



BIOLOGY

BOOKS - AAKASH SERIES

TRANSPORT IN PLANTS

Exercise I

1. branch of botany dealing with internal organisation of plants is

A. Morphology

B. Ecology

C. Physiology

D. Embryology

Answer: B



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2. Who is called father of plant physiology?

A. Calvin

B. J.C.Bose

C. Stephen Hales

D. Van Helmont

Answer: C



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3. The major contribution of Sir J. C Bose in plant physiology is

A. Defined Root pressure

B. Discovered vernalization

C. Explained the Mechanism of
translocation of food in plants.

D. Worked on Bioelectrical responses of
plants to various stimuli

Answer: D



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4. Amount of water left in soil after through drainage of gravitational water is known as:

- A. Field capacity
- B. Storage capacity
- C. Soil water
- D. Gravitational capacity

Answer: A



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5. Plants grow in clayey soils exhibit more transpiration than the plant growing in sandy soils because

A. Available water is more in clayey soils

B. Available water is less in clayey soils

C. Available water is more in sandy soils

D. Available water is same both in sandy and clayey soils

Answer: A



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6. The following is to be transported in flowering plants in unidirectional manner from root to shoot

A. Water

B. Mineral nutrients

C. Organic substances

D. 1 and 2

Answer: D



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7. Identify the incorrect statement.

A. Movement of substances over short distances occurs by diffusion

B. Cytoplasmic streaming supports short distance transport

C. Short distance transport is also supported by active transport

D. Movement of substances over small distances occurs through vascular system only

Answer: D



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8. Liquids and gases diffuse in solids than the diffusion of solids in solids. The statement is

A. Correct

B. Partly correct

C. Incorrect

D. None of the above

Answer: A



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9. Incorrect statement with regard to 'diffusion' is

A. It is a slow process and is dependent on a 'living system'

B. Diffusion in solids rather than of solids is more likely

C. Gaseous movement within the plant body occurs by means of diffusion only

D. Rate of diffusion is affected by temperature and pressure.

Answer: A



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10. Facilitated diffusion involve

A. Downhill transport

B. Without expenditure of metabolic energy

C. Involvement of proteins

D. All of these

Answer: D



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11. 'Porins' are chemically

A. Phospholipids

B. Carbohydrates

C. Proteins

D. Glycolipids

Answer: C



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12. Aquaporin density is more on

A. Tonoplasm

B. Tonoplast

C. Nuclear membrane

D. Thylakoid membrane

Answer: B



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13. 'Uniporter' is involved in the transport of

A. Two molecules move together in the same direction

B. Two molecules move together in opposite direction

C. More than two molecules move either same or in opposite directions

D. Single molecule moves across the membrane in one direction only

Answer: D



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14. Study the following and identify the mismatch

A. Simple diffusion — Transport saturates

B. Facilitated transport — Down hill transport

C. Active transport — Transport saturates

D. Both simple diffusion and facilitated transport — Metabolic energy is not required

Answer: A



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15. The following are sensitive to inhibitors

A. Uniporters

B. Symporters

C. Antiporters

D. All the above

Answer: D



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16. Which of the following statement is not true?

A. Substances which are lipid soluble can easily pass directly through the cell

membrane

B. The hydrophilic substances find it difficult to pass through the membrane

C. In facilitated diffusion, special transport lipid molecules help movement of hydrophilic substances across the membrane without expenditure of ATP

D. Porins are proteins that form large pores in outer membranes of semiautonomous organelles of eukaryotic

cells allow molecules up to the size of
small proteins

Answer: C



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17. Correct statement of the following with
regard to active transport is

A. Takes place against the concentration
gradient

B. Carrier proteins involved in active transport are called 'pumps'

C. It is an uphill transport

D. all the above

Answer: D



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18. Water relations do not include/involve

A. Absorption of water by roots

B. Ascent of sap

C. Escape of water vapour from leaves and
other aerial parts

D. Conversion inorganic essential elements
into organic compounds

Answer: D



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19. The energy available in a system for performing work is called

- A. Specific Heat
- B. Heat of Formation
- C. Gibbs free energy
- D. Heat of Vapourisation

Answer: C



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20. Water potential of a solution is

A. Zero

B. Positive

C. Zero or positive

D. Negative

Answer: D



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21. Water potential of a solution is depicted by

A. ψ_w

B. ψ_p

C. ψ_x

D. None of these

Answer: C



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22. This is an index of free energy content of water

A. Ψ

B. π

C. Ω

D. τ

Answer: A



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23. Water potential gradient decides

A. Direction of osmosis

B. Concentration of solute

C. Rate of movement of water

D. 1 and 3

Answer: D



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24. Driving force for the movement of water between different systems is

A. Water potential gradient

B. Osmotic potential gradient

C. Temperature gradient

D. Pressure gradient

Answer: A



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25. Water potential is less than 'zero' when

A. Cell is flaccid

B. Cell is plasmolysed

C. Cell is partly turgid

D. All the above

Answer: D



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26. ψ is more when

A. Solvent molecules are more

B. Solute molecules are less

C. Water potential is less negative

D. All the above

Answer: D



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27. Water will move from a region of higher water potential to a region of

A. Lower water potential

B. Less chemical potential

C. Less free energy

D. All the above

Answer: D



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28. Water potential is equal to osmotic potential and pressure potential in

A. Turgid cell

B. Flaccid cell

C. Partly turgid cell

D. All the above

Answer: D



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29. As the solute concentration in a solution increases, the change that does not occur is

A. π is more negative

B. Ψ is more negative

C. π becomes more positive

D. more influx of water

Answer: C



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30. Dilute solutions have more osmotic potentials due to

A. More number solute molecules

B. More number of solvent molecules and
less number of solute particles

C. More reduction in the capacity of water
to do work

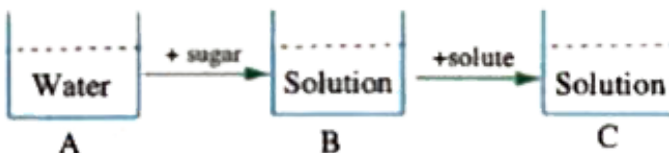
D. More decrease in the free energy of
water molecules

Answer: B



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31. Study the following figures



Identify the true statement with reference to ψ values of A, B and C

A. A greater than B but less than C

B. B greater than C but less than A

C. C less than B but greater than A

D. A greater than C but equal to B

Answer: B



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32. $\Psi_w = \Psi_s$ is not applied to

- A. Turgid cell
- B. Normal cell
- C. Plasmolysed cell
- D. Flaccid cell

Answer: B



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33. Correct expression of the following is

A. $\Psi_w = \Psi_s - \Psi_p$

B. $\Psi_s = \Psi_w + \Psi_p$

C. $\Psi_w = \Psi_s + \Psi_p$

D. $\Psi_p = \Psi_w + \Psi_s$

Answer: C



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34. When water is added to a living cell, the following is not observed.

