BIOLOGY

NEET & AIIMS

TRANSPORT IN PLANTS

Example

1. Give one example of diffusion in plants .

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2. What is diffusion pressure ?

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3. What is facilitated diffusion ?

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4. What is symport ?

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5. What are pumps ?

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6. Which factor influences activ transport of substances across the membrane ?

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7. Write two uses of water in plants.

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8. Why land plants require huge quantity of water for proper growth and development ?

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9. What is water potential ?

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10. What is the unit of water potential ?

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11. State the relationship between water potential and solute potential for a solution at atmospheric pressure .

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12. What is the direction of water movement between two adjoining cells A and B if

(A) $\Psi_S = -20$ bars , $\Psi_P = 10$ bars

(B) $\Psi_S = -24$ bars , $\Psi)_P = 12$ bars

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13. What is osmotic pressure ? Why it is a colligative property ?

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14. Write any one importance of osmosis to plants.

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15. What occupies the spece between the cell walll and the shrunken protoplast in the plasmolysed cell?

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16. What would be the Ψ_P of a flaccid cell ?

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17. Name the special type of diffusion that helps in emergence of seedlings out of the soil.

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18. Give an example of imbibant and imbibate .

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19. Name the phenomenon through which water moves over short distances in plants .

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20. What is the bulk or mass flow hypothesis ?

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21. What is root pressure ?

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22. What is transpiration ?

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23. Why all minerals are not passively absorbed by roots ? Give any one reason.

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24. What are the control points in plants where quantity and type of solutes reaching the xylem is adjusted ?

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25. Name the hypothesis which explains the translocation of sugar in phloem?

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26. In which form usually , photosynthates are translocated to other parts of plant ?

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27. Name the experiment which was used to identify the tissues through which food is translocated .

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Try Yourself Fill In The Blanks

1. In rooted plants , transport in _____ essentially unidirectional from roots to stem .

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2. Transport over longer distances that proceeds through the vascular system is called _____

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3. Movement by diffusion is _____

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4. If the external solution balances the osmotic pressure of the cytoplasm ,it is said to be _____

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5. Cells swell in_____ solution and shrink in _____ ones.

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6. If the surrounding solution of the cell is hypertonic , it gets _____

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7. The movement of molecule across a typical plant cell (about 50 μm) takes place approximately _____ seconds.

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8. The bulk movement of substanes through the conducting or vascular tissues of plants is called _____

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9. _____ is associated with translocation of mainly water , mineral salts , some organic nitrogen and hormones .

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10. The _____ movement of water occurs exclusively through the intercellular spaces and the walls of the cells.

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11. In _____ system , the movement of water is relatively slower .

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12. Most plant meet their water need by _____

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13. Cellulose microfibrills are oriented _____ rather than _____ making it easier for the stomata to open.

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14. Usually the lower surface of a ____leaf has a greater number of stomata .

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15. _____ supplies water for photosynthesis.

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16. Food , primarily _____ is transported by the vascular tissue pholem from source to sink.

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17. Hormones and amino acid are also translocated through _____

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18. _____ transport is necessary to move the sucrose out of the pholem sap .

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Watch Video Solution

19. Water in the adjacent xylem moves into the phloem by _____

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20. At the sink , osmotic pressure must be _____

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Try Yourself Determine Whether The Following Statements Are True Or False

1. Diffusion is slow process and is dependent on a living system.

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Try Your Self Determine Whether The Following Statements Are True Or False

1. Diffusion is the only means for gaseous movement within the plant body.

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2. Diffusion rates are affected by the gradient of concentration only .

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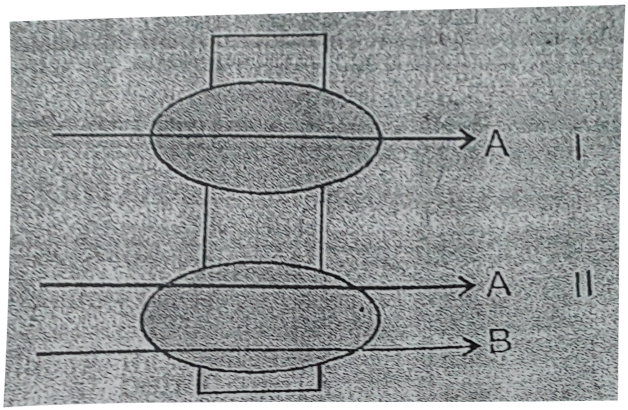
Try Yourself

1. Observe the given figure and identify the process (I) and (II)



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2. Find out A,B,C,D,E,F and G indicating either "yes" or "no" in the given table.

