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: 2006**

Instructions

1. This paper consists of two questions.

2. Answer all questions.

1. You have been provided with solutions X and Y.

(a) Design and carry out experiments to identify the food substance(s) present in solutions X and Y. Record your experimental work as shown in table 1 below:

Test for	Procedure	Observations	Inference
Starch	Add iodine solution to solution X and Y	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	Violet color appears	Protein is present
Lipid	Mix with ethanol, shake, then add water	Milky white emulsion forms	Lipid is present

(b) Name the enzymes concerned with the hydrolysis of food substances identified in solution X. Write an equation for each hydrolysis in a mature human being.
Starch: Enzyme - Amylase
Starch + Water ——> Maltose (by salivary or pancreatic amylase)
Maltose + Water ——> Glucose (by maltase)

Reducing sugar: Already simple, no further hydrolysis

Protein: Enzyme - Pepsin and Trypsin
Protein + Water ——> Peptides (by pepsin)
Peptides + Water ——> Amino acids (by peptidase)

Lipid: Enzyme - Lipase
Lipid + Water ——> Fatty acids + Glycerol

2. You have been provided with two large test tubes marked A and B. Each test tube contains a small amount of solution Z.

(a)(i) What changes do you notice in each test tube?
The test tube where you exhaled (A) shows bubbles and a color change. The other tube (B) remains unchanged.

(ii) What is solution Z?
Solution Z is lime water (calcium hydroxide solution).

(iii) What was the aim of the experiment?
To demonstrate the presence of carbon dioxide in exhaled air.

(iv) What is the name of the process being studied?
Respiration

(b) What do the changes in solution Z indicate?
That carbon dioxide is present in exhaled air.

(c) Name the gas which:
(i) is exhaled – Carbon dioxide
(ii) is inhaled – Oxygen
(iii) brought about changes to solution Z – Carbon dioxide

(d) What can you conclude from this experiment?
Exhaled air contains carbon dioxide which reacts with lime water to form a white precipitate, confirming that respiration releases CO_2.

3. Study the organisms Q, R, S, T and V.

(a) Identify specimens Q, R, S, T and V by their common names.
Q: Maize
R: Bean
S: Tilapia fish
T: Frog
V: Mushroom

(b) Write down the differences between specimens Q and R with respect to:
(i) Type of storage organ
Q stores food in the endosperm; R stores food in the cotyledons

(ii) Propagation
Q propagates through seeds with one cotyledon (monocot), R through seeds with two cotyledons (dicot)

(c) Specimens S and T have some similarities and differences.

(i) Similarities
Both are vertebrates
Both undergo external fertilization
Both lay eggs
Both are cold-blooded

(ii) Differences
S lives in water; T can live on land and water
S has scales; T has moist skin

S uses gills; T uses lungs and skin for respiration

(d)(i) What is the economic importance of V to human beings?
Mushrooms are used as food (rich in protein), in medicine, and for decomposing organic matter.

(ii) In which kingdom do specimens V and S belong?
V (mushroom) belongs to Kingdom Fungi
S (tilapia) belongs to Kingdom Animalia