Question 1 **[5]**

a) **Aim:** To determine the water potential of potato tuber by length change method.

Materials required:

Potato tuber, measuring cylinder, test tubes, cork, test tube rack, cork borer, ruler, blotting paper, sucrose solution of different molarity, thermometer and distilled water.

i. **Follow the procedure given below to carry out the experiment.**

Step 1. Take four test tubes and label them as A, B, C and D.

Step 2. Pour 10 ml of the solution of concentrations 1.0 M, 0.8 M, 0.4 M and 0.0 M in test tubes A, B, C and D respectively.

Step 3. Use a cork borer to obtain four solid cylinders of potato tuber of the same length.

Step 4. Blot out excess water from the cylinders using blotting paper.

Step 5. Put one potato cylinder in each test tube and cork the test tubes.

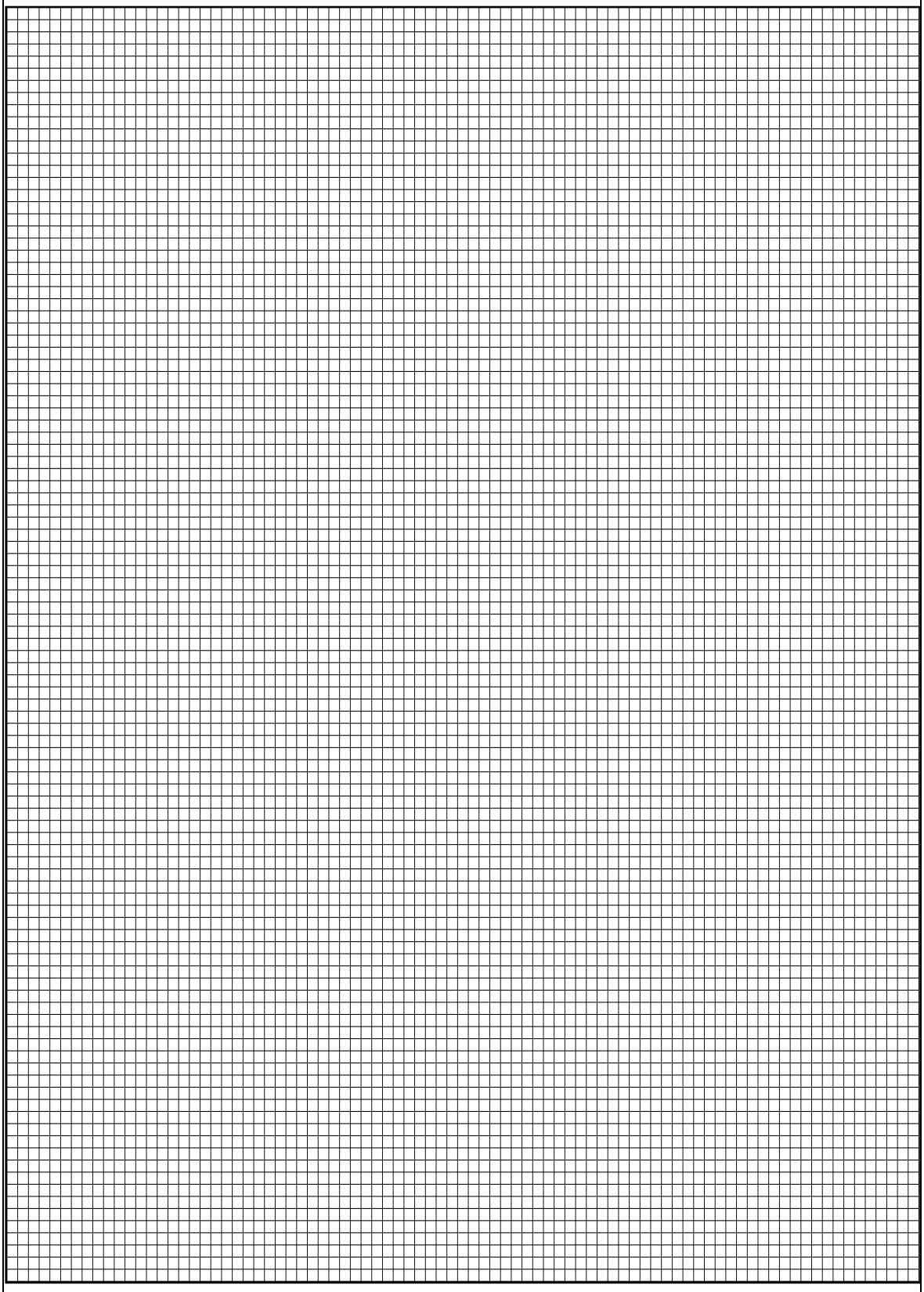
Step 6. Keep the setup undisturbed for about an hour.

Step 7. Remove the potato cylinders from each test tube. Blot out any excess solution and measure their length and record it in the observation table.

Observation Table

Test tubes	concentration of Solutions (molarity)	Initial length of potato cylinders (cm)	Final length of potato cylinders (cm) after one 1 hour	Change in length (cm) = Final length-initial length
A	1.0 M			
B	0.8 M			
C	0.4 M			
D	0.0 M			

Step 8. Plot a graph for change in length against the solution concentration.



Step 9. Determine the value of C (molar concentration of potato tuber at equilibrium) from the graph.

Step 10. Calculate the water potential using the formula:

$\Psi_w = -iCRT$

Ψ_w = water potentil i = ionization potential (mole L^{-1}). For sucrose solution it is taken as 1. C = molar concentration of potato tuber at equilibrium R = pressure constant (0.00831litre M Pa $mol^{-1}K^{-1}$). M Pa = mega pascals T = temperature (room temperature in Kelvin, ^oC + 273)	

ii. What can you conclude from this experiment?

b) Examine the given specimen **R-1** and answer the following questions. **[5]**

i. Write the semi-technical terms for floral whorls of the specimen of R-1 mentioned in the table below.

FEATURES	DESCRIPTION	
Sexuality		
Cohesion of calyx		
Aestivation of corolla		
Types of flowers based on the relative position of the ovary with floral whorls.		

ii. Carefully remove the corolla of specimen R-1. Arrange the corolla on a wet blotting paper and *Show it to the Visiting Examiner.* Draw a well labelled diagram and mention the shape of the corolla.

Shape of corolla	

iii. Study the androecium and complete the table given below:

FEATURES	DESCRIPTION	
Number of stamens		
Cohesion of stamens		
Nature of anther		

iv. Name the family to which the specimen belongs. Justify with **TWO** points of identifications.

Family		
Points of identification		

v. Mention **TWO** economic importance of plants belonging to the same family.

Question 2 **[5]**

a) i. Make a temporary stained mount of a transverse section of the given specimen R-2 and *show it to the Visiting Examiner* under a low power compound microscope.

ii. Write the steps that you followed to prepare a temporary stained mount of the transverse section of the given specimen.

iii. Draw a neat-labelled diagram of the endodermis from the T.S of specimen R-2.

iv. Why is it good to stain the specimen?

v. Identify the specimen R-2. Give **THREE** points of identification based on the nature of the vascular bundle and pith.

b) **Observe specimens A** and **B** carefully and answer the questions. **[5]**

Specimen A

i. Identify specimen A

ii. Draw a neat diagram of the specimen and label any **THREE** parts.

iii. What would happen if there was no quiescent centre?

Specimen B

i. Draw a diagram of the given specimen and label the following parts:

1. Tympanic membrane
2. External auditory canal
3. Cochlea
4. Eustachian tube

ii. Write the function of the part pointed by the arrow.

Rough Work

Rough Work

Rough Work