Property	Simple Diffusion	Facilitated Diffusion	Active
(i) Highly selective	No	A	B
(ii) Transport saturates	C	D	Yes
(iii) Requires ATP	E	F	G

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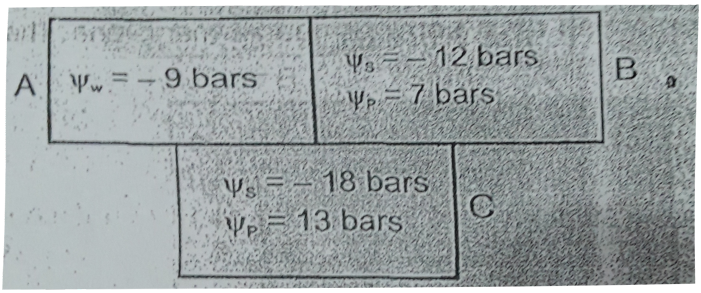
3. (a) Deduce the vaule of Ψ_W if OP and Ψ_P are 10 and 7 bars respectively .

(b) Give the direction for the flow of water in the given diagram



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4. Mention the significance of mycorrhiza during water absorption.

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

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Try Yourself Fill In The Blanks

1. _____ can not cause net transport of molecules from low to high concentration .

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2. _____ are made up of eight different types of aquaporins.

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Try Yourself Write Wheter The Following Statements Are True Or False

1. Water provides the medium in which few substances are dissolved.

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2. Most herbaceous plant have only about 10 to 15 percent of its fresh weight as dry matter .

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3. A mature corn plant absorbs almost five litres of water in a day .

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Try Yourself Write Whether The Following Statements Are True Or False

1. Water molecules possess kinetic energy only.

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2. If some solute is dissolved in pure water , the water potential decreases .

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3. In plants the negative potential in the water column in the xylem plays a major role in water transport up a stem .

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4. Water potential of a cell is affected by solute potential only .

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5. Imbibition is a special type of diffusion

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

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7. The affinity between the adsorbent and the liquid is not a pre- requisite

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8. The concentration of minerasl in the soil is usually higher than the concentratiuon of mineral in the root .

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9. Most minerals must enter the root by active absorption.

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10. The endodermal cells have few transport proteins embedded in their plasma membrane .

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11. The chief sinks for the minerals elements are the growing regions of the plant.

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12. Unloading of mineral ions occurs at the fine veins ending through diffusion.

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Exercise

1. Simple diffusion is related to all , except

A. Involvement of carriers

B. Occurs along concentration gradient

C. Continues till an equilibrium is established

D. Downhill movement

Answer: A

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2. Requirement of special membrane proteins and highly selective nature are features related to

A. Simple diffusion

B. Facilitated diffusion

C. Active transport

D. More than one option is correct

Answer: D

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3. Porins are proteins with _____ pores which allow the movement of _____ proteins.

A. Small, small

B. Large , Small

C. Large , Large

D. Small,Large

Answer: A

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4. Mobile carrier protein alongwith energy expenditure is involved in

A. ATP independent transport

B. Simple diffusion

C. Facilitated diffusion

D. Uphill movement

Answer: D

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5. Mark the odd one out (w.r.t. semi- permeable membrane)

A. Tonoplast

B. Parchment membrane

C. Collodion membrane

D. Copper ferricynide membrane

Answer: A

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6. Find the correct expression for a fully turgid cell

A. $\Psi_W = \Psi_S$

B. $\Psi_W = 0$

C. $\Psi_W = \Psi_s + \Psi_P$

D. $\Psi_W = \Psi_P$

Answer: B

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7. For a solution at atmospheric pressure , Ψ_W is equivalent to

A. Ψ_P

B. Ψ_S

C. Zero

D. TP

Answer: B

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8. Phenomenon of plasmolysis can be exploited for

A. causing plasmolysis of microbes in highly salted pickles

B. Preventing growth of microbes in jams and jellies

C. Elimination of weeds

D. All of these

Answer: D

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9. Which of the following substance acts as best imbibant ?

A. Phycocolloids

B. Proteins

C. Starch

D. Cellulose

Answer: A

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10. What is /are essential for imbibition to occur ?

A. Affinity between imbibant and imbibate

B. Water potential gradient between imbibant and imbibate

C. Low temperature condition

D. More than one option is correct

Answer: D

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11. Mass flow is the movement of substance in bulk as a result of pressure differences between two regions ? It is seen for

A. Water

B. Food

C. Minerals

D. All of these

Answer: D

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12. Symplast pathway of water in plants is not related to

A. Vacuolar path

B. Cytoplasm

C. Plasmodesmata

D. Cell wall

Answer: D

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13. Most of the flows in the roots as

A. Passive , apoplastic

B. Active , Symplastic

C. Passive , Symplastic

D. Active , Apoplastic

Answer: A

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14. Passive absorption of water is realted to all ,except

A. Apoplastic pathway

B. Transpiration pull plays the major role

C. Development of a positive pressure in xylem

D. Water absorption through the roots .

Answer: C

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15. During process of active absorption of water

A. The responsible force develops in roots

B. Rate will be higher than passive absorption

C. A negative pressure is developed in root xylem

D. OP and energy play no role

Answer: A

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16. All given factors promote absorption of water by roots , except

A. Well aerated soil

B. Highly concentrated soil solution

C. Optimum soil temperature

D. Available water in soil

Answer: B

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17. Positive hydrostatic pressure developing in root xylem due to active solute accumulation is called

