THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

733/2B **BIOLOGY 2B**

Time: 3 Hour. **ANSWERS** **Year: 2007**

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 M (frog or toad) to display its reproductive system.
(a) (i) Draw a well-labelled diagram showing at least four parts of the reproductive system.

(ii) Indicate the position of the kidneys and oviducts/testes.
In the actual diagram, four parts to be labelled include the testes or ovaries, oviducts or sperm ducts, cloaca, and urinary bladder. The kidneys are positioned on both sides of the backbone in the abdominal cavity. In males, testes are near the kidneys, while in females, the ovaries lie above the kidneys and oviducts coil alongside the kidneys.

(b) (i) Identify the organ for gamete production.
In males, the organ for gamete production is the testes. In females, it is the ovaries. These organs produce sperm and ova respectively.

(ii) Which organ temporarily stores gametes?
The sperm duct in males and oviduct in females serve as temporary storage sites for sperm and eggs respectively before release during mating or egg laying.

(iii) Name the organ used to transport gametes.
The sperm duct transports sperm from testes to cloaca in males, while in females, oviducts transport ova from ovaries to cloaca or external environment.

(c) (i) What is the consequence of cutting the anterior abdominal vein?
If the anterior abdominal vein is accidentally cut during dissection, it can lead to excessive bleeding, which may obscure internal structures and damage vital organs due to blood loss and internal damage.

(ii) Why is water added during dissection? Give two points.
Water keeps the internal organs moist, making them easier to observe and manipulate. It also prevents tissues from drying out and becoming fragile or difficult to handle.

2. You are provided with solution Q.
(a) (i) Perform food tests using the provided reagents.
(ii) Complete the following table:

Food Tested	Procedure	Observation	Inference
Starch	Add iodine solution to solution Q	Blue-black coloration	Starch is present
Reducing sugars	Add Benedict's solution and heat in water bath	Brick-red precipitate forms	Reducing sugar is present
Protein	Add Biuret reagent (NaOH and CuSO4)	Violet/purple colour appears	Protein is present
Lipid	Mix with ethanol, then add water	Cloudy white emulsion forms	Lipid is present

(b) (i) State two food items that can give rise to such a solution.
Such a solution could have been extracted from milk or groundnut paste. Both contain carbohydrates (like lactose), proteins (casein in milk), and fats.

(ii) Name the first site of digestion, the juice involved, and the end product.
The first site of digestion is the mouth for carbohydrates using saliva (which contains amylase), and the stomach for proteins using gastric juice. The final products are glucose from carbohydrates, amino acids from proteins, and fatty acids and glycerol from fats.

(c) (i) Mention three roles of the identified food substances.
Carbohydrates provide energy for metabolic processes. Proteins build and repair body tissues and enzymes. Lipids serve as energy reserves, insulate the body, and form cell membranes.

(ii) State one negative health effect of lacking this food substance.
Lack of proteins may lead to kwashiorkor, a deficiency disease characterized by swelling, muscle wasting, and stunted growth in children.

3. Observe specimens C (Maize plant), D (Bean plant), and E (Fern plant).

(a) (i) List three differences between specimen C and D based on observable features.
Specimen C (maize) has parallel venation while D (bean) has net venation. C has fibrous roots; D has a tap root system. C has long narrow leaves; D has broad leaves.

(ii) Identify two uses of specimen D in daily life.
Bean plants provide proteins as a food source. They also help in nitrogen fixation, enriching the soil.

(b) (i) Observe the lower surface of specimen E and name the structures seen.
The lower surface of the fern shows sori, which are clusters of sporangia.

(ii) State the role of those structures.
Sori produce and release spores for reproduction in ferns, which is a non-flowering mode of reproduction.

(c) Draw specimen D and label five parts.
The drawing of the bean plant should include: root system, stem, leaves, buds, and cotyledons (if seedling). These labelled parts illustrate the major structural components important for support, photosynthesis, and nutrient uptake.