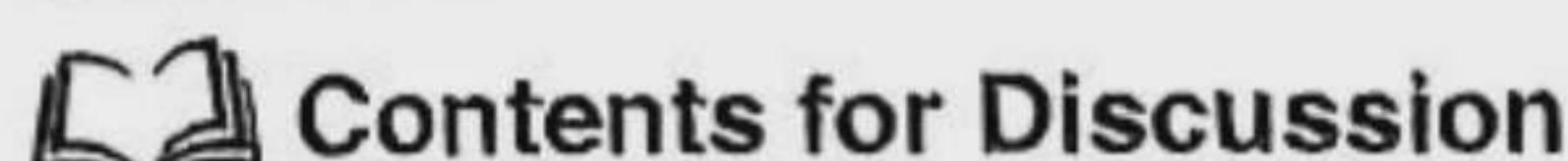


# Diffusion, Osmosis and Transpiration

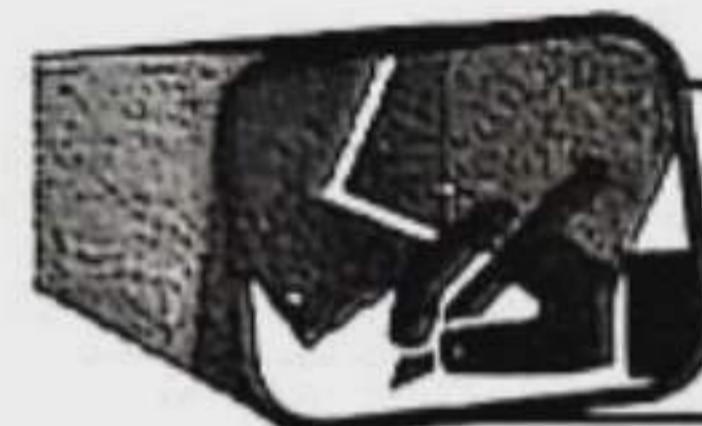
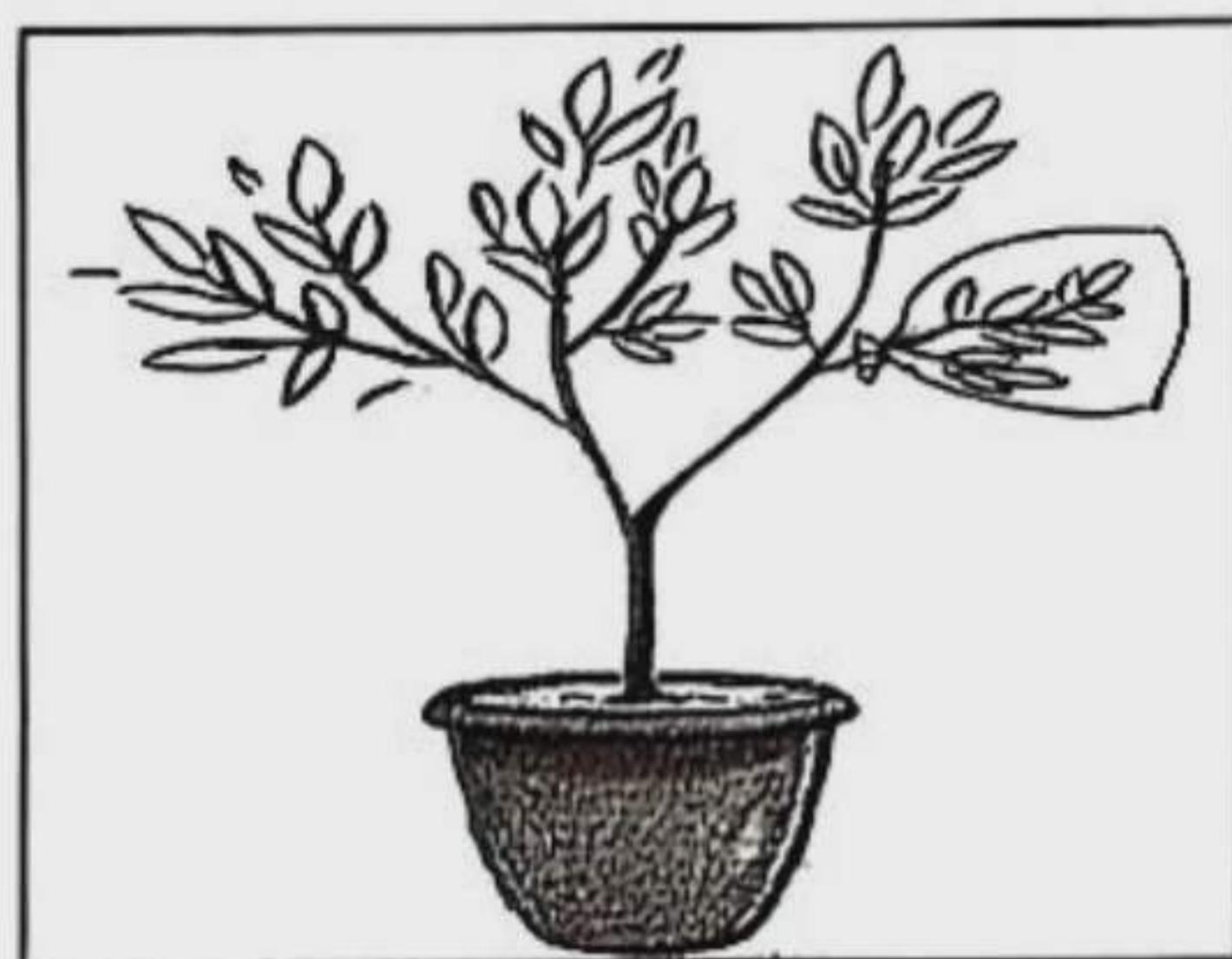


- Diffusion • Osmosis • Importance of Osmosis • Absorption of water and mineral salts • Transpiration • Significance of transpiration
  - Transport of water and mineral salts.



**Learning Outcomes :** After studying this chapter I will be able to—

- ❑ explain diffusion process;
  - ❑ explain process of osmosis;
  - ❑ explain loss of water through transpiration;
  - ❑ explain absorption of water by plants.



# Practice



**Multiple Choice, Short & Creative Q/A  
following 100% accurate format for best prep.**

Dear learners, the Q/A of this chapter have been divided into exercise, multiple choice, short, creative & exercise-based activities in light of the learning outcomes. Practice the questions well to ensure the best preparation in the exam.



## Textual Q/A



## Let's learn the textbook Q/A



## **Fill in the Blanks**

1. In terrestrial plants transpiration occurs through —.
  2. Cell membrane is a — membrane.



## MCQs with Answers

1. What do you mean by the process of release of body water of plants through leaves?

(a) Diffusion      (b) Osmosis  
(c) Transpiration      (d) Imbibition

► Explanation : (i) Diffusion : Molecules move from a region of high concentration to a region of low concentration.

(ii) Osmosis : Molecules of solutes move from a region of low concentration to a region of high concentration.

(iii) Transpiration : The process of water being released from the plant through its leaves.

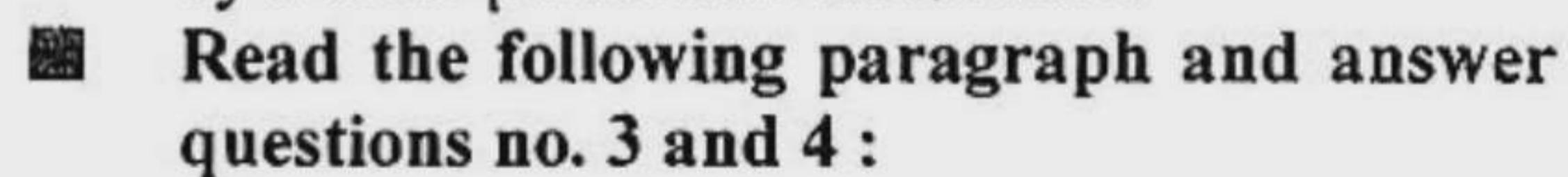
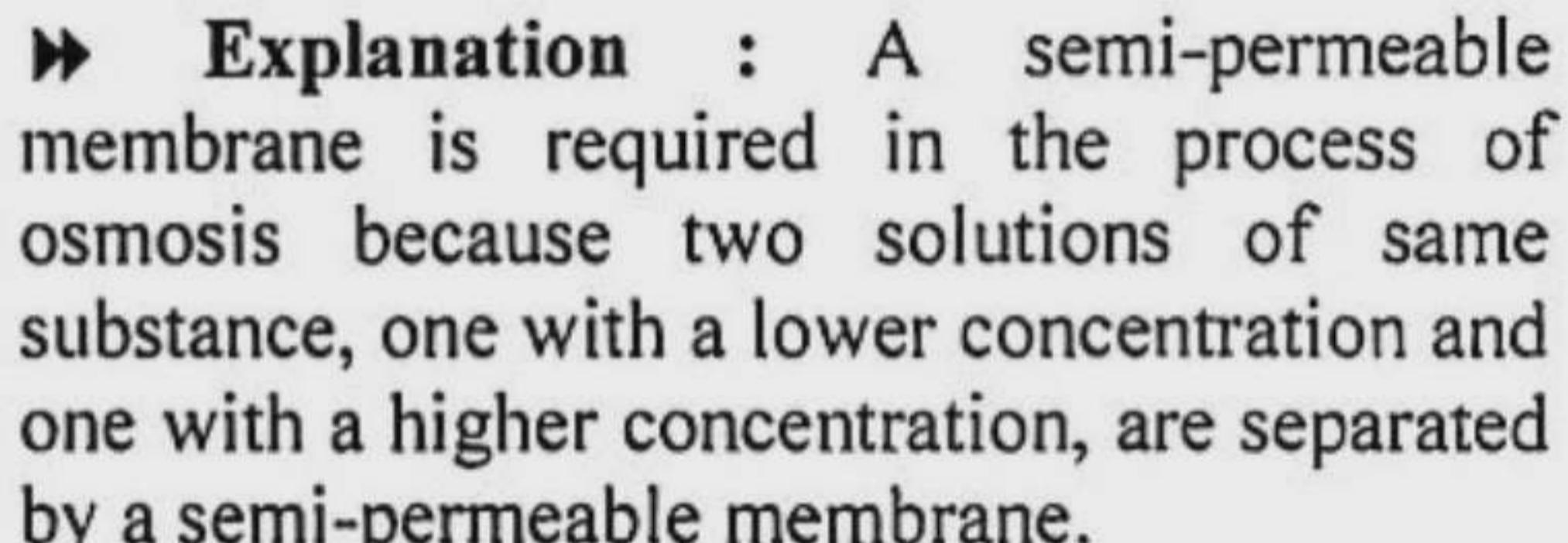
(iv) Imbibition : The process of absorption of liquid by colloidal substances.

2. During osmosis —.

  - i. semi-permeable membrane is necessary.
  - ii. solute moves from lower concentration to higher concentration.
  - iii. solvent moves from lower concentration to higher concentration.

higher concentration.  
Which of the following is correct?

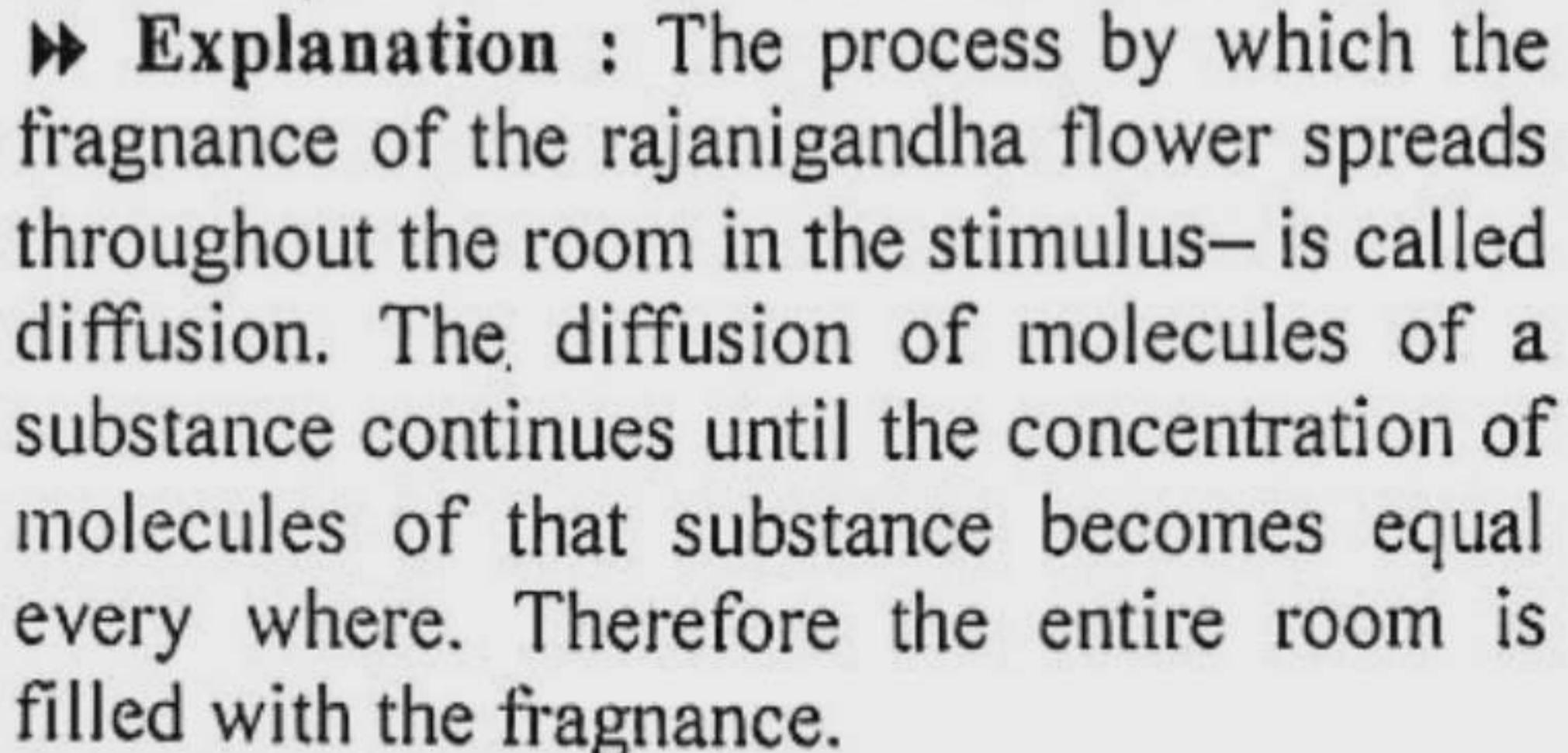
- Which of the following is correct:  
④ ① i      ② ii      ③ i & ii      ④ i & iii



Ms. Anowara kept some ranganigandha in the flower vase for her room decoration. In the evening she found the room was full of fragrance of flowers. She noticed similarity of this situation to a special process she has learnt in her science book.

3. What is the special process cited in the stem?

- Ⓐ Diffusion
  - Ⓑ Osmosis
  - Ⓒ Transpiration
  - Ⓓ Respiration



**4. In the cited process—.**

- i. oxygen enters into the cell.
- ii. water releases from plant body.
- iii. plant absorbs carbon dioxide for photosynthesis.

**Which of the following is correct?**

- (a)** i & ii      **(b)** i & iii  
**(c)** ii & iii      **(d)** i, ii & iii

► **Explanation :** The process mentioned in the stimulus is diffusion.

- (i) In the process of diffusion, plants take in carbon dioxide from the air and release oxygen during photosynthesis.
- (ii) Through the process of diffusion, oxygen enters the cell and carbon dioxide is released.
- (iii) The water absorbed by the plant body is released from the body in the form of vapor through transpiration.

### Creative Questions with Answers

**Ques. 01** One day Zarif's mother kept some dried grapes (kismis) in water for cooking vermicelli. After sometime Zarif found that the dried grapes are swollen. On another side Zarif's sister was drawing a picture with the help of colour and brush. At that time a minute amount of colour from the brush drops into a glass of water and spread out in the water.

- a. What is permeable membrane? 1
- b. What do you understand by imbibition? 2
- c. By which process does the dye from the brush of Zarif's sister spread out in the water? Explain. 3
- d. Why is the swollen up process of dried grapes (kismis) that Zarif observed important for plants? Explain. 4

**Answer to Question No. 01 :**

**a** The membrane through which molecules of both solute and solvent can pass easily is called permeable membrane. Cell wall of plants is of this type of membrane.