A. Root pressure

B. Imbibition pressure

C. Water potential

D. Diffusion pressure deficit

Answer: A

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18. According to Dixon and Jolly theory, all given factors contribute to ascent of sap, except

A. Cohesive and adhesive force of water

B. Vertical water column in xylem fibres and parenchyma

C. Continuity of water column

D. Transpiration pull

Answer: B

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19. Select an incorrect statement

A. Root pressure has never been observed in confiners

B. Root pressure cannot be inhibited by using cyanide , lack of O_2 and low temperature

C. Root pressure can re-establish the continuous chain of water molecules in the xylem

D. Develops during early morning and night

Answer: B

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20. Force responsible for exudation of liquid drops from the margin of the leaves is

A. Negative hydrostatic pressure

B. Transpiration pull

C. Imbibition

D. Positive pressure

Answer: D

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21. Which of the following contributes about 1% of the total transpiration in plants ?

A. Bark transpiration

B. Cuticular transpiration

C. Lenticular transpiration

D. Stomatal transpiration

Answer: A

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22. Select an incorrect statement

A. Guard cells are dumb-bell shaped in Poaceae

B. Inner wall of the guard cell is thin and elastic in dicots

C. Cellulosic microfibriles are arranged radilly in guard cells

D. Guard cells are bordered by one or more subsidiary cells

Answer: B

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23. According to potassium pump theory , which activity will not occur for the opening of stomata ?

A. Dissociation of malic acid

B. Passive process of ion exchange

C. Transport of H^+ ions from guard cells to subsidiary cells

D. Increased OP of guard cells by potassium malate

Answer: B

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24. Select a correct statement

A. Blue light inhibits opening of stomata

B. PMA (Phenyl mercuric acetate) is a fungicide as well as an antitranspirant

C. Transpiration does not perform evaporative cooling of leaf surface

D. Transpiration increase when the relative humidity is high

Answer: B

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25. Stomatal apparatus consists of

A. Non green guard cells + Subsidiary cells + Stomatal aperture

B. Non green guard cell + Acessory cell + Stomatal aperture

C. Guard cell + Green accessory cell + Stomatal aperture

D. Green guard cells+ Accessory cells + Stomatal aperture

Answer: D

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26. Cobalt- Chloride test is for demonstration of

A. Imbibition

B. Transpiration

C. guttation

D. More than one option is correct

Answer: B

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27. Transport proteins of _____ are control points , where a plant adjusts the quantity and types of solutes that reach the xylem.

A. Pericycle

B. Hypodermis

C. Endodermis

D. Pith

Answer: C

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28. Find odd one w.r.t chief sink for mineral elements

A. Apical and lateral meristem

B. Young leaves

C. Fruits and seeds

D. Mature leaves

Answer: D

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29. Phloem sap consists of

A. H_2O , Minerals

B. Food , Hormones

C. Organic solutes , Sugar

D. More than one option is correct

Answer: D

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30. The pressure flow of mass flow hypothesis of pholem translocation explains that

A. Sugars are loaded actively in sieve tubes

B. Incoming sugars are actively transported out of the phloem and removed as complex carbohydrates

C. Loss of solute produce as low Ψ_W in the pholem

D. More than one option is correct

Answer: D

View Text Solution

Assignment Section A Objective Type

1. Diffusion is a _____ process and is not dependent on _____

A. Slow , gradient of concentration

B. Slow , living system

C. Rapid , temperature

D. Rapid , pressure

Answer: B

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2. Diffusion rates are affected by .

A. Pressure

B. Temperature

C. Concentration gradient

D. All of these

Answer: D

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3. Gaseous movement inot an out of the plant occurs indirectly through

A. Osmosis

B. Diffusion

C. Transpiration

D. Imbibition

Answer: B

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4. Which of the following process requires membrane proteins ?

A. Simple diffusion

B. Imbibition

C. Facilitated diffusion

D. More than one option is correct

Answer: C

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5. Select the incorrect statement w.r.t. facilitated diffusion

A. Highly selective

B. Uphill transport

C. Requires special membrane proteins

D. Transport saturates

Answer: B

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6. A cell when immersed in a solution , increases in volume , so the external solution is

A. Hypertonic

B. Isotonic

C. Hypotonic

D. Either hypertonic or hypotonic

Answer: C

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7. A cell is placed in 0.4 M solution of sugar and no change in volume of cell is found. What is the concentration of the cell sap ?

