

**CHRISTIAN SOCIAL SERVICES COMMISSION (CSSC)
NORTHERN ZONE JOINT EXAMINATIONS SYNDICATE (NZ-JES)**



**FORM SIX PRE-NATIONAL EXAMINATIONS 2026
155/3 FOOD AND HUMAN NUTRITION 3
(PRACTICAL)
MARKING SCHEME**

1.a) The first portion

i) observation

A layer of cloudy white suspension was formed at the top of the solution

ii) interpretation of the observation

Lipids(fats/oils) are present in the sample

iii) Function of ethanol in this experiment

ethanol is a solvent, so in this experiment it extracted the lipids from the crushed solid food sample.

iv)The reasons for performing the following procedures

- Thorough shaking-this facilitate the lipids to dissolve in ethanol
- Allowing the solid to stand- to allow enough time for the lipids to be extracted by ethanol.
- Crushing the food sample-to break the cells of the food sample thus exposing the lipids stored inside so that they can easily be extracted.
- Using dry and clean apparat to avoid contamination including cross contamination that may affect the reaction.

b) The second portion

i) The colour turns from blue to violet or deep purple

ii) The aim of the experiment is to test for the presence of protein in the food sample.

- iii) Ethanol emulsion test cannot be used in this experiment because protein is not soluble in ethanol. Addition of ethanol will precipitate the protein resulting into a negative test.
- iv) How biuret reagent caused a colour change observed in this experiment
The biuret reagent is a solution of copper sulphate and potassium hydroxide /sodium hydroxide. Hydrated copper sulphate provided copper (II) ions which give the reagent its characteristics blue colour while potassium/sodium hydroxide solution raised the pH of the solution to alkaline level. In this alkaline solution, copper (II) ions coordinated with the nitrogen atoms of the peptide bonds (-CONH-group) to form a violet-coloured chelate complex.

2. Observation

Solution A remains clear.

Observation

Solution A turns milky

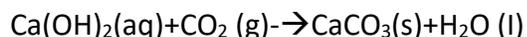
Solution A is lime water (calcium hydroxide solution).

Heating of bicarbonate of soda:

Heating of bicarbonate of soda.



Reaction of CO₂ with lime water:



In bread-making, bicarbonate of soda acts as a leavening agent. It decomposes when heated, producing carbon dioxide gas that gets trapped within the dough, causing it to rise and develop a spongy texture.

It demonstrates anaerobic respiration (fermentation) by yeast ferments the sugar in warm water to produce carbon dioxide and ethanol. The carbon dioxide causes the thin layer of wheat flour to crack and rise, while ethanol and fermentation produce a characteristic alcoholic smell.

This is a clear demonstration of how yeast works in leavening dough in baking.

3. Rice starch granules (sample J): small polygonal or angular shaped granules with simple or no marking.

- Cassava starch granules (sample K): large, oval or rounded granules with a distinct hilum (central point) and sometimes showing concentric rings.

(ii). Properties of each structure observed under microscope:

- Rice starch granules: small, irregular polygonal or angular shapes with smooth surfaces, mostly single granules.
- Cassava starch granules: large, oval or rounded, having a hilum (central point) and concentric rings under polarized light.

(iii). Plant group from which each sample was obtained:

- Rice starch (sample J): Monocotyledon
- Cassava starch (Sample K): Dicotyledonae.

(iv). Identify the samples:

- Sample J is rice starch.
- Sample K is cassava starch.

(v). common properties of samples J and K

Both are polysaccharides composed of glucose units. Both are insoluble in cold water but form pastes in hot water. Both form white sediments when mixed with water and can show a blue-black colour with iodine solution. They are stored forms of carbohydrates in plants.

It is yellowish-brown in colour, water-soluble, has a sweet test and gives a red-brown colour when heated with Benedict's solution due to the formation of reducing sugars.

(c) forms of long chains of glucose units usually present in samples J, K, and L before heating

All three samples contain starch, made up of two forms:

- Amylose: A linear chain of glucose molecules linked by α -1,4-glycosidic bonds.
- Amylopectin: A branched chain with α -1,4-glycosidic bonds in the chain and α -1,6-glycosidic bonds at the branching points.