THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

033/2A **BIOLOGY 2A**

(ACTUAL PRACTICAL A)

(For Both School and Private Candidates)

Time: 2:30 Hours **ANSWERS** **Year: 2007**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

1. You are provided with solution S.

(a)(i) Record your experimental work as shown in table 1 below:

Test for	Procedure	Observations	Inference
Starch	Add iodine solution to solution S	Blue-black color appears	Starch is present
Reducing sugars	Add Benedict's solution and heat in water bath	Brick-red precipitate forms	Reducing sugar present
Proteins	Add Biuret solution and shake gently	Purple/violet color appears	Proteins are present
Lipids	Mix with ethanol, shake, then add water	Milky white emulsion forms	Lipids are present

(a)(ii) Solution S contains starch, reducing sugars, proteins, and lipids.

(b) Suggest one storage organ in a plant from which solution S might have been prepared.
A tuber such as a potato or yam.

(c) For each food substance identified in (a)(ii) above, name its end product(s) of digestion.
Starch: Glucose
Reducing sugars: Glucose
Proteins: Amino acids
Lipids: Fatty acids and glycerol

(d) Which of the identified food substances is mostly needed by small children?
Proteins, because they are essential for growth and development.

2. You are provided with a beaker, tea bag and hot water.

(a)(i) What happened to the tea bag when it was put in hot water?
The tea spread out into the water, changing its color.

(a)(ii) Explain why the changes you observed occurred.
The contents of the tea bag diffused into the hot water due to the temperature speeding up movement of particles from high concentration (inside the bag) to low concentration (in the water).

(b)(i) What do you think was the aim of the experiment?
To demonstrate the process of diffusion using tea in hot water.

(b)(ii) Draw a conclusion from the experiment.
Substances move from a region of higher concentration to a region of lower concentration, especially when assisted by heat.

(c)(i) Name the physiological process investigated in this experiment.
Diffusion.

(c)(ii) Define the process named in (c)(i) above.
Diffusion is the movement of particles from a region of higher concentration to a region of lower concentration until equilibrium is reached.

(c)(iii) What is the importance of this process in nature?
- Enables exchange of gases in respiration and photosynthesis
- Allows absorption of nutrients in the intestines
- Facilitates removal of waste products
- Supports cellular activities in both plants and animals
- Helps maintain concentration gradients in cells

3. Study the specimens J, K, L, M and N provided.

(a) Identify specimens J, K, L, M and N by their common names.
J: Grasshopper
K: Butterfly
L: Earthworm
M: Spider
N: Millipede

(b) Name the kingdoms for each of specimens J, K, L, M and N.
J: Animalia
K: Animalia
L: Animalia
M: Animalia
N: Animalia

(c) Suggest the possible habitats for specimens J and K.
J (Grasshopper): Grasslands and farmlands
K (Butterfly): Gardens and forests near flowering plants

(d) Draw and label specimen N.
(The diagram should show: segmented body, head, antennae, legs per segment, and terminal segment.)

(e) List four observable differences between specimens J and K.
- J (grasshopper) has strong hind legs for jumping, K (butterfly) has thin legs and wings for flying

- J has short antennae, K has long, thin antennae
- J has dull body color for camouflage, K has bright colored wings
- J usually hops, K flies
- J has a more robust body structure, K is slender and delicate