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BIOLOGY

BOOKS - MODERN PUBLISHERS

BIOLOGY (HINGLISH)

TRANSPORT IN PLANTS

Practice Problems

1. How the osmotic pressure of given solution (non-electrolyte) such as sucrose can be

calculated?

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2. Define chemical potential and matric potential.

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3. Name the major sets of internal factors which determine the value of water potential.

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4. What increases the water potential of a solution?

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5. Name two factors that affect water potential.

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6. What will happen to the osmotic pressure when there is an increase in the concentration of solute?

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7. If a cell is placed in hypotonic solution, what will happen?

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8. Is water potential measurable? How is it represented and measured?

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9. What is the water potential of pure water at atmospheric pressure?

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10. What are isotonic solutions?

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11. Sir J.C. Bose proposed in theory of ascent of sap known as

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12. Name the structure through which ascent of sap takes place.

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13. What is active absorption of water?

Watch Video Solution

14. What is bleeding in plants?

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15. How aeration affects the process of absorption of water?

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16. What are three fractions of water in the soil?

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17. Name the following:

(i) Tissue through which ascent of sap occurs.

(ii) Universal solvent.

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Ncert File Exercise Questions

1. What are the factors affecting the rate of diffusion?

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2. What are porins? What role do they play in diffusion?

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3. Describe the role played by protein pumps during active transport in plants.

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4. Explain why pure water has the maximum water potential.

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5. Differentiate between the following:

(a) Diffusion and Osmosis

(b) Transpiration and Evaporation

(c) Osmotic Pressure and Osmotic Potential

(d) Imbibition and Diffusion

(e) Apoplast and Symplast pathways of movement of water in plants.

(f) Guttation and Transpiration.

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6. Briefly describe water potential. What are the factors affecting it?

Watch Video Solution

7. What happens when a pressure greater than the atmospheric pressure is applied to pure water or a solution?

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8. (a) With the help of well-labelled diagrams, describe the process of plasmolysis in plants, giving appropriate examples.

(b) Explain what will happen to a plant cell if it

is kept in a solution having higher water potential.

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9. How is the mycorrhizal association helpful in absorption of water and minerals in plants?

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10. What role does root pressure play in water movement in plants?

Watch Video Solution

11. Describe transpiration pull model of water transport in plants. What are the factors influencing transpiration? How is it useful to plants?

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12. Discuss the factors responsible for ascent of xylem sap in plants.

Watch Video Solution

13. What essential role does the root endodermis play during mineral absorption in plants?

Watch Video Solution

14. Explain why xylem transport is unidirectional and phloem transport bi-directional.

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15. Explain pressure flow hypothesis of translocation of sugars in plants.

Watch Video Solution

16. What causes the opening and closing of guard cells of stomata during transpiration?

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Ncert Exemplar Problems Multiple Choice Questions

1. Which of following statements does not apply to reverse osmosis?

A. It is used for water purification

B. In this technique, pressure greater than osmotic pressure is applied to the system

C. It is a passive process

D. It is an active process

Answer: C

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2. Which one of the following will not directly affect transpiration?

A. Temperature

B. Light

C. Wind speed

D. Chlorophyll content of leaves

Answer: D

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3. The lower surface of leaf will have more number of stomata in a

A. dorsiventral leaf

B. isobilateral leaf

C. both (a) and (b)

D. none of these

Answer: A

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4. the form of sugar transported through phloem is

A. Glucose

B. Fructose

C. Sucrose

D. Ribose

Answer: C

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5. The process of guttation takes place

A. When the root pressure is high and the rate of transpiration is low.

B. When the root pressure is low and the rate of transpiration is high.

C. When the root pressure equals the rate of transpiration.

D. When the root pressure as well as rate of transpiration are high.

Answer: A

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6. Which of the following is an example of imbibition?

A. Uptake of water by root hair

B. Exchange of Gases in stomata

C. Swelling of seed when put in soil

D. Opening of stomata

Answer: C

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7. When a plant undergoes senescence, the nutrients may be

A. Exported

B. Withdrawn

C. Translocated

D. none of these

Answer: B

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8. Water potential of pure water at standard temperature is equal to

A. 10

B. 20

C. Zero

D. none of these

Answer: C

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9. Choose the correct option Mycorrhiza is a symbiotic association of fungus with root system which helps in

A. absorption of water

B. mineral nutrition

C. translocation

D.gaseous exchange.

A. Only A

B. Only B

C. Both A and B

D. Both B and C

Answer: C

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Ncert Exemplar Problems Very Short Answer Type Questions

1. Smaller lipid soluble molecule diffuese faster through cell membrane but the movemnet of hydrophilic substnces are facilitated by certain transporters which are chemically.....

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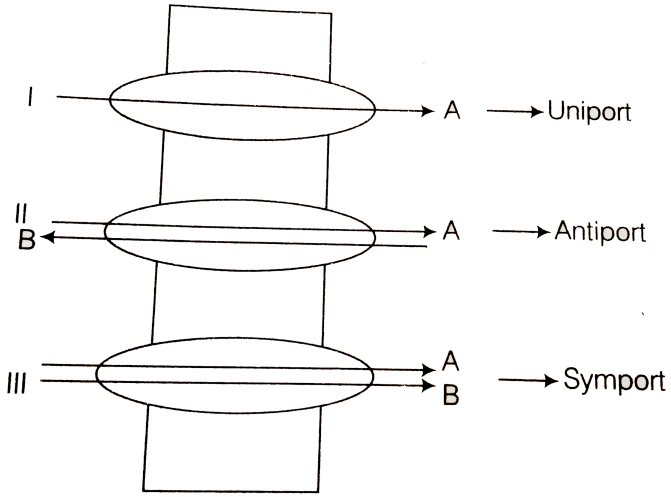
2. In a passive transport across a membrane. When two protein molecules move in opposite direction and independent of each other, it is called as ..... .



