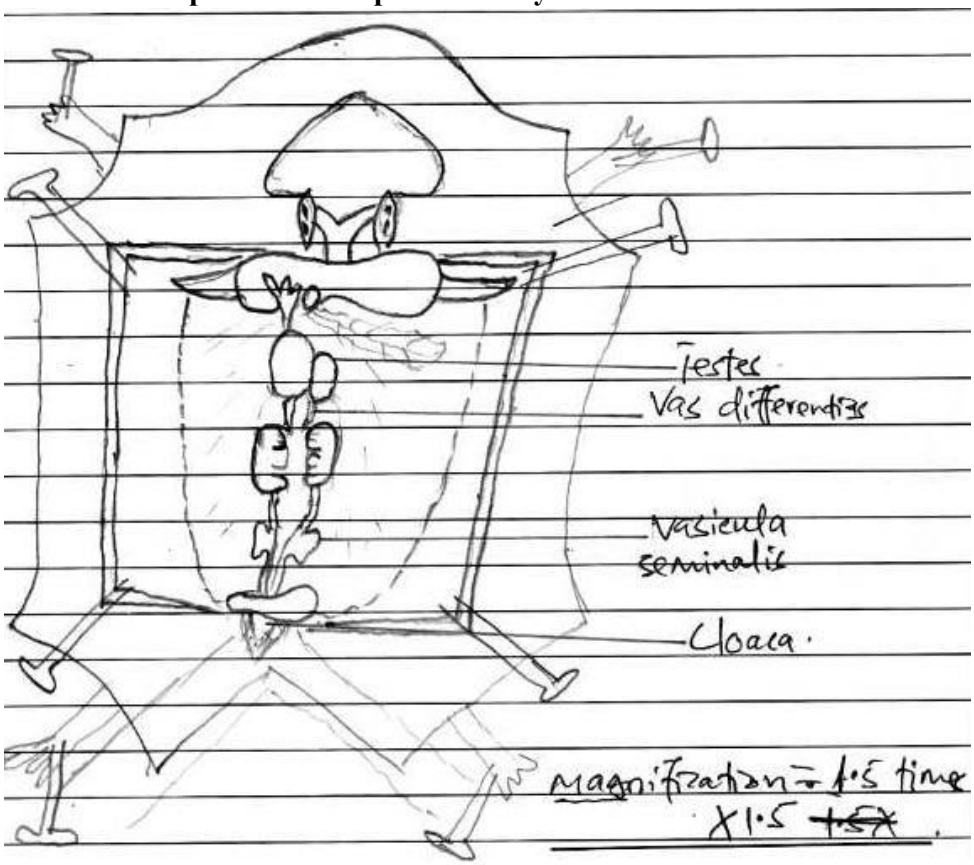
733/2B **BIOLOGY 2B**

Time: 3 Hour. **ANSWERS** **Year: 2012**

Instructions

1. This paper has three papers.
2. Answer **all** questions.
3. Question **1** contains 30 marks while question 2 and 3 have 10 marks each.
4. Mobile phones are not allowed inside the examination room.
5. Write your Examination Number on every page of your answer booklet.

1. Dissect specimen Y (a frog) to expose the reproductive system.
(a) Draw and label four parts of the reproductive system.



(b) Identify the organ responsible for:
(i) Producing gametes
The testes in male frogs produce sperm cells, while the ovaries in female frogs produce ova. These organs are responsible for generating gametes used in sexual reproduction.

(ii) Storing gametes
The oviduct in females temporarily stores the ova before they are released to the external environment during spawning. In males, sperm may be held briefly in the sperm ducts before release, though frogs do not have well-developed sperm storage organs.

(iii) Transporting gametes
The sperm ducts (also called vas efferens) in males transport sperm from the testes to the cloaca for release. In females, the oviducts transport the eggs from the ovaries to the cloaca during oviposition.

(c) What would happen if the anterior abdominal vein is damaged?
If the anterior abdominal vein is punctured or damaged during dissection, it would lead to heavy bleeding inside the body cavity. This may obscure internal organs and make it difficult to observe the structures clearly. Additionally, in a living organism, such damage would impair blood circulation and could be fatal.

(d) Why flood the body cavity with water after opening the specimen? Give two points.
Flooding the cavity with water helps to keep the internal organs moist and prevents them from drying out

during dissection, which maintains their original shape and texture. It also enhances visibility by allowing the organs to float slightly apart, making them easier to identify and observe clearly.

2. You are provided with solution K.
(a) Perform biochemical tests and record results in the table below:

Food Tested	Procedure	Observation	Inference
Starch	Add iodine solution to a portion of solution K	Blue-black color observed	Starch is present
Reducing Sugar	Add Benedict's solution, then heat in boiling water bath	Brick-red precipitate formed	Reducing sugar is present
Protein	Add Biuret solution (sodium hydroxide + copper sulfate)	Purple color appeared	Protein is present
Lipid	Mix with ethanol and water, then shake well	White emulsion formed	Lipid is present

(b) Name two natural foods from which K could be extracted.
Solution K could be extracted from milk, which contains proteins (casein), fats, and lactose sugar.
Another possible source is groundnut paste, which contains proteins, lipids, and small amounts of reducing sugars.

(c) State first site of digestion, digestive juice, and end product of the food identified in K.
Carbohydrate digestion begins in the mouth, where saliva containing salivary amylase starts breaking down sugars into maltose.
Protein digestion begins in the stomach, where gastric juice containing pepsin converts proteins into peptides.
Lipid digestion begins in the small intestine, where bile emulsifies fat and pancreatic lipase breaks it down into fatty acids and glycerol.

3. Observe specimens L (Spider), M (Housefly), N (Fern), P (Bean), and Q (Maize).
(a) Differentiate the following using four observable features:
(i) L vs M
Specimen L (spider) has two body segments: cephalothorax and abdomen, while specimen M (housefly) has three body segments: head, thorax, and abdomen.
Specimen L has eight legs, while M has six legs.
Specimen L lacks wings, while M possesses a single pair of wings.
Spiders have simple eyes only, while houseflies have compound eyes.

(ii) P vs Q

Specimen P (bean) has broad leaves, while Q (maize) has narrow leaves.
Bean plant is dicotyledonous with a taproot system, while maize is monocotyledonous with fibrous roots.
Bean shows reticulate venation in leaves, while maize shows parallel venation.
Beans produce flowers with five petals, while maize has separate male and female flowers.

(b) Draw specimen N and label four parts.