- A. Increase in free energy for water
- B. Decrease in the amount of solute
- C. Increase in pressure potential
- D. Increase in water potential

Answer: B



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35. Which of the following has negligible contribution to water potential in a fully flaccid cell

A. Ψ

B. Ψ_{π}

C. Ψ_p

D. None of the above

Answer: C



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36. Cell A, B and C are present in a sequence.

The Ψ values of these cells are -3, -6 and -10 MPa respectively. What is the direction of water flow among the cells ?

A. $A \rightarrow B \rightarrow C$

B. $B \rightarrow A \rightarrow C$

C. $C \rightarrow B \rightarrow A$

D. $A \rightarrow C \rightarrow B$

Answer: A



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37. Entry of water from soil into the plant is due to the gradient of

- A. Turgor pressure
- B. Wall pressure
- C. Pressure potential
- D. Water potential

Answer: D



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38. ϕ_p becomes negative in transpiring xylem tissue when

A. The water column inside the xylem is subjected to negative pressure or tension

B. The water column inside the xylem is subjected to push

C. The water column inside the xylem is subjected to positive hydrostatic

pressure

D. The water column in the xylem is broken
due to embolism

Answer: A



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39. The osmotic potential of cell 'X' is -5 MPa and that of cell 'Y' is -12 MPa, the pressure potential of cell 'X' is 4 MPa and that of cell 'Y' is 4 MPa. Therefore, water

- A. Shows no movement
- B. Moves in both directions
- C. Moves from cell 'X' to cell 'Y'
- D. Moves from cell 'Y' to cell 'X'

Answer: C



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40. The primary reason for a passive flow of water from soil into the atmosphere through the plant body is

A. Cohesive forces

B. Adhesive forces

C. Tension

D. Water potential gradient

Answer: D



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41. Assertion: Distance is a actual length of the path but displacement is a shortest distance between initial and final position.

Reason: Distance is a scalar quantity and it is always positive but displacement is a vector quantity. It may be positive, negative or zero.

A. Ψ_{π} and Ψ_w

B. Ψ_w and Ψ_{π}

C. Ψ_{π} and Ψ_p

D. Ψ_p and Ψ_{π}

Answer: C



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42. $\Psi_p=0$ in

A. Flaccid cell

B. Pure water

C. Turgid cell

D. 1 and 2

Answer: A



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43. $\Psi_p=0$ in

- A. Flaccid cell
- B. Plasmolysed cell
- C. Turgid cell
- D. 1 and 2

Answer: C



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44. The magnitude of following quantities increases when water starts entering into the cell

- A. Water potential
- B. Turgor pressure
- C. Osmotic potential
- D. 1 and 2

Answer: D



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45. Ψ_w is maximum during/in

- A. Completely plasmolysed cell

B. Completely deplasmolysed cell

C. Fully turgid cell

D. 2 and 3

Answer: C



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46. Plasma membrane is

A. Selectively permeable

B. Differentially permeable

C. Semipermeable

D. 1 and 2

Answer: D



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47. Osmosis is

A. Uphill transport

B. Active transport

C. Special type of facilitated diffusion

D. 1 and 3

Answer: C



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48. Osmosis is the movement of water against the concentration of A and along the concentration of B. A and B are

A. Solvent, Solvent

B. Solute, Solute

C. Solvent, Solute

D. Solute, Solvent

Answer: D



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49. Osmosis requires

A. Water potential gradient

B. Plasma membrane

C. Living systems

D. All the above

Answer: D



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50. A special type of facilitated diffusion related to movement of solvents only through living systems is called

A. Imbition

B. Osmosis

C. Plasmolysis

D. Embolism

Answer: B



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51. Osmosis is observed during

A. Absorption of water by seed coat

B. Ascent of sap in xylem

C. Apoplastic lateral conduction of water

D. Movement of water from xylem into sieve tubes during loading of food

Answer: D



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52. In thistle funnel experiment

A. Water potential in thistle funnel first decreases and then increases

B. Water potential in thistle funnel first increases and later decreases

C. Water potential in the beaker initially increase and later decreases

D. Water potential in the beaker initially decreases

Answer: A



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53. Pressure potential in thistle funnel develop

A. Before the addition of solute

B. After the addition of solute

C. Before the entry of water

D. After the entry of water in the thistle
funnel

Answer: D



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54. Experiment demonstrating osmosis

- A. Bell Jar experiment
- B. Thistle funnel experiment
- C. Potato osmometer experiment
- D. 2 and 3

Answer: D



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55. What happens to the cells in potato to which surrounded a bore with sucrose solution in it

- A. Flaccid
- B. Turgid
- C. Partly turgid
- D. Plasmolysed

Answer: A



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56. Peel is removed in potato in potato experiment because of the presence of

A. NAG

B. NAM

C. Suberin

D. Chitin

Answer: C



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57. Osmosis is observed during

- A. Absorption of water by root hair
- B. Symplastic lateral conduction
- C. Plasmolysis
- D. All the above

Answer: D



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58. At equilibrium in a thistle funnel experiment

A. No movement of water across the egg

membrane take place

B. No net movement of water across the

membrane take place

C. No movement of solute across the egg

membrane

D. 2 and 3

Answer: D



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

- A. Water potential turns zero
- B. Water potential becomes more negative
- C. Ψ_w turns positive
- D. Pure water become impure

Answer: C



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60. Turgor pressure is absent/not detected during

- A. Thistle funnel
- B. Animal cell
- C. Flaccid plant cell
- D. All the above

Answer: D



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61. Egg membrane used to demonstrate osmosis through thistle funnel experiment acts as