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3. Osmosis is a special kind of diffusion in which water diffuses across the cell membrane. The rate, and direction of osmosis depends upon both...

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4. A flowering plant is planted in an earthern pot, and irrigated. Urea is added to make the plant grow faster, but after some time the plant dies. This may be due to...

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5. Absorption of water from soil by seeds increases the _____ thus helping seedings to come out of soil.

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6. Water moves up against gravity and even for a tree of $20m$height the tip receives water within two hours . The most important physiological phenomenon which is

responsible for the upward movement of water is _____

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7. The plant cell cytoplasm is surrounded by both cell wall and cell membrane. The specificty of transport of transport of substances is mostly across the cell membrane, because

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8. The C_4 plants are twice as efficient as C_3 plants in terms of fixing CO_2 but lose only ..... as much water C_3 plants for the same amount of CO_2 fixed.

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9. Movement of substances in xylem is unidirection while in phloem it is bidirectional. Explain

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10. Identity the process occurring in I, II and III.

View Text Solution

11. Given below is a table. Fill in the gaps:

View Text Solution

12. Define water potential and solute potential.

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13. Why is solute potential always negative ? Explain $\Psi_w = \Psi_s + \Psi_p$.

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14. An onion peel was taken and

(a) placed in salt solution for five minutes.

(b) after that it was placed in distilled water.

when seen under the microscope what would be observed in (a) and (b) ?

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15. Differentiate between apoplast and symplast pathways of water movement. Which of these need active transport?

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16. How does most of the water moves within the root ?

Watch Video Solution

17. Give the location of casparian strip and explain its role in the water movement.

Watch Video Solution

18. Differentiate between guttation and transpiration.

Watch Video Solution

19. Transpiration is a necessary evil in plants. Explain

Watch Video Solution

20. Describe briefly the three physical properties of water which helps in ascent of water in xylem.

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21. A gardener forgot to water a potted plant for a day during summer, what will happen to the plant ? Do you think it is reversible ? If yes, how ?

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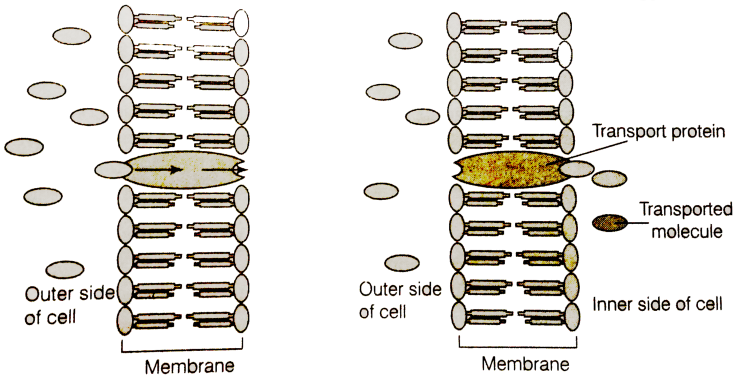
22. Identify a type of molecular movement which is highly selective and requires special membrane protenins, but does not require energy.



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23. Correct the statements.

(a) Cells shrink in hypotonic solutions and swell in hypertonic solutions.

(b) Imbibition is a special type of diffusion when water is absorbed by living cells.

(c) Most of the water flow in the roots occurs via the symplast.

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Ncert Exemplar Problems Short Answer Type Questions

1. Minerals absorbed by the roots travel up the xylem. How do they reach the parts where they are needed most ? Do all the parts of the plant get the same amount of the minerals ?

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2. If one wants to find minerals and in the form they are mobilised in the plant, how will an analysis of the exudate help ?

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3. From you kowledge of physiology can you think of some method of increasing the life of cut plants in a vase ?

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4. Do different species of plant a growing in the same area show the same rate of tranpiration at a particular time ? Justify your answer.

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5. Water is indispensable for life. What properties of water make it useful for all biological on the earth ?

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6. How is it that the intracellular level of K^+ are higher than extracellular levels in animal cells ?

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7. Cut pieces of beetroot do not leave the colour in cold water but do so in hot water. Explain.

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8. In a girdled plant, when water is supplied to the leaves above the girdle, leaves may remai green for sometime then wilt and ultimately die. What does it indicate ?

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9. Various types of transport mechanisms are needed to fulfil the mineral requirement of a plant. Why are they not fulfilled by diffusion alone?

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10. How can plants be grown limited water supply without compromising on metabolic activites ?

Watch Video Solution

11. Will the ascent of sap be possible without the cohesion and adhesion of the water molecules ? Explain.

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12. Keep some freshly cut flowers in a solution of food colour. Wait for sometime for the days to rise in the flower, when the stem, of the

flower is held up in light, coloured strands can be seen inside. Can this experiment demonstrate which tissue is conducting water up the stem ?

Watch Video Solution

13. When a freshly collected Spirogyra filament is kept in a 10 % potassium nitrate solution, it is observed that the protoplasm shrinks in size

(a) What is this phenomenon called ?

(b) What will happen if the filament is replaced in distilled water ?

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14. Sugar crystals do not dissolve easily in ice cold water. Explain.

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15. Salt is applied to tennis lawns to kill weeds. How does salting tennis lawns help in killing of

weeds without affecting the grass ?

Watch Video Solution

16. What is the chemical composition of of xylem and phloem sap ?

Watch Video Solution

17. If you are provided with two tubes (A and B), where one is narrow and the other is relatively wider and if both are immersed in a

beaker containing water as shown in the figure given below:

Why does B show higher water rise than A?

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18. What are 'aquaporins' ? How does presence of aquaporins affect osmosis ?

