



IBMYP Biology Sample Paper 1



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Group 3: Biology On-Screen Examination

Total Marks: 100

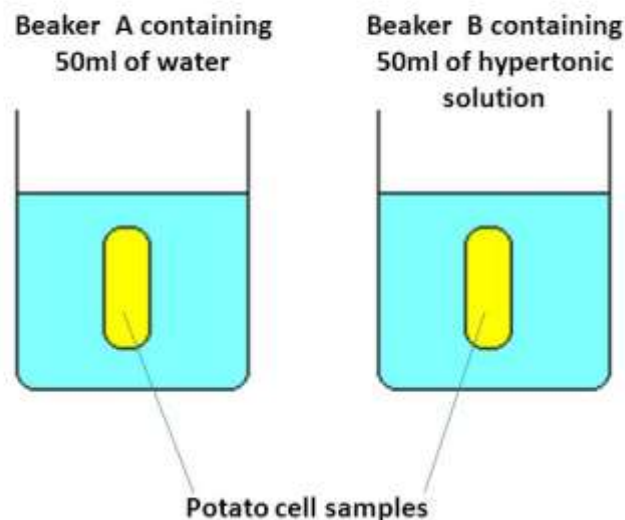
Instructions

- The on-screen examination has not yet started.
- Your time will begin once you have clicked the Start button below. Do not click Start until instructed to do so.
- Before the examination begins you are given 5 minutes to become familiar with its structure. Please navigate around the examination, taking note of the length of each task and question. You have 2 hours to complete the examination.
- There are 10 separate questions in this examination. Each question may have sub-parts. Answer all the questions in the response boxes provided. The maximum mark for this examination is 100 marks.
- As you progress through the questions, your answers are automatically saved.
- When 2 hours has ended. you will no longer be able to answer any questions.

Question 1: 14 marks

1. The potato salt solution experiment aimed to investigate the effect of different concentrations of salt solutions on the mass and texture of potato slices.

Method (Experimental procedure)



By immersing the potato slices in varying concentrations of salt solutions and observing the changes in their physical properties, such as mass and texture, the experiment provided insights into the osmosis process and its impact on plant cells. This experiment allowed for a better understanding of how salt concentrations can affect the water movement across cell membranes and potentially alter the characteristics of plant tissues.

Below were the findings from the experiment:

Solution Concentration(M)	Initial Mass(g)	Final Mass(g)
0.2M	4.2	4.5
0.5M	4.2	4.0
1.0M	4.2	3.5

a) Define osmosis and explain how it is related to the process of diffusion.(2 marks)

Solution:

Osmosis is the passive movement of water molecules from an area of higher water concentration to an area of lower water concentration across a selectively permeable membrane. It is related to the process of diffusion as both involve the movement of molecules from an area of higher concentration to an area of lower concentration. However, in the case of osmosis, specifically, it refers to the movement of water molecules.

b) Describe the role of the cell membrane in regulating osmosis.(2 marks)

Solution:

The cell membrane plays a crucial role in regulating osmosis. It is selectively permeable, meaning it allows certain substances, such as water, to pass through while restricting the movement of others. The cell membrane contains specialized proteins called aquaporins that facilitate the transport of water molecules. These aquaporins control the rate of water movement, ensuring that the cell maintains its internal balance and prevents excessive water loss or gain.

c) i) Calculate the percentage change in mass for each salt solution.(2 marks)

Solution:

To calculate the percentage change in mass, use the formula:

$$\text{Percentage Change in Mass} = \left[\frac{(\text{Final Mass} - \text{Initial Mass})}{\text{Initial Mass}} \right] * 100$$

For each salt solution:

$$0.2 \text{ M: } \left[\frac{(4.5 \text{ g} - 4.2 \text{ g})}{4.2 \text{ g}} \right] * 100 = 7.14\%$$



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+91 9540653900