**b** Absorption of water by dry or semi-dry colloidal substances is called imbibition. More easily, it can be said that the process of absorption of water by plant cell wall, protoplasm, etc. is called imbibition. For example, the amount of water absorbed by seeds during germination is done by imbibition.

**c** The process in which the dye spreads out in water is called diffusion. The colour was water-soluble and the whole water in the glass assumed the colour.

Actually there were molecules compactly combined together in the crystal of the colour. When the crystal was dropped in water, the water molecules attracted the molecules of the crystal very strongly. As a result, the crystal was completely dissolved in water and its molecules

were spread throughout the water evenly. We know, at a constant temperature and atmospheric pressure, movement of the molecule of a substance from a region of high concentration to a region of low concentration is known as diffusion.

**d** The process of swollen up the dried grapes in water is called osmosis—a process by which solvent (water) diffuse from an area of high concentration through a semi-permeable membrane to an area of low concentration solution.

Necessity of this process in plant life :

- Plants absorb water though root hairs in this process.
- Water moves from cell to cell inside the plant body by osmosis.
- Osmosis controls the rate of transpiration through opening and closing of stomata.
- The process plays an important role in the growth of the cell and maintains its normal size and shape.
- It is very active in reaching water to every living cell from root to leaf. It ensures equal distribution of water.
- Soft cells becomes turgid by absorbing water. Cells absorb water by osmosis.
- The success of germination depends on the process of osmosis.

**Ques. 02** After returning from school Adiba saw that the plants in the tub had withered away. She watered the plants in the tub in the afternoon. Next morning she found all the plants alive and afresh.

- a. What is diffusion? 1
- b. Why is transpiration called the 'necessary evil'? 2
- c. Why did the plants of the tub wither away? Explain. 3
- d. How did the plants become alive? Explain. 4

**Answer to Question No. 02 :**

**a** At a constant temperature and atmospheric pressure, the movement of the molecules of a substance from a region of high concentration to that of a low concentration is called diffusion.

**b** Transpiration is a physiological process in which plants lose water in the form of vapour through their aerial parts, mainly through the leaves. High rate of loss of water may even cause death to a plant. Still it is essential for plant life in a number of ways. This is why transpiration is called a necessary evil.

**c** The plants of the tub withered away because there had been little water in the soil to absorb. We know, higher plants absorb water from soil by their root hairs. Inside the root hair the cell sap is concentrated and in the outside there is water in

between soil particles. Since there was no water in between soil particles of the soil of the tub, the root hairs of the plants could not absorb either water or minerals. We know, the minerals remain dissolved in soil-water and roots absorb them. Adiba's plants could not do it because of water shortage.

**d** The plants became lively because Adiba watered them in the last afternoon. The plants withered away due to acute shortage of water. They got neither water nor minerals through their roots. It means that the process of osmosis and

diffusion got stuck. After Adiba had watered the plants, the process of osmosis and diffusion began. Water was absorbed through osmosis and some portion of minerals was taken by diffusion. After watering, there was water in between soil particles of the soil in the tub. So, water from soil entered into the root cell and afterwards this water reached the vessels of xylem tissue by cell-to-cell osmosis. From vessels the water moved to leaves. The minerals dissolved in soil-water absorbed by the roots in the form of sap.

## Multiple Choice Q/A

Designed as per topic

- Lesson 1-2 : Diffusion** → Textbook Page 25
- What will you require to have an experiment of diffusion? (Knowledge)
    - a** Kerosene and water
    - b** Blue vitriol and water
    - c** Hydrochloric acid and water
    - d** Sodium hydroxide and water
  - Carbon dioxide enters plants cell during —. (Knowledge)
    - a** conduction
    - b** absorption
    - c** diffusion
    - d** osmosis
  - Oxygen comes out from plant cell during —. (Knowledge)
    - a** osmosis
    - b** conduction
    - c** absorption
    - d** diffusion
  - Exchange of oxygen and carbon dioxide takes place during —. (Comprehension)
    - a** respiration
    - b** transpiration
    - c** absorption
    - d** diffusion
  - What does the process of diffusion relate to? (Comprehension)
    - a** Chemical energy
    - b** Chemical bond
    - c** Static energy
    - d** Potential energy
  - What does a plant use for oxidation of glucose? (Knowledge)
    - a** Mineral salt
    - b** Oxygen
    - c** Nitrogen
    - d** Hydrogen
  - When does oxidation of glucose take place? (Knowledge)
    - a** During respiration in cells
    - b** During absorption
    - c** During conduction
    - d** During an experiment only
  - We can have experiment on diffusion with —. (Knowledge)
    - i. indigo powder
    - ii. liquid indigo
    - iii. blue vitriol
- Which one is correct?**
- d** **a** i & ii   **b** ii & iii   **c** i & iii   **d** i, ii & iii

- Answer the questions number 09 and 10 from the following stem :
- While Mitu was going to school by the side of a bakery she noticed that the sweet smell of biscuits spread all around. Mitu found a similarity with a special process of her text book. [RB '19]
- What is the similarity found by Mitu? (Comprehension)
    - a** Diffusion
    - b** Osmosis
    - c** Absorption
    - d** Imbibition
  - In the mentioned process— (Comprehension)
    - i. plants release body water through transpiration
    - ii. plants absorb carbon dioxide for photosynthesis
    - iii. carrying Oxygen from lymph to cell

**Which one is correct?**

**d** **a** i & ii   **b** i & iii   **c** ii & iii   **d** i, ii & iii
  - In which process the smell of Jasmine is spread out? (Application)
    - a** Diffusion
    - b** Osmosis
    - c** Transpiration
    - d** imbibition
  - Which is the correct in the followings? (Higher ability)
    - a** Imbibition → Diffusion → Osmosis → Transpiration
    - b** Imbibition → Osmosis → Diffusion → Transpiration
    - c** Imbitition → Osmosis → Transpiration → diffusion
    - d** Imbibition → Diffusion → Transpiration → Osmosis
  - Which one keeps the plant stem cool, water in leaves and stem and leaf fresh? (Comprehension)
    - i. transpiration
    - ii. diffusion
    - iii. Osmosis

**Which one of the following is correct?**

**d** **a** i & ii   **b** i & iii   **c** ii & iii   **d** i, ii & iii
  - Through diffusion process —. (Knowledge) [JB '19]
    - i. oxygen enters into cells
    - ii. animal carry out respiration
    - iii. plant leaves carbon dioxide during photosynthesis

**Which one is correct?**

**a** **d** i & ii   **b** i & iii   **c** ii & iii   **d** i, ii & iii

15. Which process carries oxygen from blood to lymph? (Knowledge) [Ideal School & College, Dhaka]  
 ① Osmosis      ④ Diffusion  
 ② Endosmosis    ③ Transportation

### Lesson 3 : Osmosis

► Textbook Page 26

16. Which one of the following is an impermeable membrane? (Comprehension)  
 ① Cell wall      ④ Cell membrane  
 ② Inner membrane of egg shell      ③ Membrane of fish potka  
 ③ Polyethene      ④ Fish bladder
17. Which one of the following is a selectively permeable membrane? (Comprehension)  
 ① Cell wall      ④ All the above  
 ② Inner membrane of egg shell      ③ Fish bladder  
 ③ Fish bladder      ④ Phloem
18. Animal cell membrane is called —. (Knowledge)  
 ① plasmalemma      ④ Xylem  
 ② phloem      ③ Artery
19. What type of membrane is a fish bladder? (Knowledge)  
 ① Permeable      ④ Semi-permeable  
 ② Impermeable      ③ It is not a membrane at all
20. Which one of the following is a special type of diffusion? (Knowledge)  
 ① Osmosis      ④ Conduction  
 ② Absorption      ③ Photosynthesis
21. Example of semi-permeable membrane —. (Comprehension)  
 i. cell wall  
 ii. fish bladder  
 iii. inner membrane of egg shell  
**Which one is correct?**  
 ④ ① i & ii    ④ ii & iii    ③ i & iii    ④ i, ii & iii
22. We can have experiment on osmosis with —. (Knowledge)  
 i. raisin  
 ii. potato  
 iii. fish bladder  
**Which one is correct?**  
 ④ ① i & ii    ④ ii & iii    ③ i & iii    ④ i, ii & iii
23. Which is permeable membrane? (Knowledge) [D.B.-'19]  
 ① Cell membrane      ④ Cell wall  
 ② Membrane of fish potka      ③ Membrane inside the egg shell
24. What happens if swelled dry grapes are kept in honey? (Application) [C.B.-'19]  
 ① Diffusion      ④ Osmosis  
 ② Transpiration      ④ Imbibition
25. As a result of osmosis — (Higher ability) [CB '19]  
 i. cell sap of a plant increases  
 ii. petal of flowers closes or opens  
 iii. keeps stem and leaves fresh  
**Which one is correct?**  
 ④ ① i & ii    ④ i & iii    ③ ii & iii    ④ i, ii & iii

26. Which is permeable membrane? (Comprehension) [C.B.-'19]  
 ① Cell wall      ④ Cell membrane  
 ② Cell membrane      ③ Membrane of fish potka  
 ③ Membrane of fish potka      ④ Cell wall made up of cutin
27. Through which membrane both solute and solvent can pass? (Knowledge) [BB '19]  
 ① Polythene      ④ Cell wall  
 ② Cell membrane      ③ Membrane of fish potka
28. Which process helps to open the petals of water lily? (Knowledge) [BB '19]  
 ① Diffusion      ④ Osmosis  
 ② Transpiration      ③ Imbibition
29. Which one of the following is a permeable membrane? (Comprehension) [MB '19]  
 ① Cell wall      ④ Cell membrane  
 ② Polythene      ③ Fish potka
30. Mineral salt → Root hair → [X] → Xylem → Plant body. Here 'X' process is — (Higher ability) [MB '19]  
 ① Transpiration      ④ Diffusion  
 ② Photosynthesis      ③ Osmosis
31. Which is permeable membrane? (Comprehension) [RB '18]  
 ① Polythene      ④ Cell membrane  
 ② Cell wall made up of cutin      ③ Cell wall
32. Through which the solvent and solute molecule can pass easily? (Knowledge) [JB '18]  
 ① Polythene      ④ Cell wall  
 ② Cell membrane      ③ Fish potka
- Answer the questions No. 33 and 34 from the stem :  
 Pinki made sugar juice for the guest of her birthday party. In the morning, putting in the water rose bud fully bloom in the afternoon. [CB '18]
33. Which process helps for the making of foods for the guests? (Comprehension)  
 ① Imbibition      ④ Transpiration  
 ② Osmosis      ③ Diffusion
34. In the formation process of matter that Pinki's observation —. (Comprehension)  
 i. semi-permeable membrane is necessary  
 ii. food absorbs in animal's gland  
 iii. solvent molecules move from higher density to lower density solution  
**Which one of the following is correct?**  
 ④ ① i & ii    ④ i & iii    ③ ii & iii    ④ i, ii & iii
35. Which one of the following is impermeable membrane? (Comprehension) [CtgB '18]  
 ① cell wall made up of cutin      ④ cell wall  
 ② cell wall      ③ membrane inside the egg shell  
 ③ membrane inside the egg shell      ④ membrane of fish potka

36. Which one of the following is impermeable membrane? (Comprehension) [BB '18]  
 @ Cell wall made of cutin  
 @ Membrane of fish potka  
 @ Membrane inside the egg shell  
 @ Cell membrane
37. Which one is impermeable membrane? (Knowledge) [CtgB '17]  
 @ cell wall @ cell membrane  
 @ polythene @ membrane of fish potka
38. Actually, which process helps to keep stem and leaf fresh and straight? (Knowledge) [SB '17]  
 @ Osmosis @ Diffusion  
 @ Transpiration @ Imbibition
39. Which one is permeable membrane? (Comprehension) [BB '17]  
 @ Membrane of fish potka  
 @ Cell membrane  
 @ Cell wall @ Polythene
40. Which is the semi-permeable membrane? (Comprehension) [DjB '17]  
 @ Polythene @ Cutinic cell wall  
 @ Cell wall @ Cell membrane
41. The water molecule enters into dry grapes by—. (Comprehension) [DB '17]  
 i. Osmosis  
 ii. Diffusion  
 iii. Transpiration  
 Which one is correct?  
 a. @ i @ i & ii @ i & iii @ i, ii & iii  
 b. Which one is semi-permeable membrane? (Knowledge) [DB '16]  
 @ Cell wall @ Cell membrane  
 c. @ Cell wall made of to cutin  
 d. Which one is the semi-permeable membrane? (Comprehension) [CB '16]  
 @ polythene @ cell wall  
 e. @ cell membrane  
 f. @ cell wall made up of cutin  
 g. Which one of the following is impermeable membrane? (Comprehension) [CtgB '16]  
 @ Cell membrane  
 @ Membrane inside the egg shell  
 @ Cell wall made up of cutin  
 a. @ Membrane of fish air bladder
45. Which is permeable membrane? (Knowledge) [Ideal School & College, Dhaka]  
 @ Polythene  
 @ Cell wall made up to cutin  
 c. @ Cell membrane @ Cell wall
46. As a result of osmosis— (Comprehension) [Ideal School & College, Dhaka]  
 i. Cell sap of a plant increases  
 ii. Petals of flower closes or opens  
 iii. Keeps stem and leaves fresh  
 Which one is correct?  
 b. @ i & ii @ i & iii @ ii & iii @ i, ii & iii

## Lesson 5 : Absorption of water and mineral salts

► Textbook Page 29

47. Absorption is the joint consequence of —. (Knowledge)  
 @ diffusion and respiration  
 @ respiration and osmosis  
 @ osmosis and transpiration  
 @ diffusion and osmosis
48. Most of the colloidal substances are —. (Knowledge)  
 @ water absorbing @ oil absorbing  
 @ petroleum absorbing @ all the above
- Read the following passage and answer the question numbers 49 & 50 :  
 Teacher says, "Density of cell sap from outer covering to the middle of the root is not the same." As a result of endosmosis, water flow continues from one root-cell to the another. Finally, the water reaches the leaf through xylem vessel in the stem.
49. In what process does the root-hair absorb water from soil? (Knowledge)  
 @ Osmosis @ Imbibition  
 b. @ Conduction @ Connection
50. The passage also indicates the process of absorption which is the combined effect of—. (Comprehension)  
 i. diffusion  
 ii. osmosis  
 iii. photosynthesis  
 Which one is correct?  
 a. @ i & ii @ ii & iii @ i & iii @ i, ii & iii
51. The water absorbed from the soil, plants— (Comprehension) [DB '19]  
 i. use for physiological need  
 ii. emit as vapour  
 iii. use for metabolic activity  
 Which one is correct?  
 d. @ i & ii @ i & iii @ ii & iii @ i, ii & iii
52. Plant absorbs mineral salts from soil — (Comprehension) [JB '19]  
 i. by inactive absorption  
 ii. by active absorption  
 iii. by the absorption of water  
 Which one is correct?  
 a. @ i & ii @ i & iii @ ii & iii @ i, ii & iii
53. Which substance is coloidal? (Comprehension) [CtgB '19]  
 @ Poly thene @ Gelatine  
 b. @ Cutine @ Vaseline  
 ■ Answer questions number 54 and 55 from the following stem :  
 Suman, a class eight student, observed that he feels difficulties to close the wooden doors and windows of his reading room during rainy season. He asked the reasons to his teacher in science class. The teacher said that it is occurred due to the absorption of water by the colloidal substance which is present in the plant body.  
 [SB '18]



- 54.** The substance of the plant body is — (Knowledge)

  - (a) Cell wall
  - (b) Protoplasm
  - (c) Cytoplasm
  - (d) Cellulose

**55.** Which one of the following is related to the above process? (Comprehension)

  - (a) Diffusion
  - (b) Osmosis
  - (c) Imbibition
  - (d) Transpiration

**56.** Colloidal substances are— (Knowledge) [RB '17]

  - i. starch
  - ii. cellulose
  - iii. gelatine

**Which one is correct?**

  - (a) (a) i & ii   (b) i & iii   (c) ii & iii   (d) i, ii & iii

**57.** Colloidal substances of plant body are— (Knowledge) [CB '17]

  - i. starch
  - ii. cellulose
  - iii. gelatine

**Which one is correct?**

  - (a) (a) i & ii   (b) i & iii   (c) ii & iii   (d) i, ii & iii

**58.** Which one of the following is a colloidal substance? (Comprehension) [RB '16]

  - (a) Gelatine
  - (b) Polythene
  - (c) Cell wall made up of cutin
  - (d) Cell membrane

**59.** Which one of the following is a colloidal substance? (Comprehension) [CB '16]

  - (a) cellulose
  - (b) cell wall
  - (c) cell membrane
  - (d) chlorophyll

 **Lesson 6 : Transpiration** ➤ Textbook Page 30

**60.** Transpiration ensures —. (Comprehension)

  - (a) continuous supply of water to leaves
  - (b) absorption of water and minerals
  - (c) emission of vapour in the atmosphere
  - (d) all the above

**61.** The least rate of transpiration takes place through —. (Knowledge)

  - (a) stomata
  - (b) cuticle
  - (c) lenticel
  - (d) phloem

**62.** The parts through which transpiration takes place —. (Comprehension)

  - i. leaf
  - ii. stem
  - iii. flower

**Which one is correct?**

  - (a) (a) i & ii   (b) ii & iii   (c) i & iii   (d) i, ii & iii

**63.** The parts that does not take part in transpiration —. (Application)

  - i. flower
  - ii. stem
  - iii. fruit

**Which one is correct?**

  - (a) (a) i & ii   (b) ii & iii   (c) i & iii   (d) i, ii & iii

- 64.** The part of a plant that does not take part in transpiration —. (Knowledge)

  - root
  - flower
  - fruit

**Which one is correct?**

**a** @ i & ii   **b** ii & iii   **c** i & iii   **d** i, ii & iii

**65.** Transpiration is important in the sense that —. (Comprehension)

  - it promotes the rate of respiration
  - it promotes the rate of absorption
  - it promotes the rate of osmosis.