Watch Video Solution

19. ABA (Abscisic Acid) is called a stress hormone.

A. How this hormone overcome stress conditions ?

B. From where where does this hormone get released in leaves ?

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20. We know that plants are harmed by excess water. But plants survive under flooded

condition. How are they able to manage excess water ?

Watch Video Solution

21. Differentiate between diffusion and translocation in plants.

Watch Video Solution

22. How is fcilitated diffusion different from diffusion ?

Watch Video Solution

23. Explain the mass flow hypothesis of transport in phloem

Watch Video Solution

24. Observe the diagram and answer the following:

(a) Are these types of guard cells found in monocots or dicots?

(b) Which of these shows a higher water content (i) or (ii)?

(c) Which element plays an important role in the opening and closing of stomata?

View Text Solution

25. Define uniport, symport and antiport. Do they require energy ?

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Ncert Exemplar Problems Long Answer Type Questions

1. Minerals are present in the soil in sufficient amounts. Do plants need to adjust the types of solutes that reach the xylem? Which molecules help to adjust this? How do plants regulate the type and quantity of solutes that reach xylem?

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2. Plants show temporary and permanent wilting. Differentiate between the two. Do any of them indicate the water status of the soil ?

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3. Which of these is a Semipermeable Membrane (SP) and which is Selectively Permeable (SL) ?

(a) Animal bladder (b) Plasmalemma (c)

Tonoplast

(d) Parchment membrane (e) Egg membrane

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4. The radio labelled carbon in carbon dioxide supplied to potato plants in an experiment was seen in the tuber eventually. Trace the movement of the labelled carbon dioxide.

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5. Water molecule is very polar. Polar end of molecule attracts opposite charges on another water molecule (acts like magnet). How will you explain this property of water with reference to upward movement of water ? Comment on the upward movement of water given the intermolecular hydrogen in water.

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6. Comment on the experimental set up.

(a) What does the set up demonstrate?

(b) What will happen to the level of water if a blower is placed close to set up.

(c) Will the mercury level fluctuate (go up/down) if phenyl mercuric acetate is sprayed on leaves?

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Higher Order Thinking Skills Barin Twisting Very Short Answer Type Questions

1. What is diffusion pressure deficit (DPD) ?

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2. Who propsed K^+ ion hypthesis of stomatal opening and closure ?

Watch Video Solution

3. A cell is kept in water having low water potential. What will happen?

Watch Video Solution

4. What is sap?

Watch Video Solution

5. Define guttation.

Watch Video Solution

6. What are hydathodes ?

Watch Video Solution

7. How do roots hairs enhance the absorption of water?

Watch Video Solution

8. Why endodermis is impervious to water?

Watch Video Solution

9. Identify the channels of food transport in plants.

Watch Video Solution

10. What aids the action of capillary plants?

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Higher Order Thinking Skills Barin Twisting Short Answer Type Questions

1. A plant if transpiring rapidly. Is it due to presence of root pressure?

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2. How are companion cells helpful to sieve tubes?

Watch Video Solution

3. Write any two advantages of transpiration.

Watch Video Solution

4. How guttation is affected by root pressure?

Watch Video Solution

5. What happens if rate of transpiration exceeds the rate of absorption of water?

Watch Video Solution

6. Name the factors which affect the rate of transpiration. How this process is useful to plants?

 Watch Video Solution

7. What is an isotonic solution ?

 Watch Video Solution

8. What do your understand by active and passive absorption of water?

Watch Video Solution

9. Define imbibition and matric potential.

Watch Video Solution

10. Well aerated plants transpire more rapidly during sunny and windy days than in cool and

calm mornings. Comment.

Watch Video Solution

11. Explain why xylem transport is unidirectional and phloem transport bi-directional.

Watch Video Solution

12. How does mass flow hypthesis is different from diffusion?

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Higher Order Thinking Skills Barin Twisting Long Answer Questions

1. Explain pressure flow hypothesis of translocation of sugars in plants.

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2. Discuss the mechanism of stomatal opening and closure.

Watch Video Solution

3. Difference between osmotic pressure and turgor pressure is

Watch Video Solution

4. Differentiate between facilitated diffusion and active transport.

 Watch Video Solution

Quick Memory Test Say True Or False

1. Two factors which affect water potential are the amount of solutes and external pressure.

 Watch Video Solution

2. In plant cell, the elastic wall exerts a counter pressure to imbibitional pressure called wall pressure.

Watch Video Solution

3. The guard cell walls surrounding the aperture are thicker than outer wall.

Watch Video Solution

4. The stomata open when guard cells take up Ca^{++} from the surrounding cells.

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Quick Memory Test Complete The Missing Links

1. Pressure exerted by cell wall to balance turgor pressure is called

Watch Video Solution

2. In the thermodynamic terminology the osmotic pressure is equivalent to ..... Potential concept but opposite of its value.

Watch Video Solution

3. When a cell is placed in hypotonic solution, water moves into the cell, this flow is called.....

Watch Video Solution

4. The from and structure of growing cell are maintained be cause of .....

Watch Video Solution

5. A membrane allowing certain molecule to enter and preventing the other is called..... membrane.

Watch Video Solution

6. DPD in thermodynamic terminology is known as .....

Watch Video Solution

7. The value of water potential of pure water at normal temperature and pressure is .....

Watch Video Solution

8. The most acceptable theory of ascent of sap is .....

Watch Video Solution

9. The hydrostatic pressure developed in the cell is called

Watch Video Solution

10. The .....pressure of guard cells is responsibel for the opening of stomata.

Watch Video Solution

11. .....is the number of stomata per square mm. Of leaf suface.

