

# Planing and decision making

## Question Paper

Level	Pre U
Subject	Biology
Exam Board	Cambridge International Examinations
Topic	Planing and decision making
Booklet	Question Paper

**Time Allowed:** 57 minutes

**Score:** /47

**Percentage:** /100

## Part - B

- 1 Yeast cells have transport proteins in their cell membranes for the uptake of nutrients from the surroundings. There are separate transport proteins for glucose and for maltose. When exposed to both glucose and maltose the transport protein for maltose is downregulated and is not produced.

Plan an investigation to find out whether or not the yeast transport proteins for glucose and maltose function at the same rate.

Glucose and maltose are both reducing sugars.

You are provided with the following materials. Choose your materials from this list. You may **not** use any additional materials.

- 10% yeast suspension
- $10\text{ g dm}^{-3}$  glucose solution
- $10\text{ g dm}^{-3}$  maltose solution
- Benedict's solution
- dilute hydrochloric acid
- dilute sodium hydroxide solution and sodium hydrogencarbonate solution for neutralising
- beakers and flasks of different sizes
- stopwatch or electronic timer
- colorimeter and tubes
- centrifuge and centrifuge tubes
- thermometer
- thermostatically-controlled water baths
- pipettes and pipette fillers
- burettes and burette stands
- filter funnels and filter paper
- syringes
- glass rods for stirring
- test-tubes and boiling tubes
- test-tube and boiling tube racks

Your plan should

- include a clear statement of the hypothesis or prediction
- identify the key variables
- give full details and explanations of the procedures that you would adopt to ensure that the results are as precise and repeatable as possible
- show how you would present and analyse your results
- include a brief risk assessment
- be written in clear, scientific language.

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- 2 The yield of many cultivated varieties of crop plants such as the onion, *Allium cepa*, is reduced by the presence of relatively high concentrations of salts, particularly sodium chloride, in the soil. There are, however, salt-tolerant varieties of onion which can be grown successfully in such places. One possible explanation for this is that the fluid in the cell vacuoles of plants of the tolerant varieties differs in solute potential from that of non-tolerant varieties.

Plan an investigation to find out whether or not the solute potentials of the cell vacuoles of epidermal cells of the bulbs of salt-tolerant onions differ from those of their non-tolerant counterparts.

You are provided with the following equipment. Choose your equipment from this list. You may **not** use any additional equipment.

- an unlimited supply of 1.0 mol dm<sup>-3</sup> sodium chloride solution
- an unlimited supply of bulbs of two varieties of onion, one salt tolerant and the other non salt tolerant
- unlimited supply of distilled or deionised water
- beakers of various sizes
- glass specimen tubes
- microscope slides and coverslips
- volumetric flasks and measuring cylinders of various sizes
- graduated pipettes of various sizes, and pipette fillers
- dropping pipettes
- light microscope with low (×100), medium (×200) and high (×400) magnification and built-in illumination
- wash bottle
- marker pen
- stop clock or bench timer
- scalpel
- forceps
- glass rods for stirring
- mounted needles
- iodine in potassium iodide solution

Your plan should

- include a clear statement of the hypothesis or prediction
- identify the key variables
- give full details and explanations of the procedures that you would adopt to ensure that the results are as precise and reliable as possible
- show how you would present and analyse your results
- include a brief risk assessment
- be written in clear scientific language.

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