**Which one is correct?**

**b** @ i & ii   **c** ii & iii   **d** i & iii   **e** i, ii & iii

**66.** Transpiration does not create any impact on —. (Comprehension)

  - respiration
  - photosynthesis
  - absorption

**Which one is correct?**

**a** @ i & ii   **b** ii & iii   **c** i & iii   **d** i, ii & iii

**67.** What is similar to the transpiration of plants? (Comprehension)

  - Perspiration in humans
  - Urination in humans
  - assimilation in humans

**Which one is correct?**

**a** @ i & ii   **b** ii & iii   **c** i & iii   **d** i, ii & iii

**Answer the question No. 68 and 69 in the light of the stem below:**  
 ‘X’ is a physiological process of a plant, which is occurred by stomata. [SB '19]

**68.** Which one is occurred by the mentioned process? (Comprehension)

  - Water absorption
  - Salt absorption
  - Ion absorption
  - Loss of water

**69.** The pore of above stem is made of — (Knowledge)

  - upper epidermal cell
  - guard cell
  - synergid cell

**Which one is correct?**

**a** @ i & ii   **b** i & iii   **c** ii & iii   **d** i, ii & iii

**70.** Which maintains the moisture of the leaves? (Knowledge) [DJB '19]

  - Transpiration
  - Diffusion
  - Osmosis
  - Absorption

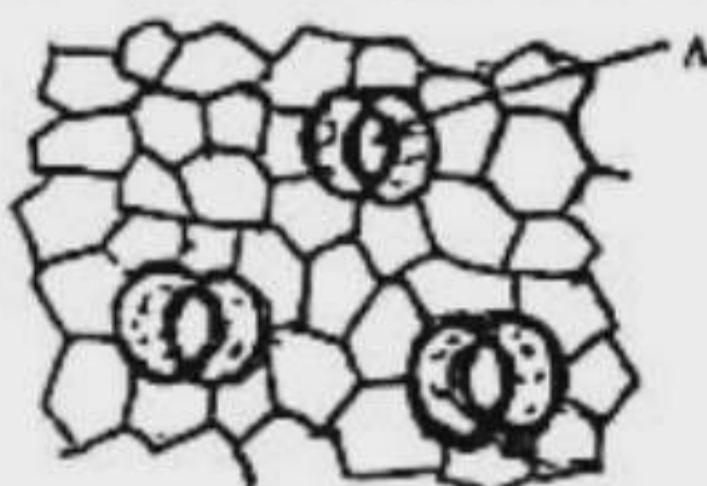
**71.** In which process does a plant loss water in the form of water vapour through evaporation in the transpiration system? (Knowledge) [CB '18]

  - Osmosis
  - Diffusion
  - Imbibition
  - Photosynthesis

**72.** Which one is a necessary evil for plant? (Knowledge) [JB '17]

  - Photosynthesis
  - Osmosis
  - Transpiration
  - Diffusion

73. Where does transpiration mainly occur? (Knowledge) [JB '17]  
 ① Cuticle ⑥ Stomata  
 ② Lenticell ⑦ Root hair
74. What is called the process of loss of water vapour through evaporation from the external tissues of the aerial parts of the plants? (Knowledge) [CB '17]  
 ② Imbibition ⑥ Transpiration  
 ③ Osmosis ⑦ Diffusion
75. Where is lenticel situated? (Knowledge) [CB '17]  
 ② Root ③ Stem ④ Flower ⑤ Leaves
76. What is the secretion of water in the form of vapour through leaves of plant called? (Knowledge) [BB '17]  
 ② Diffusion ⑥ Osmosis  
 ③ Transpiration ⑦ Photosynthesis
- 77.

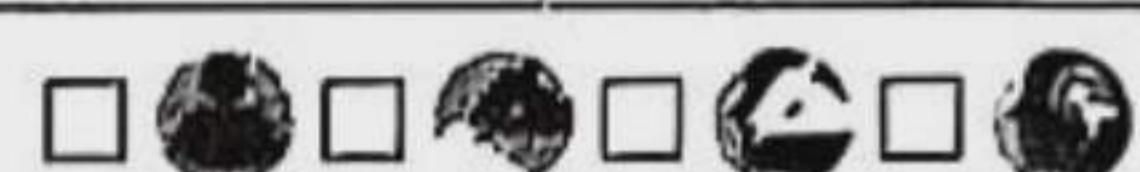


- What is done by 'A' in above figure? (Comprehension) [DB '16]  
 ② Absorption of water  
 ⑥ Absorption of mineral salt  
 ③ Respiration ⑦ Transpiration
78. Which is the 'Necessary evil' for plant? (Knowledge) [JB '16]  
 ② Diffusion ⑥ Osmosis  
 ③ Imbibition ⑦ Transpiration
79. Which one is a special physiological activity of plants? (Knowledge) [CB '16]  
 ② osmosis ⑥ diffusion  
 ③ absorption ⑦ transpiration
80. Which one is called "necessary evil"? (Knowledge) [CtgB '16]  
 ② Diffusion ⑥ Transpiration  
 ③ Osmosis ⑦ Imbibition
81. The loss of water in the form of water vapour through evaporation from plant body is known as what? (Knowledge) [SB '16]  
 ② Osmosis ⑥ Diffusion  
 ③ Respiration ⑦ Transpiration

- Lesson 8-10 : Transport of water and mineral salts → Textbook Page 32
82. Water reaches leaves from roots through —. (Knowledge)  
 ② xylem ③ phloem ④ lenticel ⑤ cuticle
83. What is the function of phloem tissue? (Comprehension)  
 ② taking water from roots to leaves  
 ④ taking food from leaves to other parts  
 ③ taking water from leaves to other parts  
 ⑤ promoting stomatal transpiration

84. Xylem and phloem are called —. (Knowledge)  
 ② transpiration tissue ⑥ absorption tissue  
 ③ diffusion tissue ⑦ conduction tissue
85. Phloem is responsible for —. (Knowledge)  
 ② upward conduction ⑥ downward conduction  
 ③ parallel conduction ⑦ all the above
86. What plant may help you in proving the process of transportation? (Knowledge)  
 ② Pepper ⑥ Papaya  
 ③ Peperomia ⑦ Pineapple
87. Transportation includes —. (Knowledge)  
 i. root ii. stem  
 iii. leaf
- Which one is correct?  
 ② ③ i & ii ⑥ ii & iii ④ i & iii ⑤ i, ii & iii
88. Transportation route includes —. (Knowledge)  
 i. xylem ii. chloëm  
 iii. phloem
- Which one is correct?  
 ② ③ i & ii ⑥ ii & iii ④ i & iii ⑤ i, ii & iii
- Read the following passage and answer the question numbers 89 & 90 :  
 Leaf is no less important than root or stem. It is important to plants for existence and growth, water and minerals reach leaf from root through stem.
89. Leaf performs the functions of —. (Knowledge)  
 i. stomach  
 ii. lung  
 iii. skin
- Which one is correct?  
 ② ③ i & ii ⑥ ii & iii ④ i & iii ⑤ i, ii & iii
90. What process does the last sentence indicate? (Comprehension)  
 ② Convection ⑥ Transportation  
 ③ Osmosis ⑦ Imbibition
91. Which of the following is related with the process of osmosis? (Knowledge) [RB '19]  
 ② Xylem tissue ⑥ Phloem tissue  
 ③ Downward transportation  
 ④ Reversible transportation
92. What is peperomia? (Knowledge) [JB '19]  
 ② A plant ⑥ A disease  
 ③ A medicine ⑦ An animal
93. To which is the food prepared in the leaves of plants spreading the whole body of the plants connected? (Knowledge) [BB '18]  
 ② Absorption ⑥ Convection  
 ③ Transpiration ⑦ Transportation



**Short Q/A****Designed as per topic****► Lesson 1-2 : Diffusion**

► Textbook Page 25

**Question 1. Why does the fragrance spread when perfume is sprayed?**

**Ans.** The fragrance spreads when perfume is sprayed because of the diffusion process. Diffusion is the spreading of molecules from a region of higher concentration to a region of lower concentration at the same temperature and atmospheric pressure. Since the perfume molecules are more concentrated near the perfume, they move towards the surrounding areas of lower concentration by the diffusion process. As a result, the fragrance of the perfume spreads all around.

**Question 2. Write two characteristics of diffusion.**

**Ans.** Two characteristics of diffusion are:

1. In the diffusion process, the molecules of a substance spread from a place of higher concentration to a place of lower concentration.
2. A suction force is created through the diffusion process, through which plants can easily transport water from the soil to the leaves.

**Question 3. Mention two importances of diffusion.**

**Ans.** Two importances of diffusion are:

1. Oxygen enters the cell and carbon dioxide exits the cell by diffusion.
2. The water absorbed by the plant body is expelled from the body in the form of vapor through transpiration by the diffusion process.

**Question 4. What role does diffusion play in animal respiration?**

**Ans.** During animal respiration, the exchange of oxygen and carbon dioxide, the transport of nutrients and oxygen from the blood to the lymph and from the lymph to the cells are accomplished by the diffusion process.

**► Lesson 3-4 : Osmosis and Importance of Osmosis**

► Textbook Page 26 &amp; 28

**Question 5. Why is the membrane inside the egg shell called a semi-permeable membrane?**

**Ans.** A membrane through which only the solvent molecules of a solution can pass but the solute molecules cannot pass is called a semi-permeable membrane. Solvent molecules can pass through the membrane inside the egg shell, but solute molecules cannot. This is why this membrane of the egg is called semi-permeable.

**Question 6. Write two characteristics of osmosis.**

**Ans.** Two characteristics of osmosis are:

1. Osmosis occurs only in the case of liquids.
2. The molecules of the solute move from a less concentrated solution to a more concentrated solution.

**Question 7. Write two importances of osmosis.**

**Ans.** Two importances of osmosis are:

1. Osmosis causes turgidity of plant cells.
2. Food can be absorbed in the intestines of animals through osmosis.

**Question 8. How many types of membranes are there and what are they?**

**Ans.** Membranes can generally be divided into three categories. Namely:

1. Impermeable membrane
2. Permeable membrane and
3. Semi-permeable membrane

**Question 9. Give two examples of semi-permeable membranes.**

**Ans.** Two examples of semi-permeable membranes are :

1. Cell membrane and
2. Fish potka (swim bladder/air bladder)

**Question 10. Why is the cell wall called a permeable membrane?**

**Ans.** A permeable membrane is a membrane through which both solvent and solute molecules can easily pass. Since both solvent and solute molecules can easily pass through the cell wall, it wall is called a permeable membrane.

**► Lesson 5 : Absorption of water and mineral salts**

► Textbook Page 29

**Question 11. In how many ways is the absorption of mineral salts in plants accomplished?**

**Ans.** The absorption of mineral salts in plants is accomplished in two ways. Namely:

1. Inactive absorption and
2. Active absorption

**Question 12. Write two differences between active absorption and inactive absorption.**

**Ans.** Two differences between active absorption and inactive absorption are:

Active absorption	Inactive absorption
1. Requires metabolic energy.	1. Does not require metabolic energy.
2. Chemical process.	2. Physical process.

**Question 13. Why are the processes of water and salt absorption in plants different?**

**Ans.** Water and mineral salts are needed for plant growth. The source of the necessary mineral salts for plants is soil water. Although the mineral salts are dissolved in the soil water, there is no relationship between the absorption of water and the absorption of salts in plants; the two processes are different. Because plants can never absorb the whole molecule of salt. The salts are absorbed only as ions. But plants absorb the whole molecule of water.

**Question 14. Why is cellulose called a hydrophilic substance?**

**Ans.** Cellulose is called a hydrophilic substance because when it comes into contact with a liquid substance, it easily absorbs the liquid substance or water, and also shrinks in the absence of the liquid substance.

**Question 15. Write the names of two colloidal substances.**

**Ans.** Two colloidal substances are:

1. Starch and
2. Gelatin

**Question 16. What is a hydrophilic substance?**

**Give examples.**

**Ans.** Substances that absorb water and swell are called hydrophilic substances. For example: cellulose, starch, glue, protein, gelatin, etc.

**Question 17. Why does imbibition occur?**

**Ans.** During germination, plants absorb a large amount of liquid substances from the soil through the imbibition process. Plants absorb water by imbibition to meet the shortage of water and other organic needs during germination. And in this process, plants use colloidal substances.

**► Lesson 6 : Transpiration** ► Textbook Page 30

**Question 18. Mention the types of transpiration.**

**Ans.** There are three types of transpiration based on where it occurs in the plant. Namely:

1. Stomatal transpiration
2. Cuticular transpiration and
3. Lenticular transpiration

**Question 19. How does transpiration keep the plant body cool?**

**Ans.** Through transpiration, the plant expels its excess water through the pores located on the leaves, i.e., the stomata. As a result, the leaves are protected from high temperatures and the plant body is kept cool.

**Question 20. How does transpiration help in causing rainfall?**

**Ans.** Plants absorb a large amount of water from the soil with the help of root hairs. Some of the absorbed water is used for its various metabolic functions and the rest is released into the atmosphere in the form of vapor through the stomata. Later this vapor condenses to form clouds, and from the clouds, it returns to the earth in the form of rain. In this way, transpiration helps in causing rainfall.

**Question 21. Write two differences between osmosis and transpiration.**

**Ans.** Two differences between osmosis and transpiration are:

Osmosis	Transpiration
1. Plants absorb mineral salts and water through osmosis.	1. Plants release excess water into the atmosphere in the form of vapor through transpiration.
2. Osmosis occurs in two ways.	2. Transpiration occurs in three ways.

**► Lesson 7 : Significance of transpiration**

► Textbook Page 31

**Question 22. Mention two important roles of transpiration.**

**Ans.** Two important roles of transpiration are as follows :

1. Transpiration increases the concentration of cell sap.
2. Through transpiration, plants release water from their bodies and remain free from the pressure of excess water.

**Question 23. Why is transpiration important for water transport?**

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**Ans.** Transpiration is very important for water transport in plants. Because transpiration allows for the continuous supply of water to the leaves for food production. The tension in the xylem vessels created by transpiration helps in the absorption of water by the root hairs and its transport to the top of the plant.

**Question 24. How does transpiration affect the weather?**

**Ans.** Water, that is, water vapor, is constantly being released into the environment through transpiration. This water vapor plays an important role in keeping the weather humid. In other words, transpiration helps keep the environment humid and cool and causes excess rainfall. In this way, transpiration in plants affects the weather.

