THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

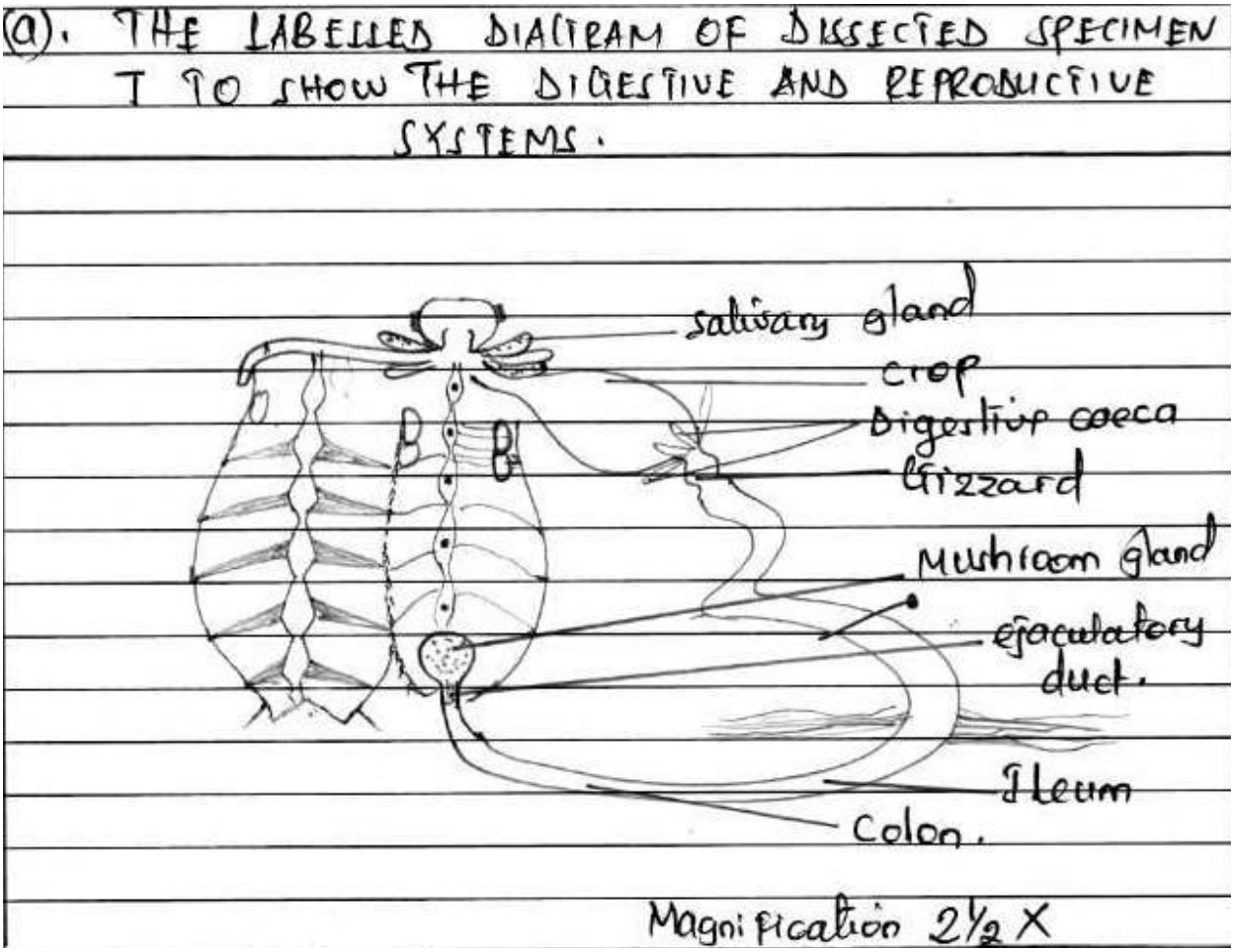
733/2A **BIOLOGY 2A**

Time: 3 Hour. **ANSWERS** **Year: 2009**

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 B (cockroach) to reveal reproductive and excretory systems.
(a) Draw and label two parts for each system.



(b) State the function of each reproductive part.
The testis in male cockroaches produces sperm cells, which are necessary for reproduction.
The vas deferens transports the sperm from the testis to the ejaculatory duct during mating.
The ovary in female cockroaches produces ova, which are the female gametes.
The oviduct receives ova from the ovaries and leads them to the genital chamber for fertilization.

(c) Identify the sex and justify with three features.
If the specimen has long, slender anal styles at the posterior end, it is a male.
The presence of paired testes and vas deferens also indicates a male specimen.
If the specimen lacks ovipositors and has a broader abdomen, it supports male identification.

(d) Why are some threadlike parts abundant?
Threadlike structures such as Malpighian tubules are numerous to increase the surface area for excretion.
This helps in efficient removal of nitrogenous wastes from the hemolymph into the hindgut for elimination.

2. Use solutions P and Q to perform food tests.
(a) Complete the following table:

Test For	Procedure	Observation	Inference
Starch	Add iodine to solution P	Blue-black colour	Starch is present in P
Reducing sugar	Add Benedict's to solution Q, heat in water bath	Brick-red precipitate	Reducing sugar is present in Q
Protein	Add Biuret solution to P	Purple or violet colour	Protein is present in P
Lipid	Rub Q on brown paper and observe after drying	Translucent spot appears	Lipid is present in Q

(b) State three biological roles of food in solutions P and Q.
Starch from solution P serves as a long-term energy reserve in the body.
Protein in solution P is used for body growth, repair of worn-out tissues, and enzyme production.
Reducing sugars and lipids from solution Q provide immediate and high-energy supply to body cells.

(c) (i) Name the enzyme involved in digestion of food in Q.
Lipase is the enzyme responsible for breaking down the lipids found in solution Q.

(ii) What are the final products?
The end products of lipid digestion are fatty acids and glycerol, which are absorbed in the small intestine.

3. Observe specimens J (Maize), K (Fish scale), and L (Bean).
(a) (i) Give two features for classifying J into its kingdom.
Maize is multicellular with organized tissues, which classifies it under the Plantae kingdom.
It has cell walls made of cellulose and performs photosynthesis using chlorophyll.

(ii) State three industrial uses of J.
Maize is used to manufacture cooking flour and animal feed.
It is processed into ethanol for biofuel production.
Corn oil from maize seeds is extracted for use in food and cosmetics industries.

(b) Identify and explain the functions of K.
Specimen K is a fish scale, which originates from a fish such as Tilapia.
Fish scales protect the body from mechanical injury and predators.
They also reduce friction, allowing smooth movement through water.

(c) Classify specimen L and give three justifying features.
Specimen L (Bean) belongs to Class Dicotyledonae.
It has broad leaves with net-like venation.
It produces seeds with two cotyledons.
The flower parts are arranged in multiples of four or five.