- A. Selectively permeable
- B. Differentially permeable
- C. Permeable
- D. Semipermeable

Answer: D



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62. At equilibrium in thistle funnel experiment

- A. Free energy is maximum
- B. Water potential gradient is zero
- C. Solution in beaker and in thistle funnel
are isotonic
- D. 1 and 2

Answer: B



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63. Identify correct statement with regard to thistle funnel experiment

A. Water potential decreases in thistle funnel initially due to presence of sucrose

B. Water potential increases in the thistle
funnel after osmosis

C. At equilibrium water potential gradient
is Zero

D. All the above

Answer: C



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64. Untrue about a higher concentration solution

- A. Less water potential
- B. Less osmotic potential
- C. More -ve water potential
- D. More water potential

Answer: D



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65. Choose the incorrect statement from the following

A. More dissolved solutes decrease the number of free water molecules

B. Hypertonic solutions have low water potentials

C. Hypotonic solutions have high osmotic potentials

D. More water potential gradient results in slower movement of water

Answer: D



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66. In terms of permeability , the cell wall and plasmalemma are :

- A. Permeable and differentially permeable
- B. Both semipermeable
- C. Semipermeable and permeable

D. Both

differentially

permeable

differentially

Answer: A



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67. If the cell is placed in hypotonic solution, what will happen?

A. Endosmosis

B. Deplasmolysis

C. Exosmosis

D. No change

Answer: A



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68. When a cell is placed in 0.5 M solution of salt and no change in the volume of the cell is observed, the concentration of cell sap would be

A. 4M

B. 5M

C. 0.5M

D. 50M

Answer: C



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69. One of the following is always negative for a plant cell

A. Pressure potential

B. Osmotic potential

C. Osmotic pressure

D. 1 and 2

Answer: B



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70. Plasma membrane controls

A. Passage of H_2O only

B. Passage of water and some selected solutes preferably in ionic form into and out of the cell

C. Passage of water and all solutes into the cell

D. Passage of all cell contents out of the cell

Answer: B



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71. Explain: Liver cirrhosis.



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72. Osmoregulation is maintained by

- A. Plasma membrane
- B. Nuclear membrane
- C. Tonoplast
- D. 1 & 3

Answer: D



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73. Egg membrane is

- A. Semi permeable
- B. The shell of it is dissolved by dilute HCl
- C. Allows solvents only but not solutes
- D. Selectively permeable Plasmolysis

Answer: D



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74. One of the following is not a natural process

A. Transpiration

B. Guttation

C. Plasmolysis

D. Imbibition

Answer: C



75. Identify incorrect statement of the following

- A. When a cell is kept in isotonic solution, the net movement of water between the two systems becomes zero
- B. The process of plasmolysis is irreversible
- C. When a cell is kept in hypotonic solution, turgor pressure increases

D. When a cell is kept in hypertonic solution, exosmosis occurs

Answer: B



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76. Which of the following have negative values for a flaccid cell and partly turgid cell ?

A. Water potential

B. Pressure potential

C. Osmotic potential

D. Both 1 & 3

Answer: D



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77. No net diffusion of water takes place when

A. A dry seed is placed in a dilute solution

B. A plant is exposed to gentle breeze

C. A cell is placed in an isotonic solution

D. A deplasmolysed cell is placed in hypertonic solution

Answer: C



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78. Identify the mismatch

A. Apoplast → Cell walls + Intercellular spaces

B. Plasmolysed cell → Shrinkage of entire
plant cell

C. Symplast → Cytoplasm +
Plasmodesmata

D. Water potential → Highest for pure
water

Answer: B



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79. When a cell is plasmolysed

- A. Turgor pressure becomes negative
- B. Pressure potential is negative
- C. Osmotic potential is negative
- D. All the above

Answer: D



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80. In Pickles, jams and jellies, the invaded bacteria die due to

- A. Endosmosis
- B. Lack of aeration
- C. Deplasmolysis
- D. Plasmolysis

Answer: D



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81. The two quantities are equal in magnitude but opposite in directions

- A. Pressure potential and water potential
- B. Osmotic potential and osmotic pressure
- C. Turgor pressure and wall pressure
- D. None of the above

Answer: B



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82. The two quantities are equal in magnitude but opposite in sign

- A. Pressure potential and water potential
- B. Osmotic potential and osmotic pressure
- C. Turgor pressure and wall pressure
- D. None of the above

Answer: C



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83. Which of the 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: D



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84. When a plant wilts, sequence of events will be as

A. Exosmosis, deplasmolysis, plasmolysis, temporary and permanent wilting

B. Exosmosis, plasmolysis, deplasmolysis, temporary and permanent wilting

C. Exosmosis, temporary and permanent wilting

D. None of the above

Answer: C



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85. All the water absorbed by osmosis is stored in

A. Vacuole

B. Cytoplasm

C. Plasma membrane

D. Nucleus

Answer: A



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86. Imbibition is involved in

A. Supply of CO_2 during photosynthesis

B. Opening and closing movement of stomata

C. For the germination of seeds

D. Movement of water from one cell to other cell

Answer: C



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87. Gums and resins absorb water by

A. Osmosis

B. Imbibition

C. Guttation

D. Facilitated diffusion

Answer: B



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88. Dry wooden pieces fixed in the crevices of a rock and soaked with water split the rock. The pressure responsible for this is

A. Osmotic pressure

B. Turgor pressure

C. Wall pressure

D. Imbibitional pressure

Answer: D



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89. Rate of imbibition is more in

A. Protein

B. Carbohydrates

C. Cellulose

D. None of these

Answer: A



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90. Which part of cell per imbibe water ?