A. 40 M

B. 4 M

C. 0.4 M

D. 0.20 M

Answer: C

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8. Select the odd one out w.r.t porins

A. Not associated with the inner membrane of plastids

B. Associated with the outer membrane of mitochondria

C. Found in outer membrane of gram positive becteria

D. Allow movement of low molecular weight hydrophillic substances .

Answer: C

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9. In antiport ,

A. Two molecules are transported in same direction across the membrane

B. Only one molecule is transported across the membrane

C. Two molecules are moved in opposite directions across the membrane

D. No transport occurs

Answer: C

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10. In active transport

A. Energy is required

B. Membrane porteins are involved

C. Pumps are present

D. All of these

Answer: D

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11. A plant cell if placed in distilled water will

A. Shrink

B. Swell up

C. Not change its shape or size

D. Burst immediately

Answer: B

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12. Doors made up of wood , swell up in rainy season due to

A. Transpiration

B. Imbibition

C. Exosmosis

D. Guttation

Answer: B

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13. Select the incorrect statement w.r.t. imbibition

A. It is diffusion process

B. Affinity between the adsorbent and the liquid is not a pre-requisite

C. It involves both capillary action and adsorption

D. Phycocolloids are best imbibants

Answer: B

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14. Concentration of water molecules in a system determines

A. Uphill transport rate

B. Number of carrier proteins

C. Water potential of the system

D. Membrane permeability

Answer: C

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15. Osmostic potential is

A. Positive

B. Negative

C. Always zero

D. Greater than one

Answer: B

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16. When solute potential increases then water potential would

A. Increase

B. Decrease

C. Remain same

D. First increase then decrease

Answer: A

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17. The hydrostatic pressure which develops due to entry of water into a plant cell is

A. Positive

B. Negative

C. Zero

D. Undetermined

Answer: A

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18. For a solution at atmospheric pressure , Ψ_W is equivalent to

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19. When a cell is placed in a solution whose osmotic concentration is equal to cell sap then ,

A. Water moves inside the cell

B. Water moves ouside the cell

C. No net movement of water occurs

D. Cell will be plasmolysed

Answer: C

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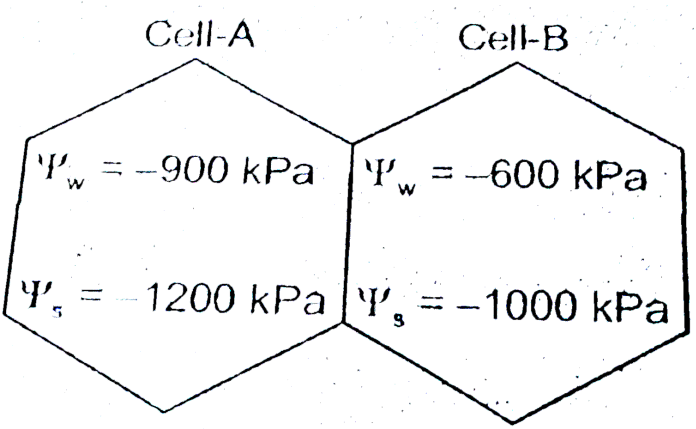
20. What would be Ψ_P of cell sap in the cell-A and cell -B respectively ?



A. 300,400 kPa

B. $-300, \ -400kPa$

C. $-1100, \ -1600kPa$

D. $900, 600kPa$

Answer: A

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21. Turgour pressure is the

A. Positive pressure

B. Negative pressure

C. Atmospheric pressure

D. Imbibition pressure

Answer: A

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22. Plant seeds when sown in soil , germinate and come out of it , due to

A. Turgour pressure

B. Imbibition pressure

C. Osmotic pressure

D. Atmospheric pressure

Answer: B

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23. In mass flow , various substance move independently according to their

A. Size

B. Concentration gradient

C. Root pressure

D. Carrier proteins

Answer: B

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24. In mycorrhiza , fungal filaments help in

A. Water absorption

B. Food translocation

C. Developing tension is xylem

D. Development of roots pressure

Answer: A

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25. Non-living components of xylem tissues are involved in

A. Symplast pathway

B. Apoplast pathway

C. Osmosis

D. Active transport

Answer: B

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26. Water reaches xylem from root hairs by

A. Apoplast pathway

B. Symplast pathway

C. Both (1) & (2)

D. Imbibition

Answer: C

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27. Symplast pathway of water in plants is not related to

A. Vacuolar path

B. Cytoplasm

C. Plasmodesmata

D. Cell wall

Answer: D

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28. Guttation happens due to the development of

A. Negative hydrostatic pressure in xylem

B. Positive hydrostatic pressure in xylem

C. Intense transpiration pull

D. Low root pressure

Answer: B

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29. Hydathodes help in

A. Bleeding

B. Guttation

C. Protection against grazing

D. More than one option is correct

Answer: B

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30. Select an incorrect statement

A. Guard cells are dumb-bell shaped in monocots

B. Inner wall of the guard cell is thin and elastic in dicots

C. Cellulosic microfibriles are arranged radilly in guard cells

D. Guard cells ar surrounded by subsidiary cells

Answer: B

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31. The outer wall of guard cell in sunflower is

A. Thin and elastic

B. Thick and elastic

C. Thin and inelastic

D. Thick and inelastic

Answer: A

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32. Stomata when open lead to

A. Exchange of gases

B. Evaporation of water

C. uptake of carbon dioxide

D. All of these

Answer: D

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33. Rate of transpiration is increased by

A. Sunlight

B. Darkness

C. High humidity

D. High speed winds

Answer: A

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34. Water is mainly transported to shoot tips by the help of

A. Capillarity

B. Root pressure

C. Transpiration pull

D. Canopy structure

Answer: C

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35. Xylem helps in translocation of

A. Some hormones

B. Water and mineral salts

C. Amides

D. More than one option is correct

Answer: D

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36. The water rises in staw due to suction , it is due to

A. Positive hydrostatic pressure

B. Negative hydrostatic pressure

C. Zero hydrostatic pressure

D. Diffusion pressure

Answer: B

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37. Transport proteins of _____ are control points , where a plant adjusts the quantity and types of solutes that reach the xylem.

