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: 2004**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

1.(a) You are provided with solution S_1. Carry out experiments to identify the food substances present in it.

Test for	Procedure	Observation	Inference
Starch	Add iodine solution to solution S_1	Blue-black color appears	Starch is present
Reducing sugar	Add Benedict's solution and heat in a water bath	Brick-red precipitate forms	Reducing sugar present
Protein	Add Biuret solution and shake gently	Purple color appears	Protein is present
Lipid	Mix with ethanol, shake, add water	Milky-white emulsion forms	Lipid is present

(b)(i) Give one biological importance of each food substance identified in solution S_1 to the body.
Starch: Source of energy after breakdown to glucose
Reducing sugar: Immediate energy supply
Protein: Growth, repair, and maintenance of tissues
Lipid: Energy storage and insulation

(ii) Name the food substances to be added to the food substances identified in S_1 to form a balanced diet.
Vitamins, minerals (like iron, calcium), and water

(iii) Name the digestive juice that contains the enzymes which digest the food substances found in solution S_1.
Saliva (amylase), Gastric juice (pepsin), Pancreatic juice (amylase, lipase, trypsin), Intestinal juice (maltase, sucrase, peptidase)

2. (a)(i) What sensation do you feel?
A cooling sensation

(ii) How is this sensation brought about?
The alcohol evaporates quickly, taking heat away from the skin due to its low boiling point, causing cooling.

(iii) What happened to the superficial blood capillaries under the rubbed part?
They constricted, reducing blood flow to the area.

(iv) What is the natural process which brings the same sensation as in 2.(a)(i) above?
Sweating during thermoregulation

(b) You have been provided with specimen L marked at the ends as Z and W.
(i) Identify, draw and label it.
It is a long bone such as the femur or humerus.

(ii) Which bones articulate at the points marked W and Z?
W: Pelvic bone or scapula

Z: Tibia/fibula or radius/ulna

(iii) What type of joint is formed at W and Z respectively?
W: Ball and socket joint
Z: Hinge joint
(iv) Why are the surfaces at Z and W smooth?
They are covered with cartilage to reduce friction during movement

(v) What is the difference between the joint formed at W and that at Z?
W (ball and socket) allows movement in all directions; Z (hinge joint) allows movement in one plane

3.(a) (i) Identify specimens M_1, M_2, M_3, M_4, M_5, and M_6 by their common names.
M_1: Maize seed
M_2: Rice seed
M_3: Bean seed
M_4: Groundnut
M_5: Cowpea
M_6: Soya bean

(ii) To which kingdom do specimens M_1 and M_5 belong?
Kingdom Plantae

(iii) Make a longitudinal section (L.S.) of specimen M_4 and make a large well labelled diagram to show the embryo.
(Diagram should show cotyledons, plumule, radicle, micropyle, hilum)

(iv) State the habitat(s) for specimens M_2 and M_5.
M_2: Cultivated fields with good drainage
M_5: Tropical and subtropical agricultural lands

(v) Compare specimens M_4 and M_6.
Both are dicot seeds
M_4 has two large cotyledons storing food; M_6 has smaller cotyledons
M_4 has thicker seed coat than M_6
M_4 is more oily while M_6 is more protein-rich

(b) (i) State the economic importance of specimens M_2 and M_3.
M_2: Staple food, source of carbohydrate
M_3: Rich in protein, improves soil nitrogen (legume)

(ii) What are the adaptive features of specimen M_2 to its mode of life?
- Tough seed coat for protection
- Endosperm stores food

- Long narrow leaves reduce water loss
- Fibrous roots allow efficient water absorption in shallow soils