Watch Video Solution

12. More is the leaf area,.....is the rate of transpiration.

Watch Video Solution

13. Transpiration is .....proportional to humidity.

Watch Video Solution

14. Guttation occurs through the pores called.....

Watch Video Solution

15. During passive absorption, water is absorbed as a result of tension created by.....

Watch Video Solution

16. .....is the exudation of water drops from the tip or margins of lamina at the vein ends.

Watch Video Solution

17. Metabolic energy of the cell is utilized in .....absorption of water

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Quick Memory Test Choose The Correct Alternative

1. Imbibition/diffusion is the movement of substances from the region of their higher concentration to the region of lower concentration.

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2. Simple diffusion/facilitated diffusion requires special membrane proteins.

Watch Video Solution

3. The magnitude by which water potential is reduced due to the presence of solue in pure water is known as solute potential/pressure potential.

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4. Plasmolysis/deplasmolysis occurs when tissue is placed in hypertonic solution.

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5. Apoplast/symplast pathway is a system of interconnected protoplast.

Watch Video Solution

6. In transpiration/guttation water loss is dilute solution of inorganic and organic substances.

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Revision Exercises Very Short Answer Questions

1. Name the universal solvent.

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2. Why is water essential for plant activities?

Watch Video Solution

3. What is protoplast?

Watch Video Solution

4. What is protoplasm ?

Watch Video Solution

5. How are protoplasm of two adjacent cells conncected to each other?

Watch Video Solution

6. What is water potential ?

Watch Video Solution

7. Name the measurement unit of water potential.

Watch Video Solution

8. List three factors which influence water potential.

Watch Video Solution

9. What do the terms Ψ_s and Ψ_p denotes?

Watch Video Solution

10. Name the structure which absorb water from soil.

Watch Video Solution

11. What are the two pathways through which water moves?

Watch Video Solution

12. Define transmembrane pathway.

Watch Video Solution

13. Define Diffusion.

Watch Video Solution

14. What is membrane permeability?

View Text Solution

15. Which element is involved in the opening and closing of stomata?

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16. What is guttation?

Watch Video Solution

17. Name the phenomenon in which drops of water oozer out from the margin of tip of leaf ?

Watch Video Solution

18. Which hormone is responsible for closing of stomata ?

Watch Video Solution

19. which fraction of soil wate is availbale to plants for absorption by roots ?

Watch Video Solution

20. Define transpiration

Watch Video Solution

21. Name the pores through which guttation occurs

Watch Video Solution

22. Define wall pressure

Watch Video Solution

23. What are hydathodes?

Watch Video Solution

24. A plant cell when kept in a certain solutin got plasmolysed what was the nature of the solution?

Watch Video Solution

25. Define osmotic potential.

Watch Video Solution

26. Define pressure potential

Watch Video Solution

Revision Exercises Short Answer Questions

1. What are subsidiary or accessory cells?

Watch Video Solution

2. What is water potential of pure water at atmospheric pressure? What happens to it when solutes are added to it?

Watch Video Solution

3. What happnes to pant cell when it is placed in a hypotonic solution?

Watch Video Solution

4. List the environmental factors which affect transpiration.

Watch Video Solution

5. What is consequence of efflux of K^+ ions?

Watch Video Solution

6. Name different theories to explain water translocation.

Watch Video Solution

7. Name the conditions on which osmotic pressure depends.

Watch Video Solution

8. Why is turgidity of cells essential for plants?

Watch Video Solution

9. Differentiate between diffusion and osmosis.

Watch Video Solution

10. Suggest two type of treatments for reducing transpiration in plants in a field

Watch Video Solution

11. What causes the leaves of the grasses to rol in dry weather?

Watch Video Solution

12. List any four mechanism that contribute to the ascent of sap in tall trees

Watch Video Solution

13. What is the role of K^+ ions in the opening of stomata?

Watch Video Solution

14. Discuss the pathways by which water moves into root.

Watch Video Solution

15. Transpiration is a necessary evil in plants. Explain

Watch Video Solution

16. Differentiate between passive and active water absorption.

Watch Video Solution

17. The movement of water through the root layers is ultimately symplastic in the endodermis. Give a reason.

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18. Differentiate between TP and WP. How do changes in TP helps in opening and closing of stomata.

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19. What are guard cells. Describe the structure of typical guard cells.

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20. Define the terms : Plasmolysis, deplasmolysis, endosmosis and exosmosis.

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21. Write a note on guttation.

Watch Video Solution

22. Write the importance of osmosis in plants.

Watch Video Solution

23. Write the importance of imbibition.

Watch Video Solution

24. What is root pressure? How is it demonstrated experimentally?

Watch Video Solution

25. Give advantages of transpiration.

Watch Video Solution

26. What are the two kinds of interactions of water molecues that allow water to travel

upward in plnts ? What other phyusical process aids in water transport to tops of t rees ?

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27. How do potassium ions $\left(K^{+}\right)$ regulate the opening and closing of stomata?

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28. What is guttation? Name the pore through which guttation occur. What does guttated water contain?

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29. What are antitranspirants? Give examples . How do they reduce transpiration?

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30. Discuss Dixon's cohesion tension theory of ascent of sap.

Watch Video Solution

31. Describe K^+ ion theory for opening and closing of stomata.

Watch Video Solution

32. Discuss Dixon's theory of ascent of sap.

Watch Video Solution

33. Explain the Capillary theory in respect of ascent of water in plants. Name the tissue involved.

Watch Video Solution

34. Discuss the factors which affect transpiration.

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35. What is imbibition? Which are the various conditionns necessary for the imbibition to take place?

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36. Define plasmolysis. What change will occur, when erythrocytes are placed in 5% NaCI solution.Explain.