A. Cell wall

B. Cell sap

C. Protoplasm

D. 1 and 2

Answer: D



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91. Absorption of water by velamen roots is due to

- A. Endosmosis
- B. Deplasmolysis
- C. Transpiration
- D. Imbibition

Answer: D



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92. Water is adsorbed on colloidal molecules
by

A. Exosmosis

B. Imbibition

C. Endosmosis

D. Plasmolysis

Answer: B



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93. Absorption of water by root hairs is an example for

- A. Passive transport of water
- B. Energy is not utilised
- C. Special type of diffusion of solvents
- D. All the above

Answer: D



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94. Bulk flow in plants is due to

- A. Pressure
- B. Concentration
- C. Temperature
- D. 1 and 2

Answer: A



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95. Apoplastic pathway is observed in

- A. Lateral conduction of water
- B. Ascent of sap
- C. Movement of organic solutes
- D. 1 and 2

Answer: D



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96. Root cell in which the movement is always symplastic is

- A. Root hair
- B. Endodermal cell
- C. Root xylem
- D. Pericycle

Answer: C



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97. Active transport is observed during

- A. Absorption of minerals by root hairs
- B. Loading of minerals in xylem
- C. Loading of sucrose in sieve elements
- D. All the above

Answer: D



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98. Absorption of ions by root hairs is

- A. Always active
- B. Mostly active
- C. Always passive
- D. Mostly passive

Answer: B



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99. Bulk flow in plants is due to

- A. Positive pressure
- B. Negative pressure
- C. Both 1 and 2
- D. Concentration gradient

Answer: C



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100. Root hairs are more in number in

A. Hydrophytes

B. Xerophytes

C. Mesophytes

D. Lithophytes

Answer: B



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101. Choose the correct option with regard to mycorrhiza.

A. Absorption of water

B. Mineral absorption

C. Translocation

D. 1 and 2

Answer: D



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102. Ascent of sap in herbs is due to

- A. Root pressure
- B. Transpiratory pull
- C. Cohesion of water
- D. Adhesion of water

Answer: A



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103. Root pressure develops during

A. Night time

B. Early mornings

C. Mid afternoons

D. 1 and 2

Answer: D



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104. Root pressure is observed when absorption of water is ___ and loss of water is ___.

A. High, High

B. Low, Low

C. High, Low

D. Low, High

Answer: C



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105. Root pressure is measured by

A. Barometer

B. Manometer

C. Osmometer

D. Thermometer

Answer: B



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106. The term root pressure was coined by

A. S.Hales

B. Dixon

C. Levitt

D. J.C.Bose

Answer: A



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107. Which one is true about guttation?

A. It occurs through specialised pored
called hydathodes

- B. It occurs in herbaceous plants when root pressure is low and transpiration is high
- C. It only occurs during the day time
- D. It occurs in plants growing under conditions of low soil moisture and high humidity.

Answer: A



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108. Root pressure is maximum when :

A. Transpiration is high and absorption is low

B. Transpiration is very low and absorption is high

C. Transpiration is absent

D. Guttation is absent

Answer: B



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109. Many transplanted plants do not survive because

- A. They do not like new soil
- B. They do not get required mineral salt
- C. Most of the root hairs are lost during transplantation
- D. Leaves get damaged

Answer: C



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110. The process of guttation takes place

A. Herbaceous stems

B. Leaf tips

C. Woody stems

D. All the above

Answer: B



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111. Which of the following helps in ascent of sap?

- A. Root pressure
- B. Transpiration pull
- C. Imbibition
- D. both (1) and (2)

Answer: D



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112. The continuity of water column in xylem is maintained due to

- A. Root pressure
- B. Cohesive property of water
- C. Transpiratory pull
- D. All the above

Answer: D



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113. Water exudation through hydathodes is

- A. Excretion
- B. Transpiration
- C. Guttation
- D. Bleeding

Answer: C



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114. Ascent of water and minerals through xylem in plants

- A. Always active
- B. Mostly active
- C. Always passive
- D. Mostly passive

Answer: C



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115. Force behind guttation

- A. Transpiratory pull
- B. Root pressure
- C. Turgor pressure
- D. Bulk flow of organic solutes

Answer: B



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116. The most accepted theory for ascent of sap is

- A. Transpiration pull and cohesion tension theory of Dixon and Jolly
- B. Pulsating action of living cell
- C. Imbibition theory
- D. de Vries cytoplasmic streaming theory

Answer: A



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117. Xylem vessels are found in:

- A. Gymnosperms only
- B. Pteridophytes only
- C. Angiosperms
- D. Dicot plants only

Answer: C



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118. Which of the following contributes most to transport of water from the ground to the leaves of a tall tree ?

A. Break down of ATP

B. Root pressure

C. Capillary rise of water in xylem

D. Cohesion of water and transpiration pull

Answer: D



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119. Xylem help in the transport of

A. Water

B. Minerals

C. Hormones

D. All the above

Answer: D



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120. Ascent of sap in tall trees is helped by

- A. Cohesion of water
- B. Adhesion of water with walls of xylem
- C. Transpiratory pull
- D. All the above

Answer: D



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121. The pressure develops in xylem vessels during active transpiration is

- A. Negative and push
- B. Positive and pull
- C. Negative and pull
- D. Positive and push

Answer: C



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122. The pressure develop in xylem in herbs and in tall trees respectively during ascent of sap

- A. Positive, positive
- B. Negative, negative
- C. Positive, negative
- D. Negative, positive

Answer: C



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123. The part of the plant with highest water potential

- A. Root hair
- B. Atmosphere
- C. Root xylem
- D. Mesophyll cell of leaf

Answer: A



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124. Least water potential is observed in

A. Soil

B. Plant

C. Atmosphere

D. Outer space

Answer: C



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125. “Pull” is observed during

- A. Ascent of sap in tall trees
- B. Ascent of sap in herbs
- C. Translocation of organic solutes in sieve elements
- D. All the above

Answer: A



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126. Cohesion among water, adhesion, capillarity all help in

A. Apoplastic movement from root hair to root xylem

B. Symplastic movement from root hair to root xylem

C. Ascent of sap in phloem elements due to root pressure

D. Translocation of organic solutes in phloem

Answer: A



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127. Guard cell help in :

- A. Transpiration
- B. Guttation
- C. Fighting against infection
- D. Protection against grazing

Answer: A



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128. Active K^+ exchange mechanism for opening and closing of stomata was given by

A. Khorana

B. Levitt

C. Devlin

D. Sachs

Answer: B



129. Lenticels are involved in

- A. Transpiration
- B. Exchange of gases
- C. Photosynthesis
- D. 1 and 2

Answer: D



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130. "Transpiration is a necessary evil", this Statement belongs to

A. Burgerstein

B. Reschke

C. Curtis

D. Brandis

Answer: C



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131. Water lost through stoma is from