**► Lesson 8-10 : Transport of water and mineral salts**

► Textbook Page 32

**Question 25. What is meant by transport in plants?**

**Ans.** Transport in plants means the movement of water and mineral salts absorbed from the soil and the food prepared in the leaves. Water is absorbed by the root hairs through the osmosis process and the mineral salts dissolved in the water are absorbed by the inactive and active absorption process and reach the leaves through the xylem tissue. And the food prepared in the leaves reaches different areas of the plant through the phloem.

**Question 26. Why are xylem and phloem called the pathways of transport in plants?**

**Ans.** The process of transporting water and mineral salts absorbed by the roots to the leaves and the food produced in the leaves throughout the plant body is called transport. Transport in plants occurs through the xylem and phloem tissues. Water absorbed by the roots goes to the leaves through the xylem and liquid food produced in the leaves is transported throughout the body by the phloem. This is why xylem and phloem are called the pathways of transport in plants.

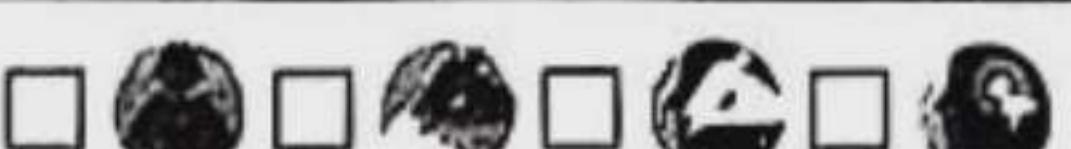




## Creative Q/A



## Designed as per learning outcomes



**Ques. 01** Look at the picture below and answer to the following questions :

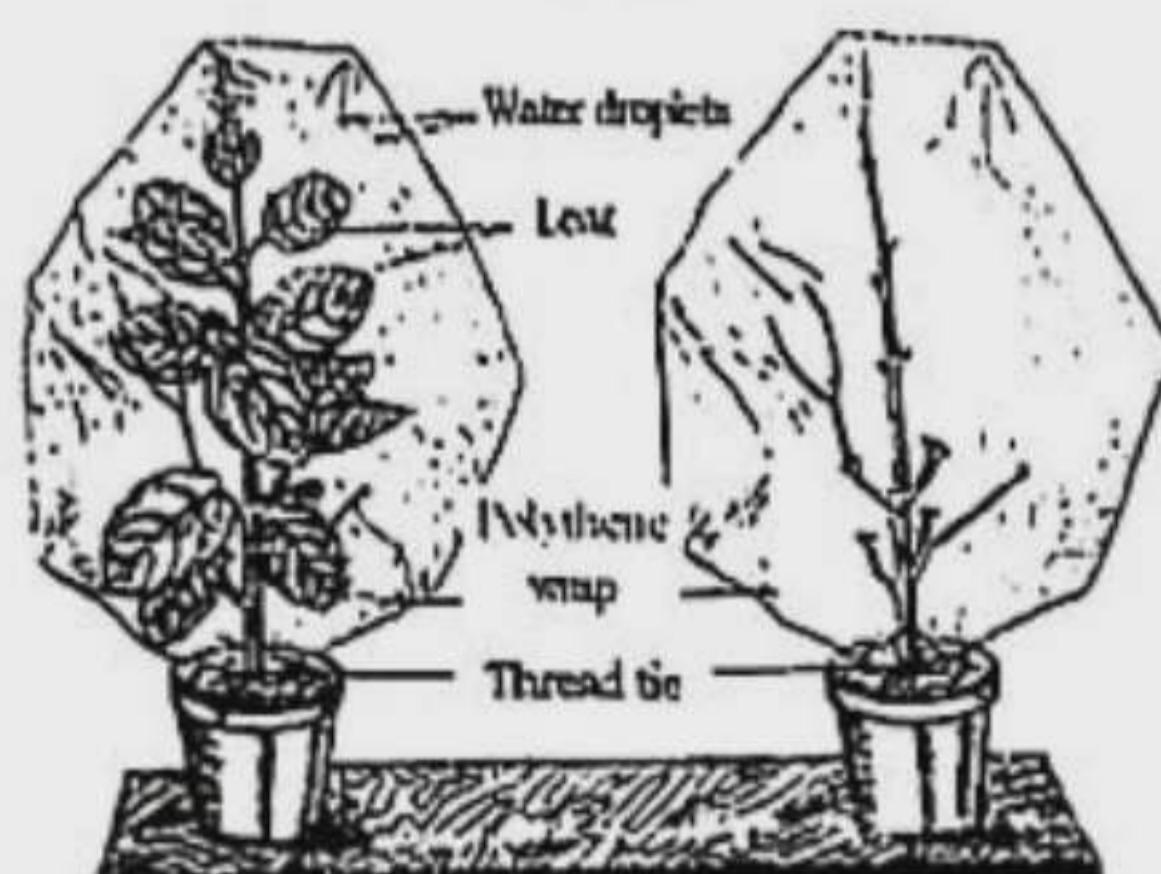


Fig. 3.9. Transpiration experiment with polythene wrap

- What does the experiment relate to? 1
- How can you compare human stomach to a leaf? 2
- State the procedure of the experiment. Note your observation and findings. 3
- "The process is as beneficial as threatening to plant life."— Evaluate the statement. 4

### Answer to Question No. 01 :

- a) The experiment relates to transpiration.
- b) We take food by mouth and the stomach performs the function of digestion. The digested food reaches the cells through blood stream. A leaf can be compared to human stomach in the sense that it makes food during the process of photosynthesis and send it to the other parts of the plant through the phloem vessels of the stem.

c) **Procedure of the experiment (in the form of instruction) :** Suppose, A and B are two potted-plants. Put them on a table and water the soil in both the tubs. The water must not overflow the tubs. Remove all the leaves of plant B. Cover both the plants with transparent polythene and tie both of them with thread at the bottom of plants A and B. Coat the tightened places with vaseline so that air or water cannot enter the packs. Keep both the plants in sunlight.

**Observation :** After a certain period, I see water droplets at the inner side of the transparent polythene belonging to plant A but there is no water droplet in case of plant B.

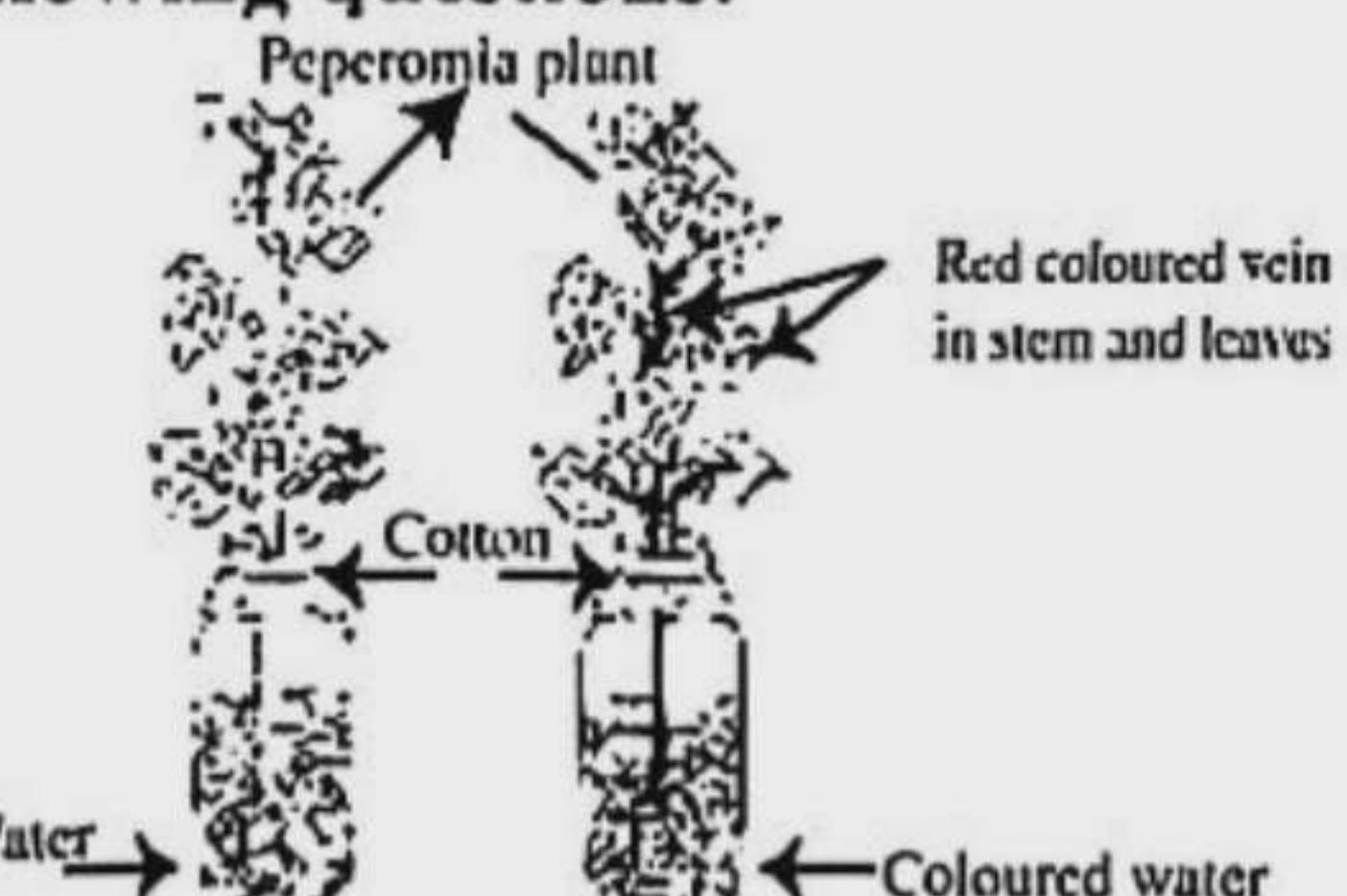
**Decision :** Transpiration takes place in plant A because it has leaves. Plant B has no leaf and so it cannot emit extra water in the form of vapour.

d) The process is transpiration. It is an ultimate process. It means emission of water from plant body in the form of vapour. It may cause severe dehydration making plants feeble or may even cause death. In this sense the process is threatening. At the same time, it is beneficial in the sense that :

- It relieves the plant from the pressure of extra water by emitting in the form of vapour.

- It enhances the density of cell sap. It promotes endosmosis and thus helps the plant in absorbing water and minerals.
- It regulates temperature and moisture in the plant body.
- It ensures water supply to the leaves so that they can make food.
- It also promotes the process of absorption and transportation.

**Ques. 02** Look at the picture below and answer to the following questions.



- How many types of transpiration are there? 1
- How can you differentiate between cell wall and cell membrane? 2
- Describe the picture. 3
- This process solely depends on absorption and transpiration. How far do you agree? Give reasons. 4

### Answer to Question No. 02 :

a) Transpiration is of three types— stomata transpiration, cuticular transpiration and lenticular transpiration.

b) In differentiating between cell wall and cell membrane, I would like to mention first that cell wall is thicker than cell membrane. Cell wall is a permeable membrane which allows the movement of both solvent and solute. But cell membrane is a semi-permeable membrane which allows the movement of solvent but not solute.

c) The picture belongs to the experiment of transportation of water in plants. The experiment is done with two Peperomia plants because of the fact that the stem of this plant is transparent. Two plants have been taken and after washing the roots well, plant 'A' has been kept in a beaker of plain water and plant B in that of coloured water. The plants have been put in the beakers in such a way that the roots remain submerged in water. After a few hours, it has been seen that there is no change taken place in plant 'A' but the stem as well as the veins of the leaves have become coloured because of transportation through the xylem tissue of the stem.

**d** Transportation means upward movement of water and minerals from root to leaves through xylem tissue of the stem as well as spreading of water and minerals in other parts from leaves through phloem tissue of the stem. It depends on absorption in the sense that the stem would get nothing to reach to the leaves if the roots did not absorb water and minerals. It would cause fading of the leaves leading to the death of the plant. Again, transportation depends on transpiration in the sense that it promotes the process of absorption and transportation. It also ensures endosmosis and thus helps plants in absorbing water and mineral. In absence of transpiration, plants cannot bear with the pressure of excessive water and are likely to die away, let alone the continuity of transportation.

**Ques. 03** The plants in the tub of Progga seemed to be lifeless. For this she drenched the dry soil with water. At this the plants became fresh. On the next day, out of curiosity she covered a branch with leaves of the plant with polythene. In the afternoon, she noticed that there was little water inside the polythene.

- What is imbibition? 1
- How does the fragrance of flower spread in the air? 2
- Explain the cause of the plants mentioned in the stem becoming fresh. 3
- The second metabolic process as mentioned in the stem is necessary for plants but it sometimes causes their death—Analyze. 4

• Dhaka Board 2019

#### Answer to Question No. 03 :

**a** The process by means of which colloidal substances absorb different liquids is called imbibition.

**b** The fragrance of flower spreads in the air through diffusion.

We know, matters (substances) are made up of small molecules. These molecules are always in motion. In case of liquid and gas, the motion of these molecules are very fast and shows tendency to diffuse towards the regions with lower concentration from higher ones. This movement of molecules continues as long as the concentration of the two regions becomes equal. Diffusion stops at once when the concentration of molecules becomes equal in two region. This type of movement of molecules is called diffusion.

We can see many examples of diffusion in our surroundings. For example, the smell of scent, atom or burning incense spread all around the room. It happens due to diffusion. High density of atoms from incense and scent spread in low density of atoms arounds the room. As a result, the whole room becomes scented.

**c** Water is essential for plants. The plants in the tub of Progga seemed to be lifeless due to lack of water. Terrestrial (land) plants absorb water from soil through root hairs. Submerged plants absorb water through their whole body. The root hairs of the terrestrial plants intake capillary water of the soil particles through osmosis.

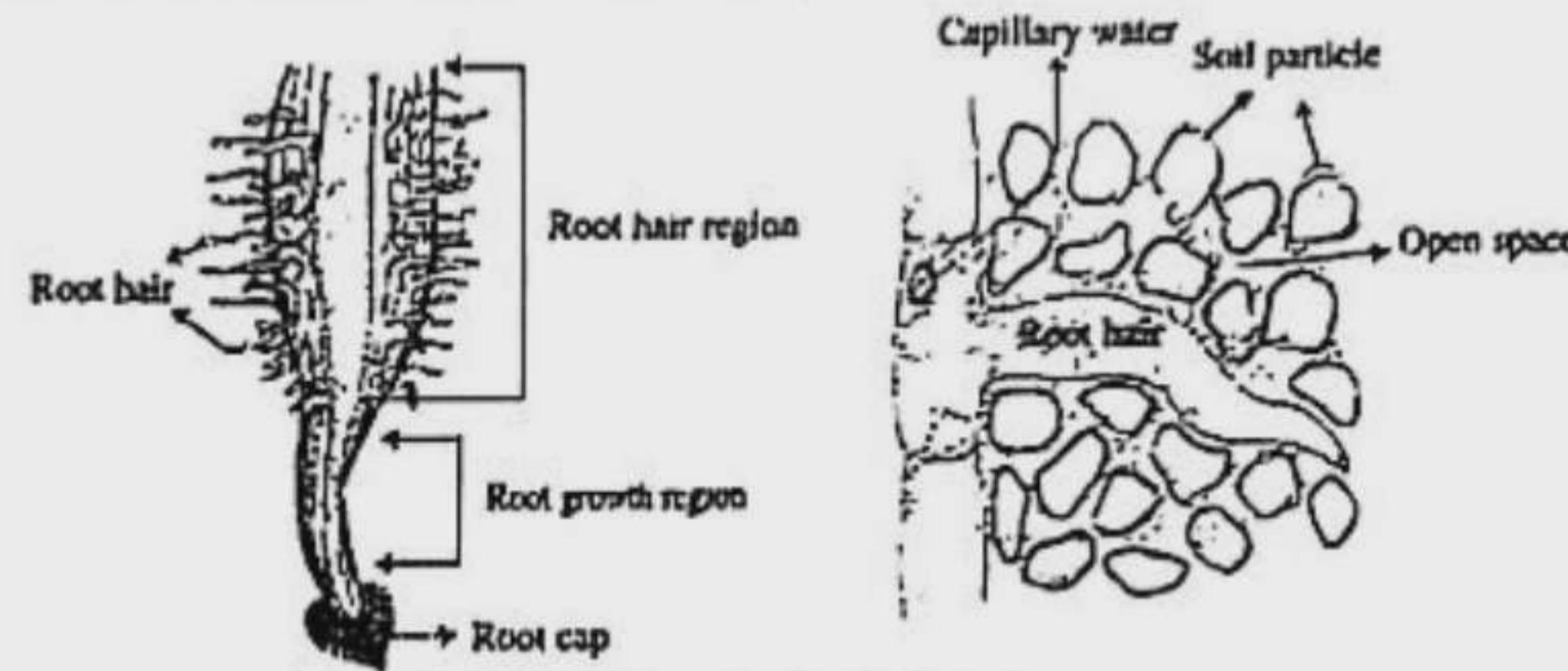


Fig. 3.5: Different regions of root

The wall of the root hair is permeable. So first it absorbs water through imbibition and the absorbed water comes in contact with semi-permeable plasma membrane below the cell wall. The concentration of the central solution of the root hair is higher than that of its environment and thus water (solvent) enters into the cell through endosmosis. The concentration of the cell sap from the outer membrane to the centre of the root cells is not equal. Consequently due to inter cellular osmosis water flows from one cell to another and finally reaches the leaves through xylem vessels of the stem.