A. Hypodermis

B. Endodermis

C. Pith

D. Pericycle

Answer: B

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38. The casparian strips of root endodermis is made up of

A. Suberin

B. Cellulose

C. Chitin

D. Keratin

Answer: A

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39. Ions are absorbed from the soil by

A. Passive transport

B. Active transport

C. Both (1) & (2)

D. Imbibition

Answer: C

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40. Remobilised minerals become available to

A. Chlorotic leaves

B. Dried leaves

C. Young leaves

D. Older parts of plant

Answer: C

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41. An analysis of the xylem exudates shows that much of the nitrogen travels as

A. Inorganic ions

B. Nitrate and nitrites

C. Organic form i.e., amino acids and amides

D. Molecular nitrogen

Answer: C

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42. A plant organ having high concentration of food , will serve as a

A. Source

B. Sink

C. Conducting tissue

D. Plasmodesmata

Answer: A

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43. Sucrose moves into sieve tube elements by

A. Diffusion

B. Endosmosis

C. Active transport

D. Exosmosis

Answer: C

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44. Translocation of photosynthates occur in the form of

A. Sucrose

B. Starch

C. Glucose

D. 3 PGA

Answer: A

Watch Video Solution

45. Find out one w.r.t. chief sink of mineral elements .

A. Apical and lateral meristem

B. Young leaves

C. Fruits and seeds

D. Mature or older leaves

Answer: D

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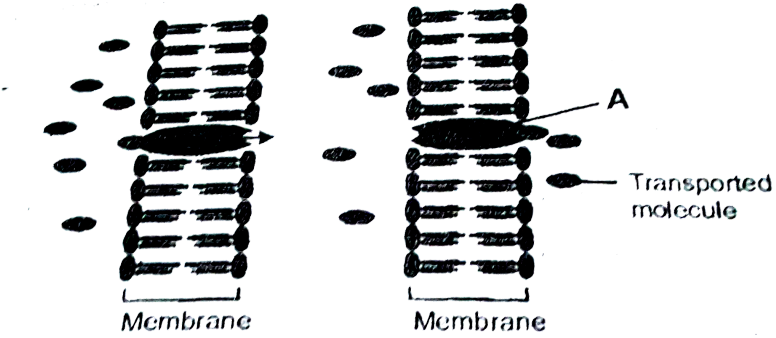
Assignment Section B Objective Type

1. Identify the mean of transport represented below and the structure marked as A



A. Simple diffusion ,A- Transport protein

B. Facilitated diffusion, A - Transport protein

C. Facilitated diuffusion, A- Transport pumps

D. Active transport,A- Transport pumps

Answer: B

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2. Facilitated diffusion is characterised by all , except

A. Requirement of membrane proteins

B. Uphill transport

C. No requirement of energy

D. Highly selective nature

Answer: B

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3. Which is not true regarding active water absorption ?

A. Require energy

B. Occurs only when transpiration is slow

C. Living cells are essential

D. Force develops is shoot

Answer: D

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4. A perfect partition between osmotically active system and pure water in physical condition can be formed by a

A. Semipermeable membrane

B. Selective permeable membrane

C. Impermeable membrane

D. Freely permeable membrane

Answer: A

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5. Water channels are

A. Made up of eight similar types of aquaporins

B. Involved in active transport

C. Involved in facilitated diffusion

D. More than one option is correct

Answer: C

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6. As a result of endosmosis , Ψ_W of cell

A. Increase

B. Decrease

C. Remain same

D. Become zero

Answer: A

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7. Which of the following equation is wrong ?

A. $\Psi_s = -\pi$

B. DPD=-OP+TP

C. $\Psi_W = \Psi_S + \Psi_P$

D. $\Psi_W = -DPD$

Answer: B

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8. Correct expression for water potential of plasmolysed cell will be

A. $\Psi_W = \Psi_S$

B. $\Psi_S = \Psi_W$

C. $\Psi - (W) = 0$

D. $\Psi_W = \Psi_S + (\Psi_P)$

Answer: D

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9. When a cell is fully turgid, which of the following will be zero