- A. Guard cell
- B. Sub stomatal cavity
- C. Subsidiary cell
- D. Lenticel

Answer: B



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132. Thick cuticle reduces this transpiration

A. Cuticular

B. Stomatal

C. Lenticular

D. None of the above

Answer: A



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133. Dumbell shaped structures in grasses is

A. Stoma

B. Guard cell

C. Substidary cell

D. Stomatal complex

Answer: B



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134. Scotoactive stomata are seen in

A. Succulent xerophyte

B. Mesophytic grasses

C. Hydrophytes

D. None of the above

Answer: A



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135. A woody plant after the fall of all leaves exhibit

A. Stomatal transpiration

B. Cuticular transpiration

C. Lenticular transpiraiton

D. 1 and 3

Answer: C



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136. Guard cell are ____ colour

A. Green

B. Colour less

C. Brown

D. Yellow

Answer: A



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137. The water potential in guard cells during day time in photoactive stomata

- A. Initially decreases and later increases
- B. Initially increases and later decreases
- C. Increases at all times

D. Decreases at all times

Answer: A



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138. Lenticels and hydathodes are small pores with following common attributes

A. their opening and closing is not regulated

B. they allow exchange of gases

C. they always remain closed

D. they are found on the same organ of plants

Answer: A



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139. Transpiration is the loss of water from

A. Dead cells

B. Living cells

C. Living and dead cells

D. None of the above

Answer: B



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140. The process involved in transpiration

A. Simple diffusion

B. Osmosis

C. Plasmolysis

D. Imbibition

Answer: A



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141. The process involved in regulating the opening and closing of stomata

A. Simple diffusion

B. Osmosis

C. Plasmolysis

D. Imbibition

Answer: B



Watch Video Solution

142. The biological middlemen SPAC is

A. Atmosphere

B. Plant

C. Soil

D. Animals

Answer: B



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143. The transpiration occurring in woody plant

- A. Stomatal
- B. Cuticular
- C. Lenticular
- D. All the above

Answer: D



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144. The type of transpiration observed in leaves

A. Stomatal

B. Cuticular

C. Lenticular

D. both (1) and (2)

Answer: D



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145. Shape, size, cell elongation, ability of roots piercing through hard floors is all due to

- A. Plasmolysis
- B. Guttation
- C. Turgor pressure
- D. Water potential

Answer: C



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146. Guard cells differ from epidermal cells in having

A. Shape

B. Size

C. Colour

D. All the above

Answer: D



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147. Least cuticular transpiration is relatively observed in

A. Xerophytes

B. Hydrophytes

C. Mesophytes

D. Lithophytes

Answer: A



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148. Stomata are distributed more on the lower surface than on the upper surface in

- A. Xerophytes
- B. Hydrophytes
- C. Mesophytes
- D. Lithophytes

Answer: A



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149. Stomatal distribution is observed only on the upper surface of the leaf in

- A. Submerged hydrophytes
- B. Floating hydrophytes
- C. Emergent hydrophytes
- D. All the above

Answer: B



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150. Amphistomatal condition is observed in the leaves of

A. Dicots

B. Monocots

C. Gymnosperms

D. 1 and 2

Answer: D



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151. The ion which shows active influx into guard cells during day time in a photoactive stomata

A. Chlorine

B. Potassium

C. Malate

D. Calcium

Answer: B



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152. The ion which shows active influx into guard cells during day time in a photoactive stomata

A. Chlorine

B. Potassium

C. Malate

D. Calcium

Answer: A



Watch Video Solution

153. The ion which shows active efflux from guard cells during day time in a photoactive stomata

A. Chlorine

B. Potassium

C. Malate

D. H^+ ions

Answer: D



Watch Video Solution

154. pH of guard cells increases during day time due to

A. Efflux of H^+ ions

B. Influx of K^+ ions

C. Influx of Cl^- ions

D. Influx of H^+ ions

Answer: A



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155. Two factors which are inversely proportional to transpiration are

A. Atmospheric pressure and relative humidity

B. Atmospheric pressure and temperature

C. Relative humidity and light

D. Relative humidity and root shoot ratio

Answer: A



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156. The plant factor which is inversely proportional to transpiration is

A. Root shoot ratio

B. Shoot root ratio

C. Stomatal frequency

D. Size of the leaf

Answer: B



Watch Video Solution

157. A chemical widely used as antitranspirant

A. PMA

B. cobalt chloride

C. potassium

D. mercury

Answer: A



Watch Video Solution

158. The hormone widely used as antitranspirant

A. Cytokinin

B. ABA

C. auxin

D. Gibberellin

Answer: B



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159. Turgor operated valves are

- A. Stoma
- B. Guard cell
- C. Subsidiary cell
- D. All the above

Answer: A



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160. Source of minerals to young leaves

- A. Minerals absorbed by root hairs
- B. Senescent leaves
- C. Minerals present in the atmosphere
- D. 1 and 2

Answer: D



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161. Mass flow hypothesis was put forward by

(a) Swanson

(b) Munch

(c) Curtis

(d) De Vries

A. Munch

B. Dixon

C. Nitch

D. Levitt

Answer: A



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162. Mass flow deals with translocation of :

A. Water

B. Inorganic solutes

C. Sugars

D. All the above

Answer: D



[Watch Video Solution](#)

163. Unloading of minerals in leaves is

- A. Active process
- B. Passive process
- C. Simple diffusion
- D. None of the above

Answer: B



[Watch Video Solution](#)

164. Positive pressure imparting bulk flow is observed in

- A. translocation of sucrose
- B. Ascent of sap in tall trees
- C. Ascent of sap in herb
- D. 1 and 3

Answer: A



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165. Double osmometer and capillary tube experiment help in understanding

- A. Ascent of sap due to root pressure
- B. Transport of food through phloem
- C. Transport of water through xylem
- D. All the above

Answer: B



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166. Pressure developed in seive elements during transports of sucrose is

- A. Positive
- B. Negative
- C. Zero
- D. None

Answer: A



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167. Translocation of sucrose takes place through

A. Phloem

B. Xylem

C. Cambium

D. Wood parenchyma

Answer: A



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Exercise II

1. The soil water available for absorption by plant roots is

A. Rain water

B. Capillary water

C. Chemically bound water

D. Gravitational water

Answer: B



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2. Sir J.C Bose was supporter of ____ theory of ascent of sap.