As Progga drenched the dry soil with water, it becomes fresh.

**d** The second metabolic process mentioned in the stem is transpiration.

Transpiration is a very essential and inevitable process for plants. High rate of transpiration is harmful for the plants. This is why apparently transpiration is known as the 'necessary evil' for the plants. Nevertheless, transpiration is very much useful for plants because, due to transpiration, excess water is released in the atmosphere, thus decreases water pressure of the plant body. The concentration of cell sap is increased due to transpiration. This creates the right condition for endosmosis. Transpiration prevents plants from getting over heated and also maintains proper humidity of the leaves. Water is very much essential for photosynthesis, the process for manufacture of food; transpiration ensures continuous supply of water to the leaves. Due to transpiration there develops a pressure into the transporting cellular tube which helps to lift the water through the xylem vessels from root to leaves through stem.

So, it can be said that, transpiration is necessary for plants but it sometimes causes their death.



**Ques. 04**

Fig. X



Fig. Y

- a. What is diffusion pressure? 1
- b. Why blue which is used in cloths is spreaded out in water? Explain it. 2
- c. Explain the process-X of above figure. 3
- d. Analyze the importance of the process of figure-'Y' in plants' life. 4

● Barishal Board 2019

**Answer to Question No. 04 :**

Due to kinetic energy of the molecule, a potential pressure is exerted and consequently the movement of molecules of solutions or gases from one region of higher concentration to that of a lower one occurs. This type of pressure is called diffusion pressure.

**b** The process by which blue from cloths spreads out in water is diffusion process.

Matters (substances) are made up of small molecules. These molecules are always in motion. In case of liquid and gas, the motion of these molecules are very fast and shows tendency to diffuse towards the regions with lower concentration from higher ones. This movement of molecules continues as long as the concentration of the two regions becomes equal. Diffusion stops at once when the concentration of molecules becomes equal in two region. This type of movement of molecules is called diffusion.

**c** The process of figure No. 'X' of the stem is osmosis. If two differently concentrated solutions of same solvent is kept separated by a semi-permeable membrane, the solvent from dilute solution diffuse through the semi permeable membrane into the high concentrated solution and this process is called the osmosis. When two differently concentrated solutions are kept together osmosis occurs naturally.

We see that if a raisin or dried grape (kismis) is kept under water for some time, it swells up. It happens because dry grape absorbs water and the absorption of water occurs through osmosis.

Osmosis is one kind of diffusion. Osmosis occurs only in case of liquid and a semi-permeable membrane keeps the two liquid separate. When dry grapes are kept in water, the water molecules diffuse into the dry grapes as the concentrated sucrose solution inside the dry grapes are separated from water by a membrane. Consequently only the water molecule diffuses into dry grapes, but sucrose molecule does not. The process is known as osmosis.

**d** The process shown in figure-'Y' of the stem is transpiration. The loss of water in the form of water vapour through evaporation from the moist surface of the internal tissues of the aerial parts of the plants, especially the leaves, is known as transpiration.

**Importance of transpiration in plants life :**

Transpiration is a very essential and significant process for plants. High rate of transpiration is harmful for the plants. This is why transpiration is known as the 'necessary evil' for the plants. Nevertheless, transpiration is very much useful for plants because, due to transpiration, excess water is released in the atmosphere, thus decreases water pressure of the plant body. The concentration of cell sap is increased due to transpiration. This creates the favourable condition for endosmosis. Transpiration prevents plants from getting over heated and also maintains proper humidity of the leaves. Water is very much essential for photosynthesis, the process for manufacture of food; transpiration ensures continuous supply of water to the leaves. Due to transpiration there develops a pull into the transporting cellular tube which helps to lift the water through the xylem vessels from root to leaves through stem.

Unlike photosynthesis and respiration, transpiration shows very little effect on the environment. But in water cycle, terrestrial plants convert land water into water vapours that go out in the atmosphere through transpiration. During transpiration a huge amount of water is released in the atmosphere in the form of water vapours.

**Ques. 05** Jihan uses Atar in his body and his classmates get fragrance of it. On the other hand, Siam finds that raisins or dry grapes got wet in water swell and grow fat.

- a. What is transpiration? 1
- b. Dry wood is hydrophilic — Explain. 2
- c. Explain the reason of getting fragrance of the classmates of Jihan? 3
- d. The methods occurred in the stem are important in the lives of men and creatures. Explain it. 4

● Dhaka Board 2018

**Answer to Question No. 05 :**

**a** The physiological process by means of which plants lose water from their body in the form of water vapour through their aerial parts mainly through the leaves is called transpiration.

**b** The substances absorbing water when they come in contact with it and conversely become constricted when they face deficiency of the liquid are called hydrophilic substance. If a piece of dry wood is placed in water, it will absorb water in it. We know that dry or half-dry colloidal substances absorb liquid. This is why the piece of wood has absorbed water. So, dry wood is hydrophilic.

**c** The reason of getting fragrance of the classmates of Jihan is diffusion. Molecules are made up of small molecules. These molecules are always in motion. In case of liquids and gases, the motion of these molecules are very fast and shows tendency to diffuse towards the regions with lower concentration from higher ones. This movement of molecules continues as long as the concentration of the two regions becomes equal. Diffusion stops at once when the concentration of molecules becomes equal in both region. This type of movement of molecules is called diffusion. We notice many events of diffusion in our surroundings. For example, the smell of scent, agar or burning incense spread all around the room. It happens due to diffusion. High density of atoms from incense and scent spread in low density of atoms around the room. As a result, the whole room becomes scented.

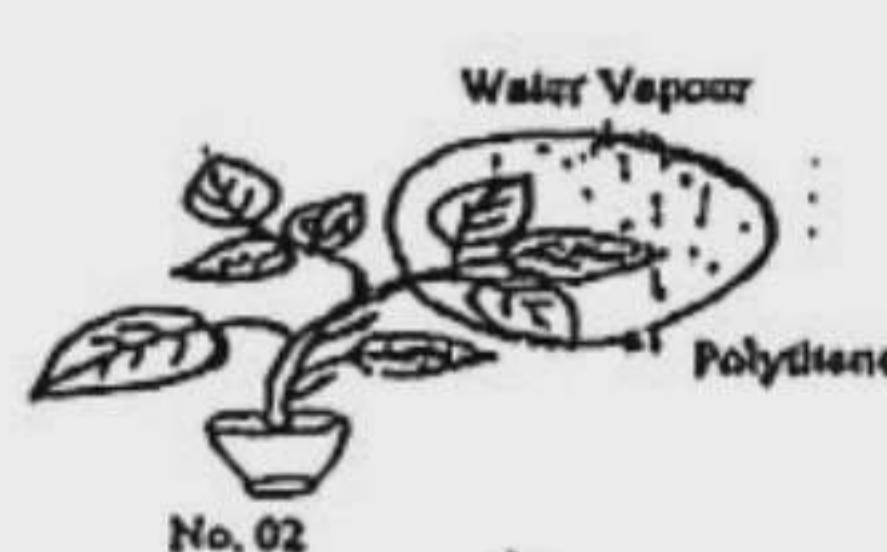
**d** The methods indicated in the stem are diffusion and osmosis. These are important in the lives of men and creatures.

**Importance of diffusion :** Diffusion takes place in every physiological process of an organism. During photosynthesis, plants absorb carbon dioxide and release oxygen as a by-product. Diffusion makes this essential task possible. Living cells use oxygen for the oxidation of glucose. Oxygen enters into the cells through diffusion and the release of carbon dioxide also occurs in the same way. The loss of water in the form of water vapour through transpiration is the result of diffusion. In case of animal respiration, exchange of oxygen and carbon dioxide, carrying of food, oxygen etc. from blood to lymphs and from lymphs to cells occur through diffusion.

**Importance of osmosis :** Different necessary mineral salts enter into the cells in soluble form. Cell membrane or plasma membrane of the living organism acts as semi-permeable membrane. Mineral salts dissolved in water enter into and pass out from the cell through plasma membrane. Intracellular water and the mineral salt solution together is called cell-sap or simply sap. So, osmosis plays a very important role in maintaining different physio-chemical process of the cell. By this process, plants absorb water and minerals dissolved in water from soil, through unicellular root hair.

#### Ques. 06

Priti's house filled with the fragrance of tuberose bought by her friends on her birthday. The dried grapes [Kismis] on the payes made in this occasion by her mother was swollen and soaked.



- a. What is called imbibition? 1
- b. Why polythene is an impermeable membrane? 2
- c. Explain the process of the figure No. 02. 3
- d. Do the two incidents occurred in the box No.-1 play the same role in plant? Give your opinion. 4

#### Answer to Question No. 06 :

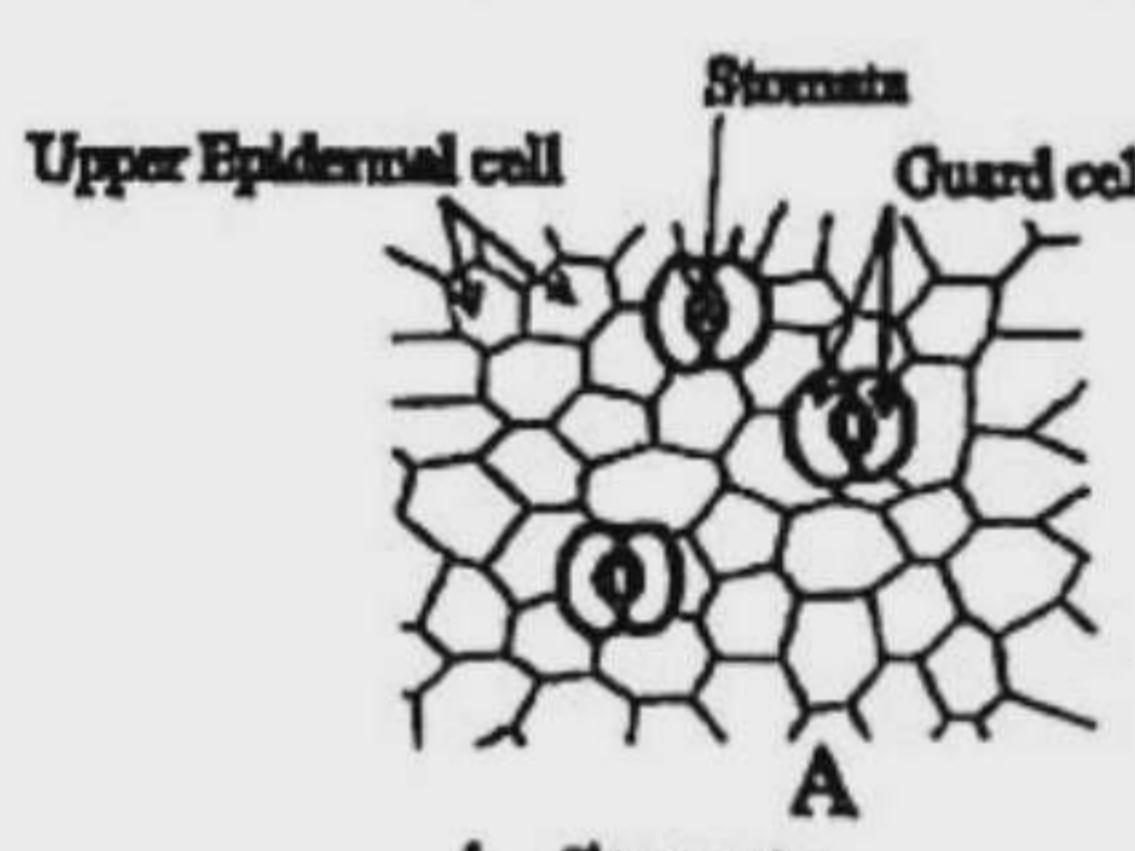
**a** The process by means of which colloidal substances absorb different liquids is called imbibition.

**b** The membrane through which molecule of both solute and solvent cannot pass is called the impermeable membrane. The polythene cannot pass molecule of solute and solvent. That's why it is impermeable membrane.

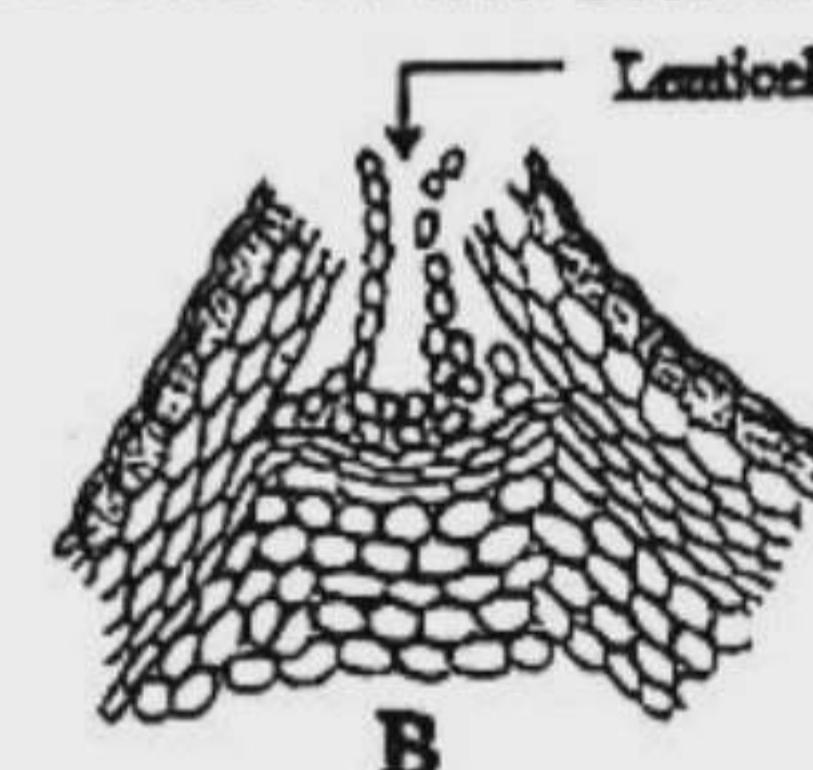
**c** The figure-2 refers to the process of transpiration. Transpiration is a special physiological process of plant. We learn from the earlier lesson that, water is essential for different physiological work of plant. For that, plant absorbs a bulk amount of water from soil through root hairs. Plants use a portion of this water in different metabolic activities and rest of it goes out in the form of water vapour to the atmosphere. The loss of water in the form of water vapour through evaporation from the moist surface of the internal tissues of the aerial parts of the plants, especially the leaves, is known as transpiration.

There are three kinds of transpiration, based on the outlet of the plant through which water is lost they are as follows :

1. **Stomata transpiration** : This is the major form of transpiration.
2. **Cuticular transpiration** : Transpiration through the cuticle of leaves and stem.
3. **Lenticular transpiration** : Some water vapour goes out through lenticels of the stem.



A Stomata



B Lenticel

Fig : Site of transpiration

**d** Yes, it plays the same role in plant that explain the two incidents occurred in the box no.-1. Diffusion takes place in every physiological process of the organism. During photosynthesis, plants absorb carbon dioxide and release oxygen as by-products. Diffusion makes this essential task possible. Living cells use oxygen for the oxidation of glucose. Oxygen enters into the cells through diffusion and the release of carbon dioxide also occurs in the same way. The loss of water in the form of water vapours through transpiration is the result of diffusion. In case of animal respiration, exchange of oxygen and carbon dioxide, carrying of food, oxygen etc. from blood to lymphs and from lymphs to cells occur through diffusion.

