

**Biology III**

**013**

16/07/2025 02:00 PM – 03:30 PM



**ADVANCED LEVEL NATIONAL EXAMINATIONS, 2024-2025**

**SUBJECT: BIOLOGY III**

**PAPER III: ALTERNATIVE TO PRACTICAL EXAMINATION**

**COMBINATIONS:**

- BIOLOGY-CHEMISTRY-GEOGRAPHY **(BCG)**
- MATHEMATICS-CHEMISTRY-BIOLOGY **(MCB)**
- PHYSICS-CHEMISTRY-BIOLOGY **(PCB)**

**DURATION: 1h 30 min**

**Instructions to candidates:**

- 1) Write your names and index number on the answer booklet as written on your registration form.
- 2) Do not open this question paper until you are told to do so.
- 3) This paper consists of one compulsory question. **(30 marks)**
- 4) Use only a **blue** or **black** pen.

**Question:**

Assume you are provided with the following materials and reagents:

- Overripe fruits (e.g., pineapple, banana, mango)
- Yeast (baker's yeast or natural wild yeast from fruit peels)
- Clean glass or plastic bottles with airtight lids
- Balloon (for gas collection/CO<sub>2</sub> release)
- Sieve or muslin cloth
- Water
- Labels and marker
- Clean funnel
- pH paper
- Measuring cylinder

**Proposed Practical Activity:**

Using fermentation to extend the shelf life of perishable fruits through fruit wine production.

**Objective:**

To demonstrate how perishable fruits can be transformed into longer-lasting products (e.g., fruit wine) through microbial fermentation.

**Experimental Procedure (for Wine or Alcoholic Fermentation):**

- 1) Preparation of the fruit mash: Wash fruits, remove spoiled parts, and crush or blend them into a mash. Add a small amount of water if too thick.
- 2) Add yeast: Sprinkle a small amount of baker's yeast into the mash. Stir well.
- 3) Transfer to a fermentation bottle: Pour the mixture into a clean bottle, filling up to  $\frac{3}{4}$  of the volume to allow for gas expansion.
- 4) Seal the bottle: Place a balloon over the bottle's mouth to allow CO<sub>2</sub> to escape.
- 5) Label and store: Store the bottle in a warm, dark place (25–30°C) for 5–7 days.
- 6) Observe daily: Note signs of fermentation (bubbling, smell change, balloon inflation).
- 7) Filter and taste: After fermentation stops (no more bubbles), filter the mixture and taste the product. It should have a sour/alcoholic flavor.
- 8) Preserve or process further: The fermented product can be pasteurized for longer storage or left longer to make vinegar (acetic fermentation).