A. Root pressure theory

B. Physical force theory

C. Vital force theory

D. None of these

Answer: C



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3. Pulsation theory of ascent of sap was proposed by

A. Dixon and Jolly

B. J.C.Bose

C. Curtis and Clarke

D. None of these

Answer: B



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4. Water can not diffuse through

A. Cuticularized or suberized wall

B. Lignified wall and cellulosic wall

C. Silica rich cell wall of diatoms and
fungal cell wall

D. Plasma membrane and bacterial cell wall

Answer: A



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5. Why plants die when over fertilized?

- A. As a result of dehydration or exosmosis
- B. Due to damage of walls of root hairs
- C. Due to blockage of nitrogenous ions
- D. Due to upsets in soil environment by poisonous soil bacteria.

Answer: A



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6. Actively growing plant tissues have a water content of

A. 20-40%

B. 40-50%

C. 65-75%

D. 85-90%

Answer: D



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7. Water potential in a dry seed is determined by

- A. Osmotic potential
- B. Pressure potential
- C. Matric potential
- D. all the above

Answer: D



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8. Water will be absorbed by root hairs when :

A. concentration of salts in soil is high

B. concentration of solutes in the cell sap
is high

C. plant is rapidly transpiring

D. they are separated from soil by
semipermeable membrane

Answer: B



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9. If cells kept for sometime in 1M solution of sucrose and 1M solution of NaCl. The water potential (Ψ_w) of the cells kept in:

A. Sucrose solution will be greater

B. NaCl solution will be greater

C. Both will be equal

D. Sucrose solution would be lower and

NaCl solution would be greater

Answer: A





10. 0.5M sucrose solution develops a pressure of 15 bars in an osmometer, which of the following statement is wrong for such a solution?

- A. That its osmotic potential is -15 bars
- B. That its water potential is -15 bars
- C. That its pressure potential is -15 bars
- D. That its osmotic pressure is +15bars

Answer: C



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11. Which arbitrary values of DPD, OP and TP appear correct for a turgid cell?

- A. DPD 02 atm , OP 07 atm , TP 5 atm
- B. DPD 00 atm , OP 15 atm , TP 15 atm
- C. DPD 10 atm , OP 15 atm , TP 6 atm
- D. DPD 05 atm , OP 12 atm , TP 7 atm

Answer: B



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12. If a thin slice of sugar beet is placed in concentrated solution of $NaCl$, then

A. It should become turgid

B. It should neither absorb water nor loose
it

C. It should absorb water from the NaCl solution

D. It should loose water from the cells

Answer: D



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13. DPD is equal to

A. $OP \times TP$

B. $OP+TP$

C. OP-WP

D. TP-WP

Answer: B



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14. DPD is abbreviated form of

A. Diffusion pressure demand

B. Daily phosphorus demand

C. Daily photoperiodic duration

D. Diffusion pressure deficit

Answer: D



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15. Suction pressure of cell as:

A. Equal to wall pressure

B. Equal to turgor pressure

C. Equal to DPD

D. Osmotic pressure

Answer: C



Watch Video Solution

16. What happens when a formalin preserved filament of Spirogyra is placed a hypertonic sugar solution?

- A. It loose turgidity
- B. It gains turgidity
- C. It is plasmolysed
- D. Nothing happens

Answer: D



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17. The direction and rate of water movement from cell to cell is based on

A. WP

B. TP

C. DPD gradient

D. Incipient plasmolysis

Answer: C



Watch Video Solution

18. Osmotic pressure of cell sap is highest in

A. Halophytes

B. Mesophytes

C. Hydrophytes

D. Lithophytes

Answer: A



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19. OP of the cell can be measured by:

- A. Plasmolysis method
- B. Osmometer
- C. Molar concentration of cell sap
- D. Deplasmolysis

Answer: C



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20. When beet root cylinders are washed and then placed in hot water. The water turns red.

This is due to

A. Plasma membrane loses its function

hence pigments come out of beetroot

B. Plasma membrane is functional and

allowed anthocyanin to come out

C. Anthocyanin get denatured

D. None of the above

Answer: A



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21. Epidermal peeling of *Tradescantia* leaf is used for demonstrating:

- A. Plasmolysis and deplasmolysis
- B. Active absorption
- C. Passive absorption
- D. Mineral absorption

Answer: A



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22. Root hairs cells under ordinary conditions typically have water potential in the range of

- A. 1 to 4 atmospheres
- B. -1 to -4 atmospheres
- C. 1 to 2 atmospheres
- D. -1 to 2 atmospheres

Answer: B



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23. Wilting of plant occurs when

- A. Xylem is blocked
- B. Phloem is blocked
- C. Epidermis and few root are removed
- D. Pith is removed

Answer: A



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24. A leaf peeling of *Tradescantia* is kept in a medium having 10% NaCl. After a few minutes if we observe the leaf peel under the microscope, we are likely to see

- A. Entry of water into the cell
- B. The cell bursting out
- C. Diffusion of NaCl into the cell
- D. Exit of water from the cell

Answer: D



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25. Perianth is represented by

A. Westermaier

B. J.C.bose

C. Godlewski

D. Stephen Hales

Answer: C



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26. With reference to magnetic dipole, match the terms of Column I with the terms of Column II and Choose the correct option from the codes given below.

Column I	Column II
(A) Dipole moment	(p) $- \mathbf{M} \cdot \mathbf{B}$
(B) Equatorial field for a short dipole	(q) $\mathbf{M} \times \mathbf{B}$
(C) Axial field for a short dipole	(r) $-\mu_0 \mathbf{m} / 4\pi r^3$
(D) External field : Torque	(s) \mathbf{m}
(E) External field : Energy	(t) $\mu_0 2\mathbf{m} / 4\pi r^3$

A. Dendrographic measurements

B. Porous pot experiment

C. High tensile strength of xylem sap

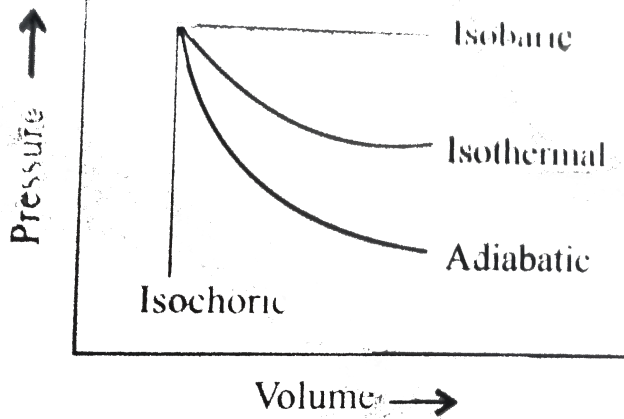
D. All of these

Answer: D



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27. The pressure-volume of various thermodynamic process is shown in graphs:



Work is the mole of transference of energy. It has been observed that reversible work done by the system is the maximum obtainable work.

$$w_{rev} > w_{irr}$$

The works of isothermal and adiabatic processes are different from each other.