Different necessary mineral salts enter into the cells in soluble form. Cell membrane or plasma membrane of the living organism acts as semi-permeable membrane. Mineral salts dissolved in water enter into and pass out from the cell through plasma membrane. Intra cellular water and the mineral salt solution together is called cell sap or simply sap. So, osmosis plays a very important role in maintaining different physio-chemical process of the cell. By this process, plants absorb water and minerals dissolved in water from soil, through unicellular root hair.

Due to osmosis turgidity of the cell is increased that keeps stem and leaf fresh and straight. Also plants can open and close its petals. In the intestine of the animals digested food may be absorbed.

**Ques. 07** Risha went to her uncle's house in winter. When she went to see the farm, she observed plant some are dead and some are alive. She asked her uncle. About this her uncle advised and explained her its absorption of water and mineral salts and also transpiration.

- What is imbibition? 1
- Why is fish potka called semi-permeable membrane? 2
- Explain the third process from this paragraph. 3
- Compare method (i) with method (ii) mentioned in the stem and describe. 4

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#### Answer to Question No. 07 :

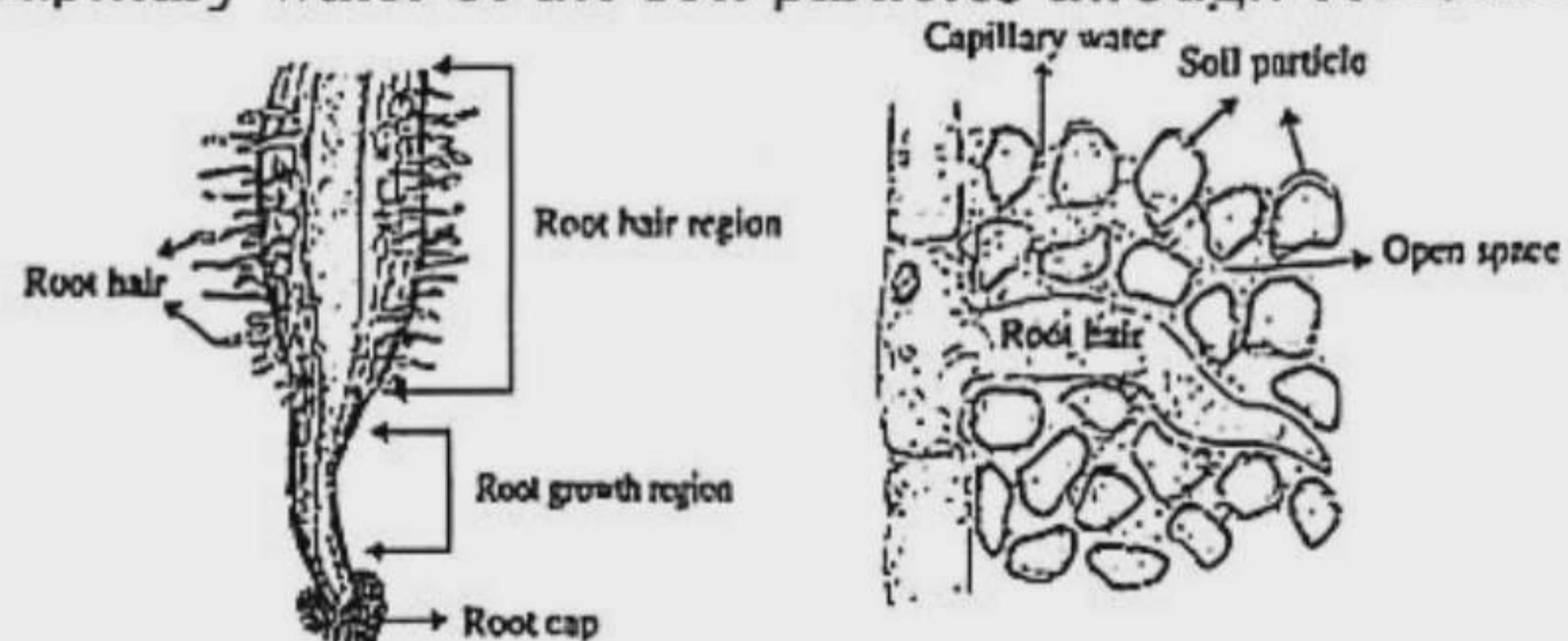
- a The process by means of which colloidal substances absorb different liquids is called imbibitions.
- b The membrane through which only the solvent molecule (water in case of plants) can pass (but not the solute molecules) is called semi-permeable membrane. Fish potka (swim bladder/air bladder) is such a kind of membrane through which only the solvent molecules can pass but not the solute molecules. That's why fish potka is called semi-permeable membrane.

c The third process of the stem is transpiration. Transpiration is a special physiological process of plant. We have already learnt that, water is essential for different physiological work of plant. For that, plant absorbs a bulk amount of water from soil through root hairs. Plants use a portion of this water in different metabolic activities and rest of it goes out in the form of water vapour to the atmosphere. The loss of water in the form of water vapour through evaporation from the moist surface of the internal tissues of the aerial parts of the plants, especially the leaves, is known as transpiration.

d Method-(i) of the stem is absorption of water and method-(ii) is absorption of mineral salts. A comparative description between two methods is given below—

#### Absorption of water :

The process by which living cells of the plant body intake water and mineral salt dissolved in water is generally known as absorption. Terrestrial (land) plants absorb water from soil through root hairs. Submerged plants absorb water through their whole body. The root hairs of the terrestrial plants intake capillary water of the soil particles through osmosis.



The wall of the root hair is permeable. So first it absorbs water through imbibition and the absorbed water comes in contact with semi-permeable plasma membrane below the cell wall. The concentration of the central solution of the root hair is higher than that of its environment and thus water (solvent) enters into the cell through endosmosis. The concentration of the cell sap from the outer membrane to the centre of the root cells is not equal. Consequently, due to inter cellular osmosis water flows from one cell to another and finally reaches the leaves through xyleme vessels of the stem.

Plant absorbs a good deal of mineral salt from the soil for their development and physiological need. Mineral salt remains in solution form in the soil. The mineral salt remains as solute with capillary water of soil but the absorption process of water and mineral salt are different and there is no relation between the two processes. Plant cannot absorb the whole salt molecule. They absorb salt only in the form of ion. However, the salt absorption process is divided into two parts. They are 1. Inactive absorption and 2. Active absorption.

**Ques. 08** The friends of Arif smelt the scent that he sprayed on his body. The next day he asked his science teacher why it happened. The teacher said that the molecules of matter spread from heavy density area to low density area.

- What is permeable membrane? 1
- Write the two difference between diffusion and osmosis. 2
- Explain the process which spreaded the smell of scent. 3
- Analyze the importance of this process mentioned above. 4

• Dhaka Board 2017

**Answer to Question No. 08 :**

a The membrane through which molecules of both solute and solvent can diffuse is called permeable membrane. Cell wall of plants is of this type of membrane.

b Two differences between diffusion and osmosis are :

Diffusion	Osmosis
1. The tendency of molecules to move towards the region with lower concentration from higher ones is called diffusion.	1. If two differently concentrated solutions of same solvent is kept separated by a semi-permeable membrane, the solvent from dilute solution diffuse through the semi-permeable membrane into the high concentrated solution and this process is called the osmosis.
2. This process depends on diffusion pressure.	2. This process depends on the nature of membrane.

c The process which spreaded the smell of scent is diffusion.

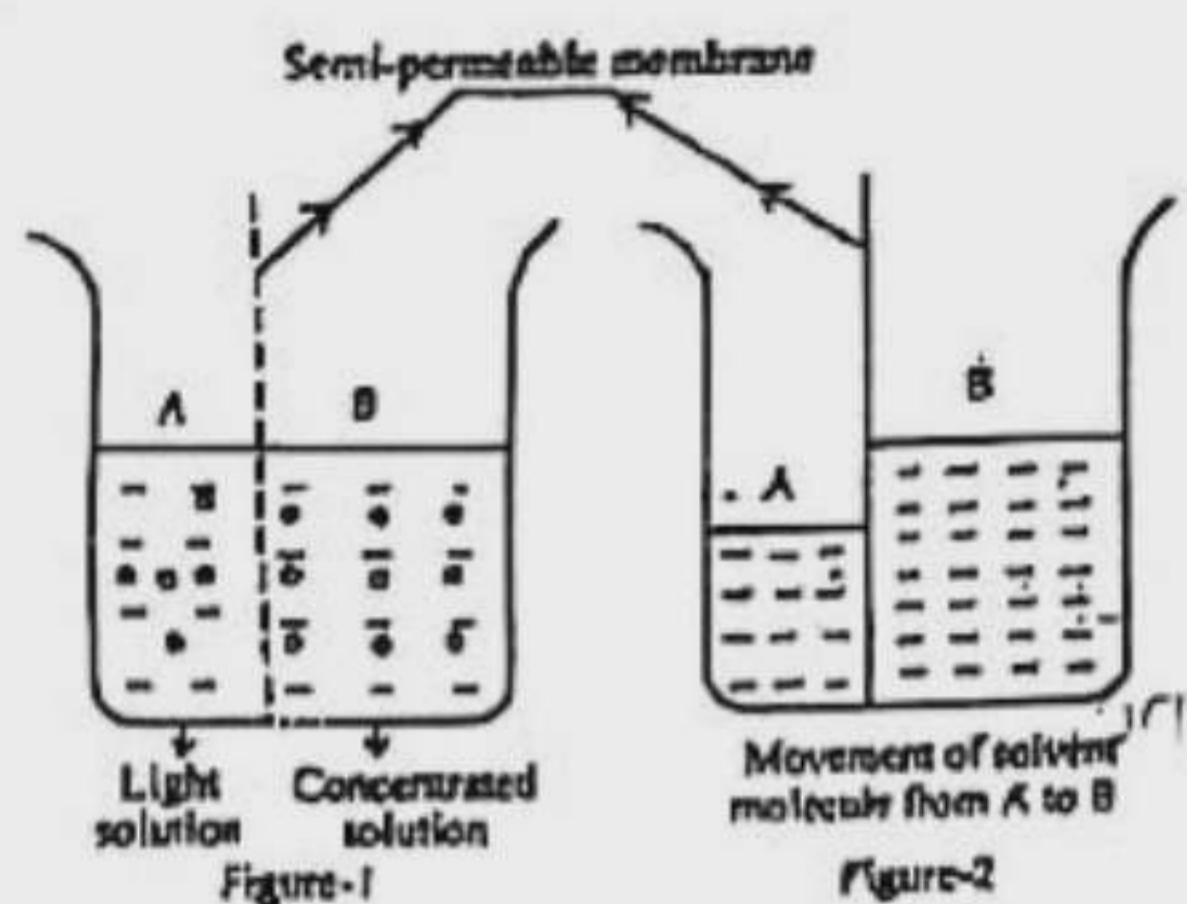
We know, matters are made up of small molecules. These molecules are always in motion. In case of liquid and gas, the motion of these molecules are very fast and shows tendency to diffuse towards the regions with lower concentration from higher ones. This movement of molecules continues as long as the concentration of the two regions becomes equal. Diffusion stops at once when the concentration of molecules becomes equal. This type of movement of molecules is called diffusion.

Due to kinetic energy of a molecule, a potential pressure is exerted and consequently the movement of molecules of solutions or gases from the region of higher concentration to that of a lower one occurs. This type of pressure is called diffusion pressure. We notice many examples of diffusion in our surroundings. For example, the smell of scent, atom or burning incense spread all around the room. It happens due to diffusion. High density of atoms from incense and scent spread in low density of atoms around the room. As a result, the whole room becomes scented.

d The importance of diffusion is described below :

Diffusion takes place in every physiological process of the organism. During photosynthesis plants absorb carbon dioxide and release oxygen as a by-product. Diffusion makes this essential task possible. Living cells use oxygen for the oxidation of glucose. Oxygen enters into the cells through

diffusion and the release of carbon dioxide also occurs in the same way. The loss of water in the form of water vapours through transpiration is the result of diffusion. In case of animal respiration exchange of oxygen and carbon dioxide, carrying of food, oxygen etc from blood to lymphs and from lymphs to cells occur through diffusion.

**Ques. 09**

- a. What is diffusion? 1
- b. Why transpiration is known as "necessary evil"? 2
- c. What type of movement of the molecules from 'A' to 'B' in the above stem? Explain it. 3
- d. In which cases the above stem's process is essential for the animal kingdom? Analyze it. 4

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**Answer to Question No. 09 :**

a Diffusion is a process of movement of the molecules of a substance from a region of high concentration to a region of low concentration at a constant temperature and atmospheric pressure. The term diffusion refers to distribution throughout.

b Transpiration is a physiological process in which plants lose water in the form of vapour through their aerial parts, mainly through the leaves. High rate of loss of water may even cause death of a plant. Still it is essential for plant life in a number of ways. This is why transpiration is called a necessary evil.

c In the stem, it is seen that there exists a semi-permeable membrane in between two solutions represented by 'A' and 'B'. By nature, a semi-permeable membrane allows a solvent of a solution to pass through it. Here solution 'B' is concentrated and solution 'A' is light. It means 'B' contains more solute than 'A'. So according to the property or characteristic of liquid substance, solvent of 'A' solution will rush to the solvent of 'B' solution through the semi-permeable membrane in order to balance the density of the two solutions by osmosis process.

d The process mentioned in the stem is osmosis. This process is very essential for the living kingdom. Different necessary mineral salts enter into the cells in soluble form. Cell membrane or plasma membrane of the living organism acts as semi-



permeable membrane. Mineral salts dissolved in water enter into and pass out from the cell through plasma membrane. Intra cellular water and the mineral salt solution together is called cell sap or simply sap. So, osmosis plays a very important role in maintaining different physio-chemical process of the cell. By this process, plants absorb water and minerals dissolved in water from soil, through unicellular root hair.

Due to osmosis, turgidity of the cell is increased that keeps stem and leaf fresh and straight. Also plants can open and close its petals. In the intestine of the animals digested food may be absorbed.

**Ques. 10** Prova was very pleased because many guavas grew on the guava tree she grew in the tub. She binds some guavas with polythene wrap for her service holder father in Dhaka. After some days her father came home and pluck the guavas. She observed that inside the polythene of the plant with leaves, water droplets appear.

- a. What is permeable membrane? 1
- b. What do you mean by "necessary evil"? 2
- c. Why did inside the polythene of the leaves water droplets appear? Explain. 3
- d. Why is the water observed inside the polythene of the leaves important for plants for life? Analyze. 4

• Cumilla Board 2017

#### Answer to Question No. 10 :

**a** The membrane through which molecule of both solute and solvent can pass easily is called permeable membrane. For example— cell wall.

**b** Transpiration of plant is known as 'necessary evil'. Transpiration is a physiological process in which plants lose water in the form of vapour through their aerial parts, mainly through the leaves. High rate of loss of water may even cause death of a plant. Still it is essential for plant life in a number of ways. This is why transpiration is called a necessary evil.

**c** The reason of water droplets inside the polythene bag is transpiration of plant.

Transpiration is a special physiological process of plant. Water is essential for different physiological work of plant. For that, plant absorbs a bulk amount of water from soil through root hairs. Plants use a portion of this water in different metabolic activities and rest of it goes out in the form of water vapour to the atmosphere. The loss of water in the form of water vapour through evaporation from the moist surface of the internal tissues of the aerial parts of the plants, especially the leaves, is known as transpiration.