The potential energy of water is referred to as

A. Osmostic pressure

B. Turgor pressure

C. Wall pressure

D. Suction pressure

Answer: D

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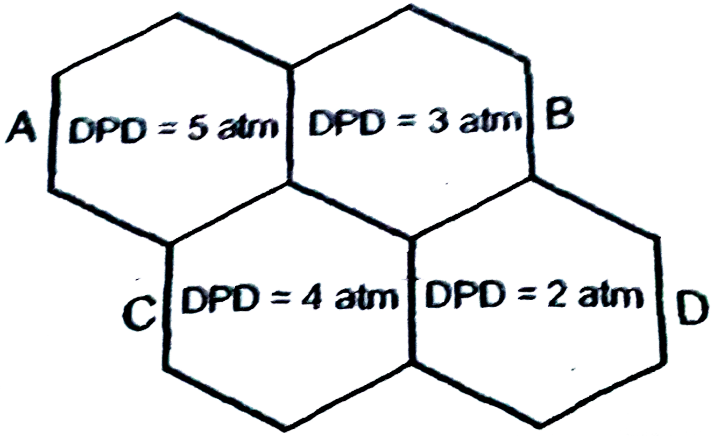
10. A hypothetical arrangement of plant cell (A,B,C and D) is given below



Find the correct sequence of movement of water using the given values

A. $D \rightarrow B \rightarrow C \rightarrow A$

B. $A \rightarrow C \rightarrow B \rightarrow D$

C. $D \rightarrow B \rightarrow A \rightarrow C$

D. $D \rightarrow A \rightarrow C \rightarrow B$

Answer: A

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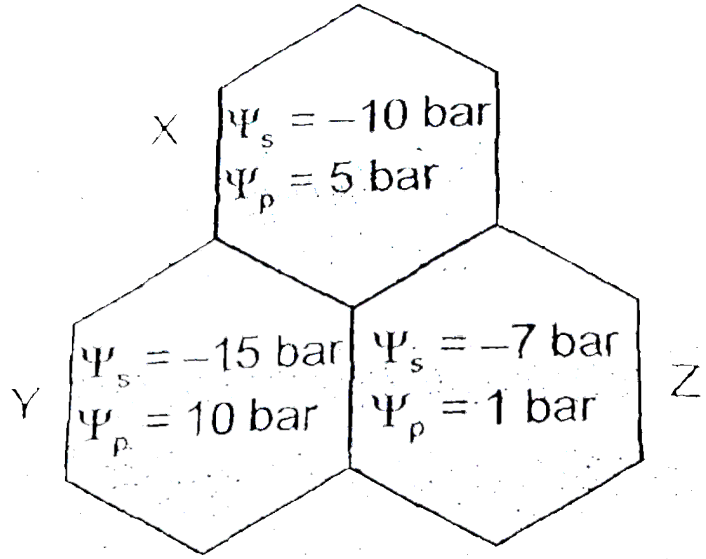
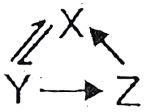
11. Find the correct pathway of movement of water in given presentation of cells .



A. (1) X, Y ← Z

B. (2) X, Y → Z

C. (3) X, Y ← Z

D. (4) 

Answer: B

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12. Which is a correct order (w.r.t. imbibing capacity in decreasing order) ?

A. Agar-agar > Pectin > Protein > Starch > Cellulose

B. Agar-agar > Protein > Pectin > Cellulose > Starch

C. Protein > Agar-agar > Pectin > Starch > Cellulose

D. Agar-agar > Starch > Protein > Cellulose > Pectin

Answer: A

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13. Which is not a characteristic of imbibition ?

A. It is a reversible phenomenon

B. Heat is generated

C. Involves both capillarity and adsorption

D. It is a property of hydrophobic and lyophobic colloids

Answer: D

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14. Phenomenon not associated with root pressure is

A. Sap exudation

B. Bleeding

C. guttation

D. Transpiration

Answer: D

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15. Which is not true for root pressure

A. Positive hydrostatic pressure

B. Maximum during the day and minimum during night

C. Magnitude is 1-2 bars

D. Develops due to metabolic activity of roots

Answer: B

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16. Phenomenonof guttation

A. Is regulated by Cohension-Tension

B. Is due to active solute accumulation by phloem

C. Takes place to release excessive solutes

D. More than one option is correct

Answer: C

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17. Which of the following statement for hydathodes is correct ?

A. Opens to release excessive pure water from leaves

B. Contains a loosely arranged parenchyma called eppithem

C. These are found at the tips of the veins in leaves

D. More than one option is correct

Answer: D

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18. In a stomatal apparatus , cellulosic microfibril are oriented

A. Longitudinally on subsidiary cells

B. Radially in the cell walls of guard cells

C. Radially and longitudinally in wall of guard cells

D. Longitudinally on both guard cells

Answer: B

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19. According to potassium pump theory of Levitt

A. Starch is incompetely oxidized to PEP during night

B. Malic acid dissociates into malate ion and protons in the subsidiary cells .

C. Movement of H^+ ions from guard cell to subsidiary cell is active

D. Potassium malate decreases the OP of guard celll during day

Answer: C

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20. A. In dry atmosphere , the relative humidity is low, so the rate of transpiration increases

B. Slow breeze promotes the rate of transpiration

C. ABA promotes transpiration

D. A high salt concentration in soil water increases transpiration

A. C and D are correct

B. B and C are correct

C. A and C are correct

D. A and B are correct

Answer: D

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21. The conditions under which transpiration would be most rapid are

A. Excess of water in soil

B. Low humidity , high temperature , turgid guard cells and moist soil

C. Low velocity of wind

D. High humidity

Answer: B

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22. A. Most researchers agree that water is mainly 'pulled' upward through the plant , where transpiration is the driving force .

