THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATTION EXAMINATION

733/2B **BIOLOGY 2B**

(ACTUAL PRACTICAL B)

Time: 3 Hours **ANSWERS** **Wednesday, 13th May 2014**

Instructions.

1. This paper consists of **three (3)** questions.
2. Answer **all** questions
3. Question number 1 carries 40 marks and the rest carry 30 marks.
4. Cellular phones are **note** allowed in the examination room.
5. Write your **examination Number** on every page of your answer booklet(s).

1. You are provided with specimen Q. Dissect the specimen in the usual way to display the excretory system. Deflect the alimentary canal to the left of the specimen.

(a) Draw a neat, large diagram of your dissection and label the structures of excretory system.

Answer:
Your diagram should show:

- Malpighian tubules
- Rectum
- Anus

(b) Name the function of each excretory structure you have labeled in (a).

Answer:

- Malpighian tubules: Remove nitrogenous waste (mainly uric acid) from the body fluids into the gut.
- Rectum: Absorbs water from waste before excretion.
- Anus: Eliminates undigested and excretory waste.

(c) State how each structure labeled in (a) is adapted to perform its function.

Answer:

- Malpighian tubules: Long, thin, and numerous to increase surface area for waste absorption from hemolymph.
- Rectum: Lined with cells adapted for water reabsorption, reducing water loss.
- Anus: Has muscular control to regulate excretion of waste materials.

(d) Classify specimen Q to its class level.

Answer:
Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta

(e) Outline any two characteristics of the phylum to which specimen Q belong.

Answer:

1. Body segmented into head, thorax, and abdomen.
2. Possesses jointed appendages for movement and feeding.

(f) Give five differences between the class of specimen Q and the class Arachnida.

Answer:

Feature	Insecta (Specimen Q)	Arachnida
Number of body parts	3 (head, thorax, abdomen)	2 (cephalothorax, abdomen)
Number of legs	3 pairs (6 legs)	4 pairs (8 legs)
Antennae	Present	Absent
Eyes	Usually compound eyes	Usually simple eyes
Wings	May be present	Absent

(g) Briefly describe two adaptations of specimen Q to harsh dry conditions.

Answer:

1. Excretes uric acid, which requires minimal water for elimination.
2. Possesses a waxy cuticle on its exoskeleton to reduce water loss by evaporation.

(h) Leave your dissection properly displayed for assessment.

2. You have been provided with solutions S_1, S_2 and S_3.

(a) Using the chemicals and reagents provided carry out the food test experiment to identify the food substances present in solutions S_1, S_2 and S_3.

Food tested	Procedure	Observation	Inference
S_1 (Starch)	Add iodine solution	Blue-black colour appears	Starch present
S_2 (Reducing sugar)	Add Benedict's solution and heat in a water bath	Colour changes to green/yellow/orange/red	Reducing sugar present
S_3 (Protein)	Add Biuret solution	Violet/purple colour appears	Protein present

(b) For each food substance identified in (a) name one common source for it.

Answer:

- Starch: Maize
- Reducing sugar: Honey

- Protein: Egg

(c) State the role played by each food substance identified in 2(a) above.

Answer:

- Starch: Provides energy after digestion into glucose.
- Reducing sugar: Provides quick, readily available energy.
- Protein: Builds and repairs body tissues and forms enzymes and hormones.

3. Carefully study the provided specimens K_1, K_2 and K_3.

(a) Identify each specimen by its common name.

Answer:

- K_1: Cactus
- K_2: Sweet potato
- K_3: Moss

(b) Name the phylum/division of each specimen provided.

Answer:

- K_1: Phylum Angiospermophyta
- K_2: Phylum Angiospermophyta
- K_3: Division Bryophyta

(c) Draw a labeled diagram of specimen K_3.

Answer:
Describe:
A simple diagram showing:

- Rhizoids
- Stalk (seta)
- Capsule
- Leaf-like structures

(d) Describe the life cycle of specimen K_3. (Diagrams are not necessary).

Answer:
Moss exhibits an alternation of generations:

1. Dominant gametophyte stage produces male (antheridia) and female (archegonia) sex organs.
2. After fertilization, the zygote grows into a sporophyte.
3. Sporophyte produces spores by meiosis.
4. Spores are dispersed, germinate, and grow into new gametophytes.

(e) How does specimen K_3 differ from higher plants.

Answer:

1. Lacks true roots, stems, and leaves.
2. Lacks vascular tissues (xylem and phloem).
3. Dominant gametophyte generation.
4. Reproduces using spores instead of seeds.
5. Requires water for fertilization.

(f) Enumerate five adaptations of specimen K_1 to its environment.

Answer:

1. Thick, fleshy stems for water storage.
2. Reduced or modified leaves (spines) to minimize water loss.
3. Thick cuticle to prevent evaporation.
4. Extensive shallow roots to absorb water quickly.
5. Ability to perform photosynthesis using stems.

(g) Which part of specimen K_2 store food.

Answer:
Tuber (modified root)

(h) Which type of food substance is stored in specimen K_2.

Answer:
Starch

(i) Name three usefulness of specimen K_2 to human being.

1. Source of carbohydrates for energy.
2. Used in making flour and processed foods.
3. Can be used in alcoholic beverage production.