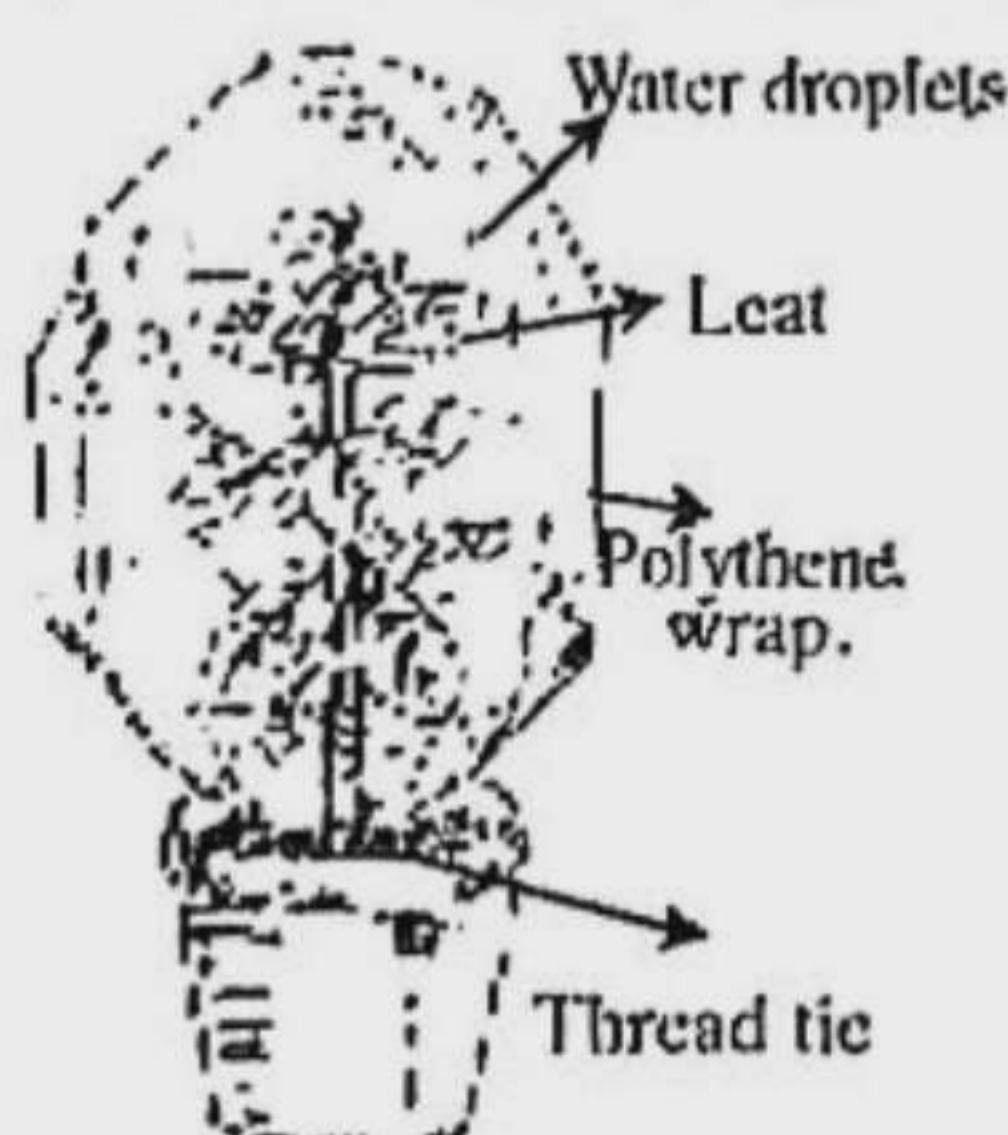


Fig : Experiment of transpiration

- d** The process of water droplets inside the polythene of the leaves is transpiration.

#### Importance of transpiration for plants life :

Transpiration is a very essential and significant process for plants. High rate of transpiration is harmful for the plants. This is why transpiration is known as the 'necessary evil' for the plants. Nevertheless, transpiration is very much useful for plants because, due to transpiration, excess water is released in the atmosphere, thus decreases water pressure of the plant body. The concentration of cell sap is increased due to transpiration. This creates the right condition for endosmosis. Transpiration prevents plants from getting over heated and also maintains proper humidity of the leaves. Water is very much essential for photosynthesis, the process for manufacture of food; transpiration ensures continuous supply of water to the leaves. Due to transpiration there develops a pull into the transporting cellular tube which helps to lift the water through the xylem vessels from root to leaves through stem.

Unlike photosynthesis and respiration, transpiration shows very little effect on the environment. But in water cycle, terrestrial plants convert land water into water vapours that go out in the atmosphere through transpiration. During transpiration a huge amount of water is released in the atmosphere in the form of water vapours.

**Ques. 11** Sumi, a student of class eight, goes with his father to visit the Sundarbans. Going there, she feels the atmosphere of the forest and asks her father why the air of that place is cold. Her father answered that happened for the special process of plants.

- a. What is photosynthesis? 1
- b. What is meant by diffusion pressure? 2
- c. Explain the causes of being cold of air at the place mentioned in the stem. 3
- d. Analyze the importance of Sumi's father's statement "special process of plant" mentioned in the stem. 4

• Dinajpur Board 2017

**Answer to Question No. 11 :**

**a** In green plants, the process of the formation of food carbohydrates is called photosynthesis. In this process, light energy is transformed into chemical energy.

**b** Due to kinetic energy of the molecule a potential pressure is exerted and consequently the movement of molecules of solutions or gases from one region of higher concentration to that of a lower one occurs. This type of pressure is called diffusion pressure.

**c** In the stem, Sumi visited sundarbans with her father. Sundarban is a mangrove forest where a lot of plants are present. The causes of being cold of air at the sundarban is transpiration of huge plants of Sundarban.

Transpiration is a special physiological process of plant. Water is essential for different physiological work of plant. For that, plant absorbs a bulk amount of water from soil through root hairs. Plants use a portion of this water in different metabolic activities and rest of it goes out in the form of water vapour to the atmosphere. The loss of water in the form of water vapour through evaporation from the moist surface of the internal tissues of the aerial parts of the plants, especially the leaves, is known as transpiration.

**d** The 'special process of plant' mentioned in the stem is transpiration.

Transpiration is a very essential and significant process for plants. High rate of transpiration is harmful for the plants. This is why transpiration is known as the 'necessary evil' for the plants. Nevertheless, transpiration is very much useful for plants because, due to transpiration, excess water is released in the atmosphere, thus decreases water pressure of the plant body. The concentration of cell sap is increased due to transpiration. This creates the right condition for endosmosis. Transpiration prevents plants from getting over heated and also maintains proper humidity of the leaves. Water is very much essential for photosynthesis, the process for manufacture of food; transpiration ensures continuous supply of water to the leaves. Due to transpiration there develops a pull into the transporting cellular tube which helps to lift the water through the xylem vessels from root to leaves through stem.

Unlike photosynthesis and respiration, transpiration shows very little effect on the environment. But in water cycle, terrestrial plants convert land water into water vapours that go out in the atmosphere through transpiration. During transpiration a huge amount of water is released in the atmosphere in the form of water vapours.

**Ques. 12**

(i)



(ii).

- a. What is called reproduction? 1
- b. What do you mean by imbibition? 2
- c. Explain how the process no. (i) is occurred in the plant. 3
- d. Which process of the stem is more suitable for environment? Analyze it. 4

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**Answer to Question No. 12 :**

**a** The complex process by which an organism produces its offsprings is called reproduction, a natural phenomenon.

**b** Most of the colloidal substances are hydrophilic. Plant body contains various colloidal substances, such as starch, cellulose, gelatin, etc. These substances can absorb water because of their colloidal nature. The process by which colloidal substances (cell wall in plants) absorb different liquid (water in case of plants) is called imbibition.

**c** Figure- (i) in the stem tells the process known as osmosis. This process plays an important role in the life of a plant. The way of occurrence of osmosis in plants are described below :

For increasing turgidity of plant cell, mineral salts are essential. Different necessary mineral salts enter into the plant cells in soluble form. Cell membrane or plasma membrane of the living organism acts as semi-permeable membrane. Mineral salts dissolved in water enter into and pass out from the cell through plasma membrane. Intra cellular water and the mineral salt solution together is called cell sap or simply sap. So, osmosis plays a very important role in maintaining different physio-chemical process of the cell. By this process, plants absorb water and minerals dissolved in water from soil, through unicellular root hair.

**d** In the stem, there are two physiological processes that take place in all the living organisms. Figure (i) refers to osmosis and figure (ii) refers to transpiration. Both the process is essential for existence of plants. Now before going to determine the matter whether osmosis or transpiration is more suitable for environment, let us discuss the two things as under :

Osmosis plays very important role in maintaining different physio-chemical process of living cell. By this process, plants absorb water and minerals dissolved in water of soil through root hair.



Turgidity of plant cell is increased due to osmosis which is essential for keeping stem and leaf fresh and straight. Besides, plants can open and close its petals due to osmosis. So, osmosis plays important role in the life of living beings specially for plants. On the other hand, water is essential for the process of photosynthesis required to produce food. A bulk amount of water is required for this purpose. Plants fulfill their requirement of such bulk amount of water through transpiration. In absence of transpiration, photosynthesis as well as production of food would be stopped in plants. Living cells need water for executing physio-chemical activities round the clock. Necessary water reacts to the living cells through transpiration. Due to transpiration a pull exists into the transporting cellular tube which helps to lift water through the xylem vessels from root to leaves through stem. Transpiration affects on moisture of atmosphere. Air around a plant gets wet due to continuous transpiration is decreased. Again, when wind blows and carried away air saturated with moisture, transpiration starts again. In water cycle, terrestrial plants convert land water into water vapour that goes in the atmosphere through transpiration. Again, during transpiration, a huge amount of water is released in the atmosphere in the form of water vapour. From the above discussion, it is seen that osmosis takes part in physio-chemical activities of plants whereas transpiration takes part in removing hostility of environment.

So, it is justified to say that transpiration is more suitable for environment.

**Ques. 13** In Chemical Laboratory, Ishtiaq dropped some blue vitriol in the water of beaker and observed that whole water of the beaker become blue color slowly. After going home he saw his mother immersed some dried grapes in a bowl which was inflated.

- What is lime water? 1
- What role does osmosis play in the animal body? 2
- Explain what will happen if Ishtiaq drops a piece of zinc in the beaker? 3
- Analyze comparatively the act of inflation of the dried grape and the incident he observed in the Laboratory. 4

• Ideal School & College, Dhaka

#### Answer to Question No. 13 :

- The dilute solution of calcium hydroxide is known as lime water.
- Osmosis is a process in which solvent passes from the lower concentrated solution to higher concentrated solution through semi-permeable membrane.

Cell membrane or plasma membrane of the living organism acts as semi-permeable membrane. Mineral salts, simple food substances dissolved in water of blood in animal cell enter and pass out from cell through plasma membrane by the process of osmosis. Osmosis helps to maintain shape and size of animal cell.

**c** The process in which blue vitriol spreads in whole water of the beaker is diffusion.

We know, matters (substances) are made up of small molecules. These molecules are always in motion. In case of liquid and gas, the motion of these molecules are very fast and shows tendency to diffuse towards the regions with lower concentration from higher ones. This movement of molecules continues as long as the concentration of the two regions becomes equal. Diffusion stops at once when the concentration of molecules become equal. This type of movement of molecules are called diffusion.

Due to kinetic energy of the molecule, a potential pressure is exerted and consequently the movement of molecules of solutions or gases from one region of higher concentration to that of a lower one occurs. This type of pressure is called diffusion pressure.

As blue vitriol is dissolved in water so diffusion takes place in the beaker. For diffusion whole water of the beaker become blue colour. If Ishtiaq drops a piece of zinc in the beaker then nothing will happen because zinc is not dissolved in water. For this reason, no diffusion will take place and there will be no change.

**d** The process of inflation of the dried grape is osmosis and the incident Ishtiaq observed in the laboratory is diffusion.

A comparison between them is given below :

Diffusion	Osmosis
i. The process through which the molecules of any substance are spreaded from the region of its higher concentration to the region of lower concentration is called diffusion.	i. Movement of solvent through a selectively permeable membrane from its lower concentration to its higher concentration is called osmosis.
ii. With the increase of atmospheric pressure, the rate of diffusion decreases.	ii. In the case of osmosis, pressure and temperature of atmosphere should be the same.

Diffusion	Osmosis
iii. In diffusion we find diffusion pressure.	iii. In osmosis we find osmosis pressure.
iv. The significance of diffusion in the absorption of water and mineral salts in plants is immense.	iv. By osmosis process plants absorb water from soil.

Diffusion	Osmosis
v. Example : If some incense is poured in a corner of a room, its fragrance is immediately spread throughout the whole room.	v. Example : If some dried grapes are placed in water, the constricted raisins are immediately swelled up being turgid.

## Knowledge & Comprehension-based Q/A

Designed as per topic

### Preparatory Knowledge-based Q/A

#### Question 1. What is diffusion?

Ans. The movement of molecules of liquid and gas from higher concentration to lower concentration is called diffusion.

#### Question 2. What is osmosis?

Ans. Osmosis is a kind of diffusion where in the gradual passing of a liquid through a membrane on account of there being a difference of liquid substance on either side of the membrane.

#### Question 3. How many kinds of transpiration take place in the plants?

Ans. Three kinds of transpiration take place in the plants.

#### Question 4. What do plants use to absorb water from soil?

Ans. Plants use root hair for absorbing water from soil.

#### Question 5. What is imbibition?

Ans. The process by means of which colloidal substances absorb different liquids is called imbibitions.

#### Question 6. What is photosynthesis?

Ans. Photosynthesis is a chemical process by means of which green plants produce carbohydrate food mixing carbon dioxide and water in presence of light from the sun.

#### Question 7. What is the combined result of diffusion and osmosis?

Ans. The combined result of diffusion and osmosis is absorption.

#### Question 8. What is the way of reaching water and mineral salts to leaves?

Ans. Water and mineral salts reach to the leaves through xylem vessel.

#### Question 9. Where from the plants absorb mineral salts?

Ans. The plants absorb mineral salts from capillary solution of the soil.

### Question 10. Which has the responsibility for upward transport of sap?

Ans. Xylem has the responsibility for upward transport of sap.

### Preparatory Comprehension-based Q/A

#### Question 1. What are the divisions of the salt absorption process of plants?

Ans. Plants cannot absorb the whole salt molecule. They absorb mineral salts only in the form of ion and the process of absorption of salts is divided into two parts namely (i) Inactive absorption and (ii) Active absorption.

#### Question 2. Transpiration is a very essential and significant process for plants — Explain.

Ans. Transpiration balances water pressure of the plant body. It helps to increase concentration of cell sap creating right condition for endosmosis and ensures continuous supply of water to the leaves for conducting photosynthesis. For all these stated above transpiration is essential and significant process for plants.

#### Question 3. What is meant by transportation?

Ans. It is fact that water and solution of mineral salts absorbed through root hair naturally reaches to leaves and other parts of the plants through vascular tissue named xylem. Besides, carbohydrate food produced in the green parts of the plants by photosynthesis naturally reaches to different parts of plant body through vascular tissue named phloem. The process by which water from root hair reaches leaves and food from leaves reaches different parts of plant body is known as transportation.

#### Question 4. Why is diffusion important for organisms?

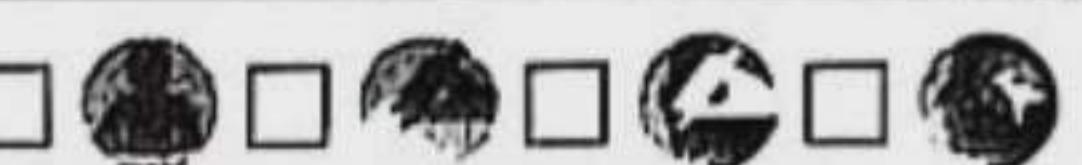
Ans. Diffusion helps plants absorbing carbon dioxide and releasing oxygen during photosynthesis in plants. Transpiration that is the loss of water in the form of water vapours is the result of diffusion. Diffusion executes respiration of animals, transportation of food, oxygen, etc. from blood to lymph and from lymph to cells. So, diffusion is essential for every physical process of organisms.



## Solutions to Textual Activities



Along with textual reference



### Solutions to Activities of Exercise

**Project 01** Plant a chilli/tomato sapling in a tub. Add concentrated urea solution after the sapling becomes afresh. See what changes take place in the sapling in a few days. Write down your observation and note down also the cause behind it. Discuss with your teacher what it proves. In the light of your observation what suggestions do you have for the farmers of your area?

► Textbook Page 34

**Solution :** I planted a chili or tomato sapling in a tub. After planting, after a few days, I noticed that the sapling had become fresh. Then I added a concentrated urea solution to the tub.

After a few days of observation, I saw that the plant had become much greener, fresher and bigger than before. The leaves, stem and branches of the plant have grown. The reason for this is urea. As a result of discussing with the teacher, I learned that urea is a chemical fertilizer whose main ingredient is nitrogen. After applying urea fertilizer, the plant absorbs it through the diffusion process with the root hairs. This proves that urea fertilizer causes physical growth of plants.