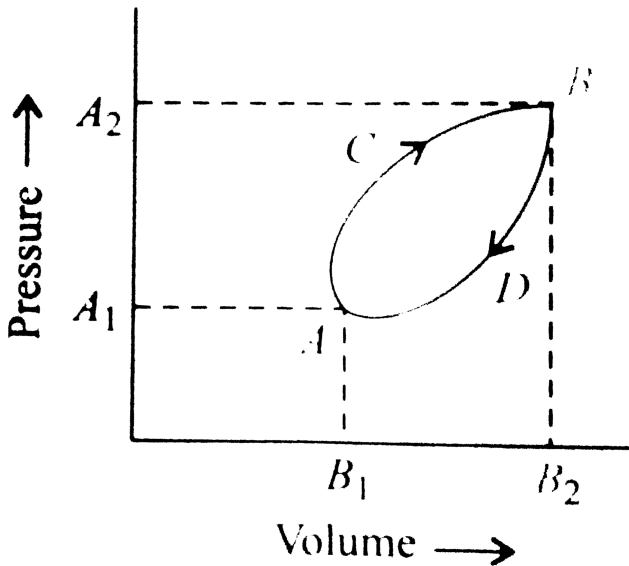
$$w_{\text{isothermal reversible}} = 2.303nRT \log_{10} \left(\frac{V_2}{V_1} \right)$$

$$= 2.303nRT \log_{10} \left(\frac{P_2}{P_1} \right)$$

$$w_{\text{adiabatic reversible}} = C_V(T_1 - T_2)$$

A thermodynamic system goes in a cyclic process as represented in the following

$P - V$ diagram:



The net work done during the complete cycle is given by the area

A. J.C.Bose

B. Priestly

C. Strasburger

D. None of these

Answer: A



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28. Perianth is represented by

A. Stephen Hales

B. Boehm

C. Sachs

D. Goldewski

Answer: D



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29. Who proposed relay pump theory of the ascent of sap ?

A. J.C.Bose

B. Godlewski

C. Westermaler

D. Sachs

Answer: B



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30. The pressure developed in tracheary elements of xylem due to metabolic activity of roots is called:

A. OP

B. TP

C. Root pressure

D. Atmospheric pressure

Answer: C



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31. The cut end of herbs stem just above the ground cause loss of water. This is due to

A. Physical force theories

B. Root pressure

C. Vapourisation of water

D. Non-osmotic absorption of water

Answer: B



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32. An innovative professor who wants to give a live demonstration of a physiological process, filled a glass bottle with previously

moistened mustard seeds, screw-capped the bottle and kept it away in corner and resumed his lecture. Towards the end of his lecture, there was a sudden explosion with glass pieces of the bottle thrown around. Which of the following phenomenon did the professor wanted to demonstrate?

A. Diffusion

B. Anaerobic respiration

C. Osmosis

D. imbibition

Answer: D



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33. The cohesive force of water is due to :

A. S-bonds

B. O-bonds

C. H-bonds

D. OH-bonds

Answer: C



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34. A higher plant cell covered with cutin and suberin is placed in water. After 15 minutes, the cell

- A. cell size will increase
- B. cell-size will decrease
- C. no change in the cell
- D. cell would be killed

Answer: C



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35. Conduction of sap in plants occurs through:

A. Heart wood only

B. Sap wood only

C. Xylem as whole

D. All of these

Answer: B



36. The blockage of one or two tracheary elements in a tree may cause

- A. Breakage in the continuity water column
- B. No breakage of continuity of water column and ascent of sap will take place
- C. Breakage of cohesion force in water molecules
- D. None of the above

Answer: B



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37. This plant is ideal to demonstrate ascent of sap

- A. Rose plant
- B. Balsam plant
- C. Coconut plant
- D. Cucumber plant

Answer: B



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38. The term ‘tensile strength’ represents that there is

A. A strong cohesion force between water molecules, so that column does not break when stretched by transpiration pull

B. A strong adhesion between water molecules and walls of xylem vessels so the column does not break and it is stretched by transpiration pull

C. Absence of vacuoles in the vessels, so the column does not break and it is stretched by transpiration pull

D. Both a and b

Answer: A



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39. In a branch cut from a rapidly transpiring plant, water snaps away from the cut end. It shows that it

A. Is under tension

B. Is in excess in vessels

C. Has been absorbed by capillary force

D. Has been absorbed by imbibition force

Answer: A



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40. When an oak tree is kept in a poisonous solution, that rises to the top of the tree, even then the tree is ready to take another supply of poisonous solution followed by uptake of even pure water. This shows that

A. Living cells are not involved in ascent of
sap

B. Living cells play a major role in ascent of
sap

C. Both xylem and phloem play a major role
in ascent of sap

D. Living cells play 60% role and vessels of
xylem play 40% role in ascent of sap

Answer: A



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41. Who among the following scientists first gave the starch sugar interconversion theory for stomatal movements ?