B. Less than one percent of water reaching the leaves is used in plant growth and photosynthesis .

C. Cobalt chloride paper turns blue on absorbing water .

A. All are correct

B. Only C is incorrect

C. Only B is incorrect

D. Only A is correct

Answer: B

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23. During stomatal opening (photo-active) which does not occur?

A. Increase in pH of guard cells

B. Hydrolysis of starch in guard cells

C. Increased TP of subsidiary cells

D. Dissociation of malic acid in guard cells

Answer: C

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24. Select incorrect statement w.r.t. translocation of mineral ions.

A. The chief sinks for the mineral elements are the apical and lateral meristems.

B. Most readily mobilised element are N,P,K

C. Most of the nitrogen travels as inorganic ions through xylem.

D. Small amount of P and S are carried as organic compound through xylem.

Answer: C

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25. Transport of water and minerals in Xylem , is $\underline{\mathrm{A}}$

Transport of organic and mineral nutrients is $\underline{\mathrm{B}}$

A. A-Unidirectional , B- Unidirectional

B. A-Multidirectional , B- Multidirectional

C. A-Multidirectional , B- Multidirectional

D. A-Unidirectional , B- Multidirectional

Answer: D

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26. According to the pressure flow hypothesis

A. Phloem loading produces a hypertonic condition in the sieve tubes.

B. Water potential gradient facilitates the mass movement in the phloem.

C. Phloem unloading is a passive process .

A. A&B are incorrect

B. B &C are incorrect

C. A & B are correct

D. A & C are correct

Answer: C

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27. A girdled plant (upto bast) may survive for some time but it will eventually die, besause

A. Water will not move upward

B. Water will not move downward

C. Sugars and other organic solutes will not move downward

D. Sugars and other organic solutes will not move upward

Answer: C

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28. Phloem loading and unloading process are respectively

A. Active , Passive

B. Passive , Active

C. Active , Active

D. Passive , Passive

Answer: C

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29. Which of the following statement is not true for stomatal apparatus

A. Cellulose microfibrils are arranged longitudinally to axis to stomata

B. Subsidiary cells are located as modified epidermal cells

C. Guard cells may be ellipsoidal in monocots

D. Inner walls of guard cells are thick and elastic

Answer: A

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30. A . Much of nitrogen in xylem sap is carried in organic form.

B. In phloem , movement of nutrients is always unidirectional .

A. Only A is correct

B. Only B is correct

C. Both A & B are correct

D. Both A & B are incorrect

Answer: A

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Assignment Section C Previous Year Questions

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

A. Concentration of outer wall of guard cells

B. Decrease in turgidity of guard cells

C. Radial orientation of cellulose microbibrils 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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2. 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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3. 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. Acidic

B. Alkaline

C. Low refractive index

D. Absence of sugar

Answer: B

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4. Water vapour comes out from the plant leaf through the stomatal opening. Through the same stomatal opening carbon dioxide diffuses

into the plant during photosynthesis. Reason out the above statements using the following options.

A. One process occurs during the day time , and the othet at night

B. Both processes cannot happen simultaneously

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

D. The above processes happen only during night time

Answer: C

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5. Root pressure develops due to

A. Increase in transpiration

B. Active absorption

C. Low osmotic potential in soil

D. Passive absorption

Answer: B

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

A. Positive root pressure

B. Dissolved sugar in water

C. Tensile strength of water

D. Lignification of xylem vessels

Answer: C

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7. 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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8. In a ring girdled plant :

A. Neither root not shoot will die

B. The shoot dies first

C. The root dies first

D. The shoot and root die together

Answer: C

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9. Which one gives the most valid and recent explanation for stomatal movement?

A. Guard cell photosynthesis

B. Transpiration

C. Potassium influx and efflux

D. Starch hydrolysis

Answer: C

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10. Which of the following criteria does not pertain to facillatated transport

A. High selectively

B. Transport saturation

C. Uphill transport

D. Requirement of special membrane proteins.

Answer: C

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11. Lenticels are involved in

A. Gaseous exchange

B. Food transport

C. Photosynthesis

D. Transpiration

Answer: A

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12. Guttation is the result of