From this observation, the suggestions that I will give to my farmer brothers is:

1. A clear idea about the symptoms of nitrogen deficiency in seedlings.
2. Encourage them to apply nitrogen fertilizers, such as urea, to their agricultural land in the correct proportion, according to the advice of the Upazila Agricultural Officer or by using a nitrogen leaf chart.



### Solutions to Topic Related Activity

#### Activity 02 Experiment of transpiration.

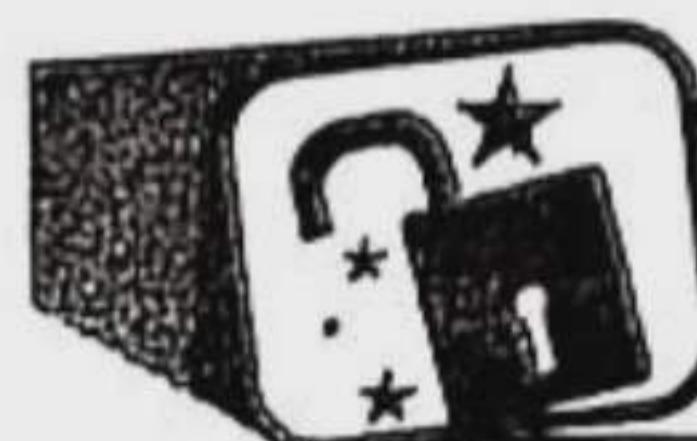
► Textbook Page 31

**Necessary materials :** Potted plant, table, water, polythene, thread and vaseline.

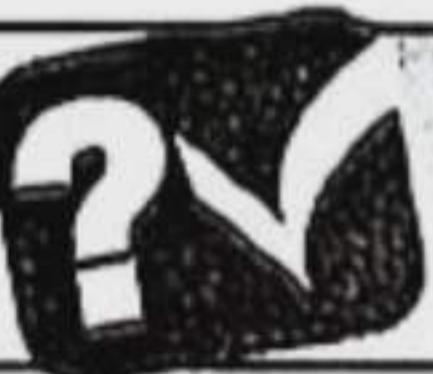
**Procedure :** Place two potted plants on a table and add the necessary amount of water to the base of the plants. Keep one plant with leaves and cover it with a polythene wrap, tying the polythene with thread at the base of the plant and applying a coating of vaseline there so that no air or water can pass from the outside. Remove the leaves of the other plant and cover it with a polythene wrap in the same way as the first plant. Place both plants in sunlight.

**Solution :** After observing the described experiment for a while, I will see that water droplets have accumulated inside the polythene on the tub of the plant with leaves, but no water has accumulated inside the polythene on the tub of the plant without leaves. From this experiment, I proved that plants release water from their bodies in the form of vapor through the process of transpiration through the stomata. That is, transpiration occurs in the leaves.

From this observation, I have come to the conclusion that transpiration does not occur in plants without leaves.



### Super Suggestions

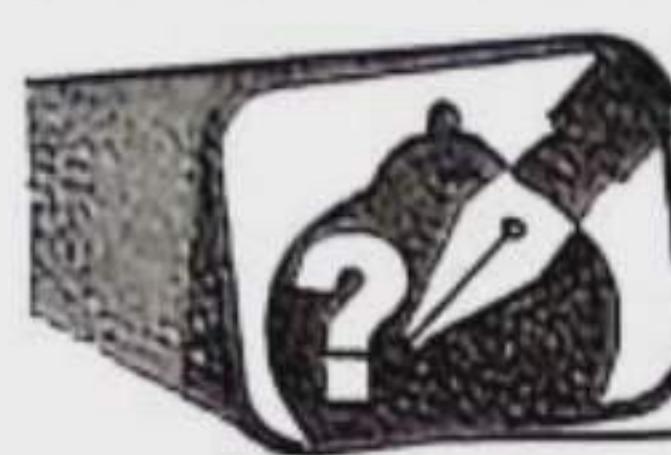


Super Suggestions with 100% preparatory questions selected by the Master Trainer Panel

Dear learners, important multiple choice, short, creative, knowledge & comprehension-based questions of this chapter selected by Master Trainer Panel for Half-Yearly and Annual Exams are presented below. Learn the answers to the mentioned questions well to ensure 100% preparation.

Question Pattern	7★	5★
MCQs with Answers	Learn each MCQs in this chapter thoroughly.	
Short Q/A	2, 3, 6, 7, 12, 13, 17, 21, 22	1, 5, 9, 10, 14, 18, 23, 25
Creative Q/A	1, 2, 3, 5, 8, 10, 11, 13	4, 6, 7, 12
Knowledge-based Q/A	2, 4, 5, 7, 10	1, 3, 6, 9
Comprehension-based Q/A	1, 2	3, 4

**Exclusive Tips** ► Master the solutions to all the activities in this chapter along with exercise and other Q/A to develop the creative thinking and assess your talent.



# Assessment & Evaluation



A question bank presented in the form  
of a class test to assess the preparation

## Class Test

Time : 3 hours

## Science

### Class : Eight

Full marks : 100

#### Multiple Choice Questions (Each question carries 1 mark)

$1 \times 30 = 30$

[N.B. : Answer all the questions. Each question carries one mark. Block fully, with a ball-point pen, the circle of the letter that stands for the correct/best answer in the "Answer Sheet" for Multiple Choice Question Type Examination.]

1. Carbon dioxide enters plants cell during —.  
Ⓐ conduction Ⓑ absorption Ⓒ diffusion Ⓓ osmosis
2. Oxygen comes out from plant cell during —.  
Ⓐ osmosis Ⓑ conduction Ⓒ absorption Ⓓ diffusion
3. What does the process of diffusion relate to?  
Ⓐ Chemical energy Ⓑ Chemical bond  
Ⓒ Static energy Ⓒ Potential energy
4. Answer the question No. 4 and 5 in the light of the stem below:  
'X' is a physiological process of a plant, which is occurred by stomata.
5. Which one is occurred by the mentioned process?  
Ⓐ Water absorption Ⓑ Salt absorption  
Ⓒ Ion absorption Ⓒ Loss of water
6. The pore of above stem is made of—  
i. upper epidermal cell  
ii. guard cell  
iii. synorgid cell  
Which one is correct?  
Ⓐ i & ii Ⓑ i & iii Ⓒ ii & iii Ⓓ i, ii & iii
7. What does a plant use for oxidation of glucose?  
Ⓐ Mineral salt Ⓑ Oxygen  
Ⓒ Nitrogen Ⓒ Hydrogen
8. We can have experiment on diffusion with—  
i. indigo powder  
ii. liquid indigo  
iii. blue vitriol  
Which one is correct?  
Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
9. Which process carries oxygen from blood to lymph?  
Ⓐ Osmosis Ⓑ Diffusion  
Ⓒ Endosmosis Ⓒ Transportation
10. Animal cell membrane is called —.  
Ⓐ plasmalemma Ⓑ xylem  
Ⓒ phloem Ⓒ artery
11. Example of semi-permeable membrane —.  
i. cell wall  
ii. fish bladder  
iii. inner membrane of egg shell  
Which one is correct?  
Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
12. What happens if swelled dry grapes are kept in honey?  
Ⓐ Diffusion Ⓑ Osmosis  
Ⓒ Transpiration Ⓒ Imbibition
13. Which process helps to open the petals of water lily?  
Ⓐ Diffusion Ⓑ Osmosis  
Ⓒ Transpiration Ⓒ Imbibition
14. Through which the solvent and solute molecule can pass easily?  
Ⓐ Polythene Ⓑ Cell wall  
Ⓒ Cell membrane Ⓒ Fish potka

14. Which one is impermeable membrane?  
Ⓐ cell wall Ⓑ cell membrane  
Ⓒ polythene Ⓒ membrane of fish potka
15. Which is the semi-permeable membrane?  
Ⓐ Polythene Ⓑ Cutinic cell wall  
Ⓒ Cell wall Ⓒ Cell membrane
16. Most of the colloidal substances are —.  
Ⓐ water absorbing Ⓑ oil absorbing  
Ⓒ petroleum absorbing Ⓒ all the above
17. The substance of the plant body is —.  
Ⓐ Cell wall Ⓑ Protoplasm Ⓒ Cytoplasm Ⓓ Cellulose
18. Which one of the following is related to the above process?  
Ⓐ Diffusion Ⓑ Osmosis Ⓒ Imbibition Ⓓ Transpiration
19. Read the following passage and answer the question numbers 19 & 20 :  
Leaf is no less important than root or stem. It is important to plants for existence and growth. water and minerals reach leaf from root through stem.
20. Leaf performs the functions of —.  
i. stomach  
ii. lung  
iii. skin  
Which one is correct?  
Ⓐ i & ii Ⓑ ii & iii Ⓒ i & iii Ⓓ i, ii & iii
21. What process does the last sentence indicate?  
Ⓐ Convection Ⓑ Transportation  
Ⓒ Osmosis Ⓒ Imbibition
22. Which one of the following is a colloidal substance?  
Ⓐ cellulose Ⓑ cell wall  
Ⓒ cell membranc Ⓒ chlorophyll
23. The least rate of transpiration takes place through —.  
Ⓐ stomata Ⓑ cuticle Ⓒ lenticell Ⓓ phloem
24. Which maintains the moisture of the leaves?  
Ⓐ Transpiration Ⓑ Diffusion  
Ⓒ Osmosis Ⓒ Absorption
25. Which one is a necessary evil for plant?  
Ⓐ Photosynthesis Ⓑ Osmosis  
Ⓒ Transpiration Ⓒ Diffusion
26. Where does transpiration mainly occur?  
Ⓐ Cuticle Ⓑ Stomata Ⓒ Lenticell Ⓓ Root hair
27. Where is lenticel situated?  
Ⓐ Root Ⓑ Stem Ⓒ Flower Ⓓ Leaves
28. Which is the 'Necessary evil' for plant?  
Ⓐ Diffusion Ⓑ Osmosis  
Ⓒ Imbibition Ⓒ Transpiration
29. Which one is a special physiological activity of plants?  
Ⓐ osmosis Ⓑ diffusion  
Ⓒ absorption Ⓒ transpiration
30. Which one is called "necessary evil"?  
Ⓐ Diffusion Ⓑ Transpiration  
Ⓒ Osmosis Ⓒ Imbibition
31. Water reaches leaves from roots through —.  
Ⓐ xylem Ⓑ phloem Ⓒ lenticell Ⓓ cuticle

## Answer Sheet ▶ Multiple Choice Questions

1	Ⓐ	2	Ⓑ	3	Ⓐ	4	Ⓓ	5	Ⓐ	6	Ⓑ	7	Ⓐ	8	Ⓓ	9	Ⓐ	10	Ⓑ	11	Ⓓ	12	Ⓓ	13	Ⓓ	14	Ⓒ	15	Ⓓ
16	Ⓓ	17	Ⓓ	18	Ⓒ	19	Ⓓ	20	Ⓑ	21	Ⓐ	22	Ⓒ	23	Ⓓ	24	Ⓒ	25	Ⓓ	26	Ⓓ	27	Ⓓ	28	Ⓓ	29	Ⓓ	30	Ⓓ



Science

**Short-Answer Question** (Each question carries 2 marks)**Answer any 10 of the following questions :** $2 \times 10 = 20$ 

1. Why does the fragrance spread when perfume is sprayed?
2. Write two characteristics of diffusion.
3. Mention two importances of diffusion.
4. What role does diffusion play in animal respiration?
5. Write two characteristics of osmosis.
6. How many types of membranes are there and what are they?
7. Give two examples of semi-permeable membranes.
8. Why is the cell wall called a permeable membrane?

9. In how many ways is the absorption of mineral salts in plants accomplished?
10. Why is cellulose called a hydrophilic substance?
11. Why does imbibition occur?
12. How does transpiration keep the plant body cool?
13. How does transpiration help in causing rainfall?
14. Why is transpiration important for water transport?
15. What is meant by transport in plants?

**Creative Question** (Each question carries 10 marks)**Answer any 5 of the following questions :** $10 \times 5 = 50$ 

1. The plants in the tub of Progga seemed to be lifeless. For this she drenched the dry soil with water. At this the plants became fresh. On the next day, out of curiosity she covered a branch with leaves of the plant with polythene. In the afternoon, she noticed that there was little water inside the polythene.
  - a. What is imbibition? 1
  - b. How does the fragrance of flower spread in the air? 2
  - c. Explain the cause of the plants mentioned in the stem becoming fresh. 3
  - d. The second metabolic process as mentioned in the stem is necessary for plants but it sometimes causes their death—Analyze. 4



Fig. X



Fig. Y

2.
  - a. What is diffusion pressure? 1
  - b. Why blue which is used in cloths is spreaded out in water? Explain it. 2
  - c. Explain the process-X of above figure. 3
  - d. Analyze the importance of the process of figure-'Y' in plants' life. 4
3. Jihan uses Atar in his body and his classmates get fragrance of it. On the other hand, Siam finds that raisins or dry grapes got wet in water swell and grow fat.
  - a. What is transpiration? 1
  - b. Dry wood is hydrophilic—Explain. 2
  - c. Explain the reason of getting fragrance of the classmates of Jihan? 3
  - d. The methods occurred in the stem are important in the lives of men and creatures. Explain it. 4

4. 
 

Priyanka's house filled with the fragrance of perfume bought by her friends on her birthday. The dried grape (Kismis) on the plates made in this occasion by her mother was smaller and parched.

No. 01
Water Vapour

No. 02
Polythene

  - a. What is called imbibition? 1
  - b. Why polythene is an impermeable membrane? 2
  - c. Explain the process of the figure No. 02. 3
  - d. Do the two incidents occurred in the box No.-1 play the same role in plant? Give your opinion. 4

5. Risha went to her uncle's house in winter. When she went to see the farm, she observed plant some are dead and some are alive. She asked her uncle. About this her uncle advised and explained her its absorption of water and mineral salts and also transpiration.
  - a. What is imbibition? 1
  - b. Why is fish potka called semi-permeable membrane? 2
  - c. Explain the third process from this paragraph. 3
  - d. Compare method (i) with method (ii) mentioned in the stem and describe. 4
6. The friends of Arif smelt the scent that he sprayed on his body. The next day he asked his science teacher why it happened. The teacher said that the molecules of matter spread from heavy density area to low density area.
  - a. What is permeable membrane? 1
  - b. Write the two difference between diffusion and osmosis. 2
  - c. Explain the process which spreaded the smell of scent. 3
  - d. Analyze the importance of this process mentioned above. 4
7. Sumi, a student of class eight, goes with his father to visit the Sundarbans. Going there, she feels the atmosphere of the forest and asks her father why the air of that place is cold. Her father answered that happened for the special process of plants.
  - a. What is photosynthesis? 1
  - b. What is meant by diffusion pressure? 2
  - c. Explain the causes of being cold of air at the place mentioned in the stem. 3
  - d. Analyze the importance of Sumi's father's statement "special process of plant" mentioned in the stem. 4



(i)



(ii)

8.
  - a. What is called reproduction? 1
  - b. What do you mean by imbibition? 2
  - c. Explain how the process no. (i) is occurred in the plant. 3
  - d. Which process of the stem is more suitable for environment? Analyze it. 4

**Answering Reference ► Short-Answer Questions**

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|--------------------------------|--------------------------------|---------------------------------|---------------------------------|
| 1 ► See this Chapter, Ques. 01 | 5 ► See this Chapter, Ques. 06 | 9 ► See this Chapter, Ques. 11  | 13 ► See this Chapter, Ques. 20 |
| 2 ► See this Chapter, Ques. 02 | 6 ► See this Chapter, Ques. 08 | 10 ► See this Chapter, Ques. 14 | 14 ► See this Chapter, Ques. 23 |
| 3 ► See this Chapter, Ques. 03 | 7 ► See this Chapter, Ques. 09 | 11 ► See this Chapter, Ques. 17 | 15 ► See this Chapter, Ques. 25 |
| 4 ► See this Chapter, Ques. 04 | 8 ► See this Chapter, Ques. 10 | 12 ► See this Chapter, Ques. 19 |                                 |

**Answering Reference ► Creative Questions**

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|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 1 ► See this Chapter, Ques. 03 | 3 ► See this Chapter, Ques. 05 | 5 ► See this Chapter, Ques. 07 | 7 ► See this Chapter, Ques. 11 |
| 2 ► See this Chapter, Ques. 04 | 4 ► See this Chapter, Ques. 06 | 6 ► See this Chapter, Ques. 08 | 8 ► See this Chapter, Ques. 12 |