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Revision Exercises Long Answer Questions

1. Describe osmosis as a special case of diffusion.

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2. Describe the theories related to translocation of water

Watch Video Solution

3. Describe the factors which affect the rate of absorption of water.

Watch Video Solution

4. Discuss the process of facilitated diffusion.

Watch Video Solution

5. Discuss the active potassium theory for opening and closing of stomata.

Watch Video Solution

6. Discuss the statement, 'transpiration and photosynthesis - a compromise'.

Watch Video Solution

7. Explain the mechanism of stomatal opening.

Watch Video Solution

8. Describe with the help of well labelled diagrams the mechanism of opening and closing of stomata in dicots and monocots.

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9. Explain the mechanism of closing and opening of stomata. Name the category of plants which keep their stomata open during night and closed during the day.

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10. Write briefly the role of transpiration in plants.

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Competition File Multiple Choice Questions

1. Stomata that can also open at night, present in

A. Xerophytes

B. Gametophytes

C. Hydrophytes

D. none of these

Answer: A

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2. Complementary cells are associated with

A. Lenticels

B. Hydathodes

C. Rhytidome

D. Bark

Answer: A

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3. Bulliform cells are found in

A. Seeds of sunflower

B. Leaf of wheat

C. Pod of pea

D. Tuber of potato

Answer: B

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4. Potometer works on the principle of

A. Amount of water absorbed equals the amount of water transpired

B. Osmotic pressure

C. Root pressure

D. Potential difference between the tip of the tube and that of plant

Answer: A

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5. Which of the following theory gives the latest explanation for the closure of stomata

A. ABA theory

B. Munch theory

C. Starch glucose theory

D. Active K^+ transport theory

Answer: A

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6. Loss of liquid water by guttation occurs through

A. Hydathodes

B. Stomata

C. Cuticle

D. Bark

Answer: A

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7. Movement of H_2O through cell wall is called

A. Apoplast

B. Symplast

C. Tonoplast

D. none of these

Answer: A

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8. The pathway of the movement of water throughcell wall only is called

A. Symplast pathway

B. Plasmodesmata pathway

C. Apoplast pathway

D. Vacuolar pathway

Answer: C

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9. The rate of transpiration of a plant would gradually increase if

A. The relative humidity increases

B. The relative humidity decreases

C. The relative humidity remain unchanged

D. The water potential gradient remain unchanged

Answer: B

10. Absorption of diffusible ions by cells concentration gradient is called :

A. Passive absorption

B. Active absorption

C. Osmosis

D. Donnan equilibrium

Answer: B

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11. Path of water movement from soil to xylem is

A. Soil $\rightarrow$ root hair $\rightarrow$ cortex $\rightarrow$ pericycle $\rightarrow$ endodermis $\rightarrow$ metaxylem $\rightarrow$

protoxylem

B. Soil $\rightarrow$ root hair $\rightarrow$ cortex $\rightarrow$ endodermis $\rightarrow$ pericycle $\rightarrow$ protoxylem $\rightarrow$ metaxylem

C. Soil $\rightarrow$ root hair $\rightarrow$ epidermis $\rightarrow$ cortex $\rightarrow$ phloem $\rightarrow$ xylem

D. Soil $\rightarrow$ root hair $\rightarrow$ cortex $\rightarrow$ protoxylem $\rightarrow$ phloem $\rightarrow$ metaxylem

Answer: D

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12. Which of the following statement is/are not true

(A). In CAM plants stomata open during dark and remain closed during the day

(B). Role of Na^+ in stomatal opening in now universally accepted

(C). The water potential of roots cells is higher than the water potential of soil

(D). Capillarity theory is the most accepted thory of water movement through plants.

(E). The walls of xylem vessels made up of

ligno-cellulose have strong affinity for water molecules

A. B, C and E only

B. B, C and D only

C. A, B and C only

D. B and C only

Answer: B

 Watch Video Solution

13. Cohesion and adhesion theory is otherwise called:

A. Relay pump theory

B. Pulsation theory

C. Root pressure theory

D. Transpiration pull theory

Answer: D

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14. Ascent of sap in plants was demonstrated by

A. Girdling experiment

B. Ganong's experiment

C. Went experiment

D. Lever auxanometer

Answer: A

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15. Which one is incorrect statement?

A. Movement of water is expressed in terms of free energy

B. Free energy determines the direction by which physical and chemical changes should occur

C. Water potential is the sum of free energy of water molecules in pure water and in any other system

D. Water potential of pure water is zero

Answer: C

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16. Plasmolysis is the result of

A. Exosmosis

B. Endosmosis

C. Reverse osmosis

D. Diffusion

Answer: A

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17. A cell, when kept in sugar solution, gets dehydrated. Then, the solution is

A. Hypotonic

B. Hypertonic

C. Isotonic

D. none of these

Answer: B

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18. Guard cells help in

A. Protection against grazing

B. Transpiration

C. Guttation

D. Fighting against infection

Answer: B

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19. Cell A has osmotic potential of -18 bars and pressure potential of 8 bars, whereas, cell B has osmotic potential of -14 bars and pressure potential 2 bars. The direction of flow of water will be

A. From cell B to cell A

B. From cell A to cell B

C. No flow of water

D. In both the directions

Answer: B

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20. In the leaves, veins are useful for

A. Transport of water and minerals

B. Mechanical support

C. Transport of organic food material

D. All of the above

Answer: D

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21. Accumulation of which one of the following acids results in closure of stomata

A. Malic acid

B. Aspartic acid

C. Phosphoenol pyruvic acid

D. Oxalacitic acid

Answer: A

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22. Which one of the following is not a characteristic of active transport?

