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: 2003**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

1. (a) Carry out experiments to identify the food substances present in solution S.

Test for	Procedure	Observation	Inference
Starch	Add iodine solution to solution S	Blue-black color appears	Starch is present
Reducing sugar	Add Benedict's solution and heat in water bath	Brick-red precipitate forms	Reducing sugar present
Protein	Add Biuret solution and shake	Purple color appears	Protein is present
Lipid	Mix with ethanol, shake, then add water	Milky-white emulsion appears	Lipid is present

Solution S contains starch, reducing sugar, protein, and lipids.

(b) Suggest one natural food substance from which solution S might have been prepared.
Boiled mashed potato or groundnut paste.

(c) For each food substance identified, name the gland, digestive juice, enzyme, and end product of digestion taking place in:

(i) Stomach:
- Protein
- Gland: Gastric gland
- Digestive juice: Gastric juice
- Enzyme: Pepsin
- End product: Peptides

(ii) Duodenum:
- Starch, protein, lipid
- Gland: Pancreas
- Digestive juice: Pancreatic juice
- Enzymes: Amylase (starch), Trypsin (protein), Lipase (lipids)
- End products: Maltose, peptides, fatty acids and glycerol

(d) Why is it important to include the identified food substances in the diet to a five-year-old child?
They support growth, provide energy, help tissue development, enhance brain development, and build immunity.

2.(a)
2.1 Make a drawing to show the colour pattern of specimen P.
(The drawing should show a variegated leaf with green and white areas)

2.2 Dip specimen P in hot water for about one minute.

2.3 Boil specimen P in alcohol using a hot water bath.

2.4 Dip the boiled specimen P in hot water.

2.5 Spread specimen P on a white tile and add 2–3 drops of iodine solution.

(b)(i) Identify specimen P.
It is a variegated leaf.

(ii) What observation did you make after applying iodine solution to specimen P?
Only the green areas of the leaf turned blue-black, while the white areas remained unchanged.

(b)(i) Why was specimen P dipped in hot water at the beginning of the experiment?
To kill the cells and stop all physiological processes.

(ii) Why was specimen P boiled in alcohol?
To remove chlorophyll and make the color changes with iodine visible.

(iii) Why was specimen P dipped in hot water after boiling in alcohol?
To soften it after alcohol made it brittle.

(c) Why was the alcohol boiled using a hot water bath?
Alcohol is flammable and could catch fire if directly heated.

(d)(i) What is the aim of the experiment?
To show that chlorophyll is necessary for photosynthesis.

(ii) Name the physiological process which was being investigated.
Photosynthesis.

(iii) What conclusion can you make from this experiment?
Only the parts of the leaf with chlorophyll can carry out photosynthesis and produce starch.

3.(a) Identify specimens E, F, G, H, I, and J using common names.
E: Fern
F: Tilapia
G: Lizard
H: Mushroom
I: Mango fruit

J: Millipede

(b)(i) Name the kingdoms for each of the specimens E, F, G, H, I, and J.
E: Plantae
F: Animalia
G: Animalia
H: Fungi
I: Plantae
J: Animalia

(ii) Write down three characteristics that distinguish the kingdom(s) to which specimens E, F, G, and H belong from members of other kingdoms.
- F and G (Animalia): Multicellular, lack cell walls, have nervous coordination
- E (Plantae): Multicellular, have chlorophyll, cell walls made of cellulose
- H (Fungi): No chlorophyll, absorb nutrients saprophytically, have chitin cell walls

(c) Suggest the possible habitats for specimens F and G.
F (Tilapia): Freshwater lakes and rivers
G (Lizard): Dry land, rocky or sunny areas

(d)(i) Suggest the method of dispersal for specimen I.
Animal (edible fleshy fruit attracts animals for seed dispersal)

(ii) Draw and label specimen J.