A. Loftfield

B. Lloyd

C. Sayre

D. Von Mohl

Answer: B



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42. Chemical reactions are invariably associated with the transfer of energy either in the form of heat or light. In the laboratory,

heat changes in physical and chemical processes are measured with an instrument called calorimeter. Heat change in the process is calculated as

$$q = ms\Delta T \quad s = \text{Specific heat}$$
$$= c\Delta T \quad c = \text{Heat capacity}$$

Heat of reaction at constant volume is measured using bomb calorimeter.

$$q_V = \Delta U = \text{Internal energy change}$$

Heat of reaction at constant pressure is measured using simple or water calorimeter.

$$q_p = \Delta H$$

$$q_p = q_V + P\Delta V$$

$$\Delta H = \Delta U + \Delta nRT$$

The heat capacity of a bomb calorimeter is $500 JK^{-1}$. When $0.1g$ of methane was burnt in this calorimeter, the temperature rose by $2^{\circ}C$. The value of ΔU per mole will be

- A. Potometer
- B. Dendrometer
- C. Porometer
- D. Moll's apparatus

Answer: A



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43. A chemical widely used as antitranspirant

A. cobalt chloride

B. dimethyl mercury

C. potassium iodide

D. phenyl mercuric acetate

Answer: D



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44. Which of the following theory gives the latest explanation for the opening and closing of stomata?

A. ABA theory

B. Munch theory

C. Starch glucose theory

D. Active K^+ transport theory

Answer: D



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45. Which one of following is not an antitranspirant?

A. PMA

B. BAP

C. Silicon oil

D. Low viscosity substances

Answer: B



Watch Video Solution

46. Which one of the following will not directly effect transpiration?

A. Temperature

B. Light

C. Wind speed

D. Respiration

Answer: D



Watch Video Solution

47. When phloem is removed by girdling

A. Kramer

B. J.C.Bose

C. Strasburger

D. Hartig

Answer: C



Watch Video Solution

48. Although a girdled (upto bast) tree may survive for sometime , but it will eventually die because

A. Water will not move upwards

B. Water will not move upwards

C. Sugars and other organic materials will
not move downwards

D. Sugars and other organic materials will
not move upwards

Answer: C



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49. How does the removal of a ring of bark and wood from the trunk of a tree kills it ?

- A. Mineral salts cannot go up
- B. Immediate stoppage of photosynthesis
- C. food and water cannot be translocated
- D. The exposed part dies due to heat

Answer: C



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50. When stem of plant is girdled (ringed) :

- A. The root dies first
- B. The shoot dies first
- C. The roots and the shoot will die at the same time
- D. neither the root nor the shoot wilts

Answer: A



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51. Ringing (girdling) experiment cannot be performed in

A. Sugarcane

B. Mango

C. Indian rubber plant

D. Tectona

Answer: A



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52. The protoplasmic streaming hypothesis for food translocation has not been accepted on the following grounds.

- A. It can not explain bi-direction movement
- B. Mature sieve elements do not show streaming

C. It can not explain faster rate of translocation

D. All of the above

Answer: A



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Exercise Iii

1. The water potential of pure water is:

A. Zero

B. Less than zero

C. More than zero but less than one

D. More than one

Answer: A



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

A. Contraction of outer wall of guard cells

B. Decrease in turgidity of guard cells

C. Radial orientation of cellulose

microfibrils in the cell wall of guard cells

D. Longitudinal orientation of cellulose

microfibrils in the cell wall of guard cells

Answer: C



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3. Specialised epidermal cells surrounding the guard cell are called

A. Complementary cells

B. Subsidiary cells

C. Bulliform cells

D. Lenticels

Answer: B



Watch Video Solution

4. The phloem sap is

A. Alkaline

B. acidic

C. low osmotic pressure

D. none of the above

Answer: A



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5. Water vapour comes out from the plant leaf through the stomata opening. Through the same stomata opening carbon dioxide diffuses 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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6. Root pressure is usually because of

A. Increase in transpiration

B. Active absorption

C. Low osmotic potential in soil

D. Passive absorption

Answer: B



Watch Video Solution

7. Roots play insignificant in absorption of water in :

A. Wheat

B. Sunflower

C. Pistia

D. Pea

Answer: C



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8. A column of water within xylem vessels of tall trees does not break under its weight because of

- A. Positive root pressure
- B. Dissolved sugars in water
- C. Tensile strength of water
- D. Lignification of xylem vessels

Answer: C



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9. Transpiration and root pressure cause water to rise in plants by

A. Pushing and pulling it respectively

B. Pulling it upward

C. Pulling and pushing it respectively

D. Pushing it upward

Answer: C



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10. The osmotic expansion of a cell kept in water is chiefly regulated by

A. Mitochondria

B. Vacuoles

C. Plastids

D. Ribosomes

Answer: B



Watch Video Solution

11. Lenticels are involved in

A. Transpiration

B. Gaseous exchange

C. Food transport

D. Photosynthesis

Answer: B



Watch Video Solution

12. Which of the following criteria does not pertain to facilitated transport

A. Requirement of special membrane proteins

B. High selectivity

C. Transport saturation

D. Uphill transport

Answer: D



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13. Which one of the following is correctly matched

A. Passive transport of nutrients - ATP

B. Apoplast - Plasmodesmata

C. Potassium - Readily immobilization

D. Bakane of rice seedlings - E. Kurosawa

Answer: D



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14. Guard cells differ from other epidermal cells in having

A. Mitochondria

B. Endoplasmic reticulum

C. Chloroplasts

D. Protoplasm

Answer: C



Watch Video Solution

15. Which one of the following elements in plants is not remobilised ?

A. Calcium

B. Potassium

C. Sulphur

D. Phosphorus

Answer: A



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16. Guttation is the result of

A. Diffusion

B. Transpiration

C. Osmosis

D. Root pressure

Answer: D



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17. which one of the following structures between two adjacent cells is an effective transport pathway?

A. Plasmodesmata

B. Plastoquinones

C. Endoplasmic reticulum

D. Plasmalemma

Answer: A



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18. Guard cell help in :

- A. Fighting against infection
- B. Protection against grazing
- C. Transpiration
- D. Guttation

Answer: C



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19. The rupture and fractionation do not usually occur in the water column in vessel/tracheids during the ascent of sap because of :

- A. weak gravitatalinal pull
- B. transpirational pull
- C. lignified thick walls
- D. cohesion and adhesion

Answer: D



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20. Two cells A and B are contiguous, Cell A has osmotic pressure 10 atm, turgor pressure 7 atm and diffusion pressure deficit 3 atm. Cell B has osmotic pressure 8 atm, kturgor pressure 3 atm and diffusion pressure dificit 5 atm. The resul will be

- A. Movement of water from cell A to B
- B. Movement of water from cell B to A
- C. No movement of water

D. Equilibrium between the two

Answer: A



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