A. Highly selective

B. Transport saturates

C. Uphill transport

D. Insensitive to inhibitors

Answer: D

Watch Video Solution

23. Water in the soil available to plants is :

A. Gravitational water

B. Capillary water

C. Hygroscopic water

D. None of these

Answer: B

Watch Video Solution

24. When a cell is plasmolysed, it becomes

A. Flaccid and its TP becomes 0

B. Turgid and its TP becomes 0

C. Turgid and TP becomes equal to OP

D. Flaccid and DPD becomes 0

Answer: A

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25. The factor, most important in regulating transpiration, is

A. Temperature

B. Light

C. Wind

D. Relative humidity

Answer: B

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26. The process by which water is absorbed by solid like colloids causing them to increase in volume is

A. Osmosis

B. Plasmolysis

C. Imbibition

D. Diffusion

Answer: C

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27. Select the correct statement

A. Absorption of water by seeds and dry wood are examples of facilitated diffusion

B. The apoplast is the system of interconnected protoplasts

C. Pinus seeds cannot germinate and establish without the presence of mycorrhizae

D. The translocation in phloem is unidirectional whereas in the xylem it is bidirectional

Answer: C

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28. Phloem sap is mainly made of

A. Water and sucrose

B. Water and minerals

C. Oligosaccharides and hormones

D. none of these

Answer: A

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29. Force generated by transpiration can create pressure sufficient to lift water even upto the height of

A. 130 feet

B. 130 metre

C. 230 feet

D. 230 metre

Answer: B

 Watch Video Solution

30. Which growth hormone is asscoiated with stomatal movemants

A. Auxin

B. Gibberellin

C. ABA

D. Cytokinin

Answer: A

Watch Video Solution

31. Consider the following statements with reference to facilitated transport

A. Requires ATP energy

B. Transport saturates

C. Highly selective

D. Requires special membrane properties

E. Uphill transport

of the above statements.

A. A, B and C are relevant but D and E are irrelevant

B. B, C and E are relevant but A and D are irrelevant

C. C, D and E are relevant but A and B are irrelevan

D. B, C and D are relevant but A and E are irrelevant

Answer: D

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32. Which of the following is not a purpose of transpiration

A. Helps in absorption and transport in plants

B. Prevents loss of water

C. Maintains shape and structure of plants by keeping the cell turgid

D. Supplies water for photosynthesis

Answer: B

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33. Osmotic pressure of pure water is

A. 0

B. 1

C. 10

D. 100

Answer: A

Watch Video Solution

34. When turgidity is lost in guard cells the stomatal pore

A. Remains unchanged

B. Gets plasmolysed

C. Becomes closed

D. Opens fully

Answer: C

Watch Video Solution

35. The osmotic expanison of a cell kept in water is chiefly regulated by

A. Mitochondria

B. Vacuoles

C. Plastids

D. Ribosomes

Answer: B

 Watch Video Solution

36. The phenomenon of water moving out of cell an plasma membrane shrinking from the cell wall is :

A. Plasmolysis

B. Exosmosis

C. Hydrolysis

D. Endomosis

Answer: A

Watch Video Solution

37. In a plant cell DPD is zero when it is â€¦â€¦â€¦..

A. Plasmalysed

B. Turgid

C. Flaccid

D. Incipient

Answer: B

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38. The number of stomatal pores per cm^2 of leaf surface are in the range of

A. 1000-60, 000

B. 10-1000

C. 50, 000 -6, 00, 000

D. 50-100

Answer: A

 Watch Video Solution

39. transport proteins of endodermal cells are control point where a plant adjusts the quantity and types of solutes that reach the

xylem. Root endodermis is able to actively transport ions in one direaction only becaouse of the layer of .

A. Actin

B. Lignin

C. Siberin

D. Cellulose

Answer: C

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40. Water potential gradient between the absorbent and the liquid imbibed is essential for imbibition.

A. Affinity between the absorbent and the liquid

B. Molecular density of the absorbent

C. Concentration of the absorbent

D. Pressure potential of the absorbent

Answer: A

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41. Which of the following is not correct in mass flow hypothesis ?

A. As hydrostatic pressure in the phloem sieve tube increases pressure flow stops and sap is accumulated in phloem.

B. The sugar is moved bidirectionally.

C. The sugar which is transported is sucrose.

D. Loading of the phloem sets up a water potential gradient that facilitates the mass movement in the phloem.

Answer: A

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42. Water vapour comes out from the plant leaf through the stomatal opening . Through the same stomatal opening carbon dioxide diffurses into the plant during photosynthesis

Reason out the above statements using one of following options

A. Both processes cannot happen simultaneously.

B. Both processes can happen together because the diffusion coefficient of water and CO_2 is different.

C. The above processes happen only during night time.

D. One process occurs during day time, and the other at night.

Answer: B

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43. Specialised epidermal cells surrounding the guard cells are called

A. Complementary cells

B. Subsidiary cells

C. Bulliform cells

D. Lenticels

Answer: A

Watch Video Solution

44. A few drops of sap were collected by cutting across a plant stem by a suitable method. The sap was tested chemically. Which one of the following test results indicates that it is phloem sap ?

A. Law of refractive index

B. Absence of sugar

C. Acidic

D. Alkaline

Answer: D

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45. The water potential of pure water is

A. Less than zero

B. More than zero but less than one

C. More than one

D. Zero

Answer: D

Watch Video Solution

46. Root hairs develop from the region of

A. Elongation

B. Root cap

C. Meristematic activity

D. Maturation

Answer: D

Watch Video Solution

47. Which of the following facilitates opening of stomatal aperture?

A. Decrease in turgidity of guard cells.

B. Radial orientation of cellulose microfibrils in the cells wall of guard cells.

C. Longitudinal orientiation of cellulose microfibrils in the cell wall of guard cells.

D. Contraction of outer wall of guard cells.

Answer: B

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48. Stomata in grass leaf are

A. Kidney shaped

B. Rectangular

C. Dumb-bell shaped

D. Barrel shaped

Answer: C

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49. If the concentration of external solution is more than the cytoplasm, the solution is known as :

A. Hypertonic

B. Isotomic

C. Hypotonic

D. None

Answer: A

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50. Water is released as droplet this is known as :

A. Root pressure

B. Transpiration

C. Guttation

D. None

Answer: C

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51. Stomata of a plant open due to

A. Influx of hydrogen ions

B. Efflux of potassium ions

C. Influx of calcium ions

D. Influx of potassium ions.

Answer: D

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52. Plasmodemata connections help in

A. Cytoplasmic streaming

B. Synchronous mitotic divisions

C. Locomotion of unicellular organisms

D. Movement of substances between cells.

Answer: D

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53. Dumb-bell shaped guard cells are found in

A. Wheat

B. Bean

C. Groundnut

D. Sunflower

Answer: A

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54. Wilting in plants occurs when

A. Blockage of xylem

B. Blockage of phloem

C. Both (a) and (b)

D. Increased transpiration

Answer: D

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55. A plant cell attains turgidity due to

A. Electrolysis

B. Exosmosis

C. Plasmolysis

D. Endosmosis

Answer: D

Watch Video Solution

56. Which one of the following theriores for ascent of sap was proposed by and eminent indian sceintist J.C bose?

A. Pulsation theory

B. Relay pump theory

C. Transpiration pull theory

D. Root pressure theory

Answer: A

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57. When a fresh-water protozoan possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will

A. Disappear

B. Increase in size

C. Decrease in size

D. Increase in number

Answer: A

Watch Video Solution

58. water reaches the top of a plant due to

A. Root pressure

B. Capillarity

C. Transpiration

D. Diffusion

Answer: A

 Watch Video Solution

59. A cell when dipped in 0.5 M sucrose solution has no effect but when the same cell will be dipped in 0.5 M NaCl solution the cell will

A. Increase in size

B. Decrease in size

C. Will be turgid

D. Will be plasmolysed

Answer: D

Watch Video Solution

60. Potometer works on the principle of

A. Amount of water absorbed equals the amount of water transpired

B. Osmotic pressure

C. Root pressure

D. Potential difference between the tip of the tube and that of plant

Answer: A

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61. During active absorption of water :

A. Energy is not used

B. Transpiration pull provides force for absorption of water

C. Root respiration provides energy

D. Photosynthesis provides energy

Answer: C

 Watch Video Solution

62. Rate of transpiration is dependent upon

A. Negative turgor pressure

B. Temperature

C. D.P.D

D. Vapour pressure deficit

Answer: A

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63. Cohesive force of water molecules is of the magnitude of (Dixon and Joly)

A. 1-10 atm

B. 10-15 atm

C. 45-100 atm

D. 15-45 atm

Answer: C

 Watch Video Solution

64. Plasmolysis will occur when the cell is placed in .....solution :

A. Hypotonic

B. Hypertonic

C. Isotonic

D. Hypotonic and Isotonic

Answer: B

Watch Video Solution

65. In hypertonic solution a cell water potential

A. Increases

B. Decreases

C. First increases then decreases

D. Remains unchanged

Answer: A

 Watch Video Solution

66. In which of the following plants , there will be no transpiration ?

A. Aquatic, submerged plants

B. Plants living in deserts

C. Aquatic plants with floating leaves

D. Plants growing in hilly regions

Answer: A

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67. The translocation of organic solutes in sleve tube membres is supportted by

A. Root pressure and transpiration pull

B. P-protein

C. Mass flow involving a carrier and ATP

D. Cytoplasmic streaming

Answer: B

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68. Passage cells are thin walled cells found in

A. Phloem elements that serve as entry points for substance for transport to other plant parts

B. Testa of seeds to enable emergence of growing embryonic axis during seed germination

C. Central region of style through which the pollen tube grows towards the ovary

D. Endodermis of roots facilitating rapid transport of water from cortex to pericycle

Answer: D

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Competition File Matching The Questions

1. Match the item in Column A with appropriate item in Column B :

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Competition File Assertion Type Question

1. Assertion : During rainy season, doors made up of wood generally swell up due to imbibition.

Reason : This happens due to absorption of water without forming a solution

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

2. Assertion : In osmosis solvent moves through a semipermeable membrane from a place of lower diffusion pressure to a place of higher diffusion pressure.

Reason : It is due to migration of solvent from hypertonic solution to hypotonic solution through a semipermeable membrane.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: D

 Watch Video Solution

3. Assertion : In lotus metabolism is hindered when the leaves are coated with wax on upper surface.

Reason : In lotus, stomata are present on upper epidermis, so that if leaves are coated with wax on upper surface, stomatal transpiration will not occur.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

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4. Assertion : Purple cabbage leaves do not lose their colour in cold water but do so in boiling water.

Reason : Plasma membrane becomes impermeable in boiling water and pigments come out.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: C

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5. Assertion : Guttation takes place through hydathodes.

Reason : Each stoma is made up of two kidney shaped guard cells in dicots.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: B

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6. Assertion : When plant cells are placed in highly concentrated sugar or salt solution, they get plasmolysed.

Reason : Highly concentrated sugar or salt

acts as hypotonic solution which leads to exosmosis.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: C

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7. Assertion : Light plays an important role in process of transpiration.

Reason : Light leads to opening of stomata and in dark stomata get closed.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

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8. Assertion : Plasma membrane is a permeable membrane.

Reason : Both solute and solvent can pass through semipermeable membrane.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: D

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9. Assertion : Potometer is used to measure the rate of transpiration.

Reason : It is based on principle that water lost in transpiration is equal to water absorbed.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

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10. Assertion : Entry of water from soil into xylem takes place through gradient of suction pressure.

Reason : Water moves from a place of higher suction pressure to a place of lower suction pressure.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: C

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11. Assertion : Guttation takes place through hydathodes.

Reason : Hydathodes are special pores present at the end of veins and water exudes out of them.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of

Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

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12. Assertion : According to Scarth, opening and closure of stomata is controlled by pH value.

Reason : Low pH value favours opening of

stomata and higher pH value closure of stomata.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: B

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13. Assertion : When CO_2 concentration of atmosphere increases, stomata close partially.

Reason : CO_2 combines with water to form carbonic acid which lowers pH value ans stomata close.

A. If both Assertion and Reason are true and Reason is correct explanation of

Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

14. Assertion : At incipient plasmolysis, water potential (Ψ_w) is equal to solute potential (Ψ_s).

Reason : $\Psi_w = \Psi_m + \Psi_s + \Psi_p$ At incipient plasmolysis the cell wall exerts no pressure on the wall contents and the pressure potential (Ψ_p) is zero. The matric potential (Ψ_m) is almost negligible. Thus $\Psi_w = \Psi_s$ at incipient plasmolysis.

A. If both Assertion and Reason are true and Reason is correct explanation of

Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

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15. Assertion. Plant cell wall lacks selective permeability.

Reason. It allows free passage of dissolved materials through it.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: A

 Watch Video Solution

16. Assertion : In plants water moves from higher water potential to lower water potential.

Reason : Energetically water moves form higher to lower energy.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: C

17. [A]: Stomata remain open during day

[R]: Stomata help in gaseous exchange.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: B

18. Assertion : Water and mineral uptake by root hairs from the soil occure through apoplast until it reaches endodermis

Reason : Casparian strips in endodermis are suberized.

A. If both Assertion and Reason are true and Reason is correct explanation of Assertions.

B. If both Assertion and Reason are true but Reason is not correct explanation of Assertion.

C. If Assertion is true but Reason is false.

D. If both Assertion and Reason are false.

Answer: B

Competition File Analogy Type Questions

1. Observe the relationship between first two words and then fill the suitable word/words at the fourth place.

Leaves : Foliar transpiration :: Stem : .....

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2. Observe the relationship between first two words and then fill the suitable word/words at the fourth place.

Glucose : Stomata open :: Starch : Stomata : .....

Watch Video Solution

3. Observe the relationship between first two words and then fill the suitable word/words at the fourth place.

Levitt : Malate hypothesis :: Steward : .....

Watch Video Solution

4. Observe the relationship between first two words and then fill the suitable word/words at the fourth place.

Stomata : Transpiration :: Hydathode : .....

Watch Video Solution

5. Observe the relationship between first two words and then fill the suitable word/words at the fourth place.

Root hairs : Water absorption :: Vessels : .....

Watch Video Solution

6. Observe the relationship between first two words and then fill the suitable word/words at the fourth place.

Osmotic pressure : Osmotic potential :: DPD : .....

Watch Video Solution

Competition File Reasoning Type Questions

1. Give the reasons for the following statements :

Cuticle reduces the rate of transpiration.

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2. Give the reasons for the following statements :

Water along with dissolved organic and inorganic substances is excreted during the process of bleeding.

Watch Video Solution

3. Give the reasons for the following statements :

Root pressure is also responsible for ascent of sap.

Watch Video Solution

4. Give the reasons for the following statements :

Process of transpiration represents the kind of diffusion of water vapours.

Watch Video Solution

5. Give the reasons for the following statements :

Pickles, meat and fish are preserved by salting.

Watch Video Solution

6. Give the reasons for the following statements :

In acicular leaves like that of Pinus transpiration rate is less.

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7. Raisins swell up when placed in water.

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Chapter Practice Test

1. What is the chemical potential of pure water at normal temperature and pressure ?

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2. Name the process of loss quantity of water in the form of droplets from tip of leaves.

Watch Video Solution

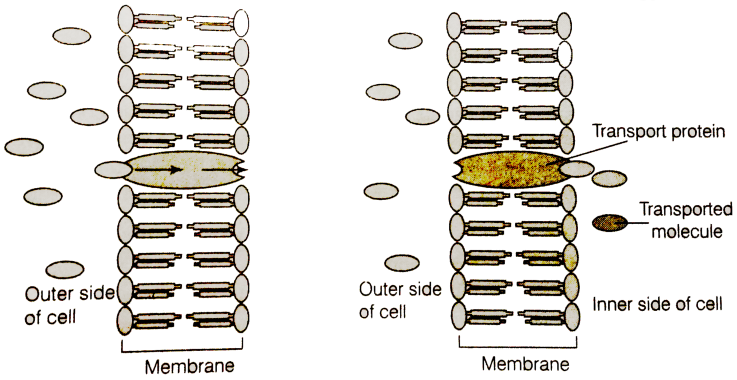
3. What are antitranspirants ?

Watch Video Solution

4. If a plant cell is kept in solution having higher water potential, what will happen ?

Watch Video Solution

5. Identify a type of molecular movement which is highly selective and requires special membrane protenins, but does not require energy.



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6. What is cohesion force ?

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7. How surface tension and high capillarity help in the process of transpirtion?

Watch Video Solution

8. What is osmotic pressure ?

Watch Video Solution

9. Why does rate of transport reach maximum in facilitated diffusion ?

Watch Video Solution

10. Mention any two limitations of root pressure

Watch Video Solution

11. What are the advantages of transpiration ?

Watch Video Solution

12. How is the mycorrhizal association helpful in absorption of water and minerals in plants?

Watch Video Solution

13. Differentiate between guttation and transpiration.

Watch Video Solution

14. Differentiate between diffusion and translocation in plants.

Watch Video Solution

15. Discuss the mechanism of water absorption by plants.

Watch Video Solution