A. Osmosis

B. Root pressure

C. Diffusion

D. Transpiration

Answer: B

Watch Video Solution

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

A. Plasmalemma

B. Plasmodesmata

C. Plastoquinones

D. Endoplasmic reticulum

Answer: B

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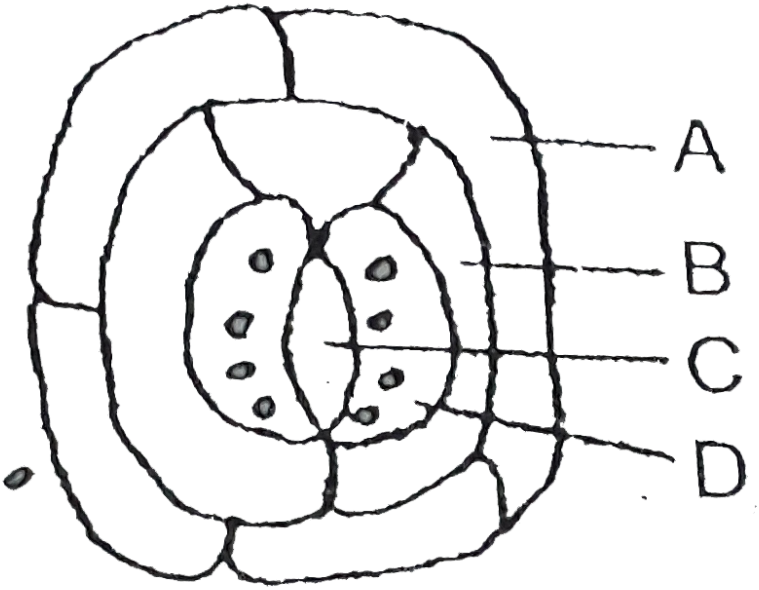
14. Given below is the diagram of a stomatal apparatus . In which of the following all the four parts labelled as A , B,C and D are correctly identified ?



A. A- Subsidiary cell

B-Epidermal cell

C-Guard cell

D- Stomatal aperture

B. A- Guard cell

B- Stomatal aperture

C-Subsidiary cell

D-Epidermal cell

C. A-Epidermal cell

B- Guard cell

C- Stomatal aperture

D- Subsidiary

D. A-Epidermal cell

B- Subsidiary cell

C-Stomatal aperture

D- Guard cell

Answer: D

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15. Guard cells help in

A. Transpiration

B. Guttation

C. Fighting against infection

D. Protection against grazing

Answer: A

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

A. Transpiration pull

B. Lignified thick walls

C. Cohension and adhesion

D. Weak gravitational pull

Answer: C

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17. 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, turgor pressure 3 atm and diffusion pressure deficit 5 atm. The result will be

A. Movement of water of 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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18. The translocation of organic solutes in sleve tube membres is supportted by

A. Root pressure and transpiration pull

B. P- proteins

C. Mass flow involving a carrier and ATP

D. Cytoplasmic streaming

Answer: C

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19. Potometer works on the principle of

A. Amount of water absorbed equals the movement transpired

B. Osmotic pressure

C. Root pressure

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

Answer: A

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20. When water enters in roots due to diffusion, it is termed as

A. Osmosis

B. Passive absorption

C. Endocytosis

D. Active absorption

Answer: B

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21. When water moves through a semipermeable membrane, which of the following is created

A. Osmotic pressure

B. Suction pressure

C. Turgour pressure

D. Wall pressure

Answer: C

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22. When a cell is fully turgid, which of the following will be zero

The potential energy of water is referred to as

A. Turgour pressure

B. Water potential

C. Wall pressure

D. Osmotic pressure

Answer: B

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23. If turgidity of a cell surrounded by water increases, the wall pressure will

A. Fluctuate

B. Remain unchanged

C. Increase

D. Decrease

Answer: C

Watch Video Solution

24. Water potential and osmotic potential of pure water are

A. 100 and 200

B. Zero and 100

C. 100 and zero

D. zero and zero

Answer: D

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25. Stomatal opening is affected by

A. Nitrogen concentration , carbon dioxide concentration and light

B. Carbon dioxide concentration , temperature and light

C. Nitrogen concentration , light and temperature

D. Carbon dioxide concentration , nitrogen concentration and temperature

Answer: B

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26. Which of the following statement is not true for stomatal apparatus

A. Inner walls of guard cell are thick

B. Guard cells invariably possess chloroplasts and mitochondria

C. Guard cells are always surrounded by subsidiary cells

D. Stomata are involved in gasesous exchange .

Answer: C

Watch Video Solution

27. Opening and closing of stomata is due to

A. Hormonal change in guard cells

B. Change in turgor prssure of guard cells

C. Gaseous exchange

D. Respiration

Answer: B

Watch Video Solution

28. Stomata of a plant open due to

A. Influx of potassium ions

B. Eflux of potassium ions

C. Influx of hydrogen ions

D. Influx of calcium ions

Answer: A

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29. Stomata of CAM plants

A. are always open

B. Open during the day and close at night

C. Open during the night and close during the day

D. Never open

Answer: C

Watch Video Solution

30. Potometer works on the principle of

A. Osmotic pressure

B. Amount of water absorbed equals the amount transpire

C. Root pressure

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

Answer: B

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31. Glycolate induces opening of stomata in

A. Presence of oxygen

B. Low CO_2 concentration

C. High CO_2

D. CO_2 absent

Answer: B

Watch Video Solution

32. Which of the following get accumulated in the vacuoles of guard cells during stomatal opening ?

A. Water , calcium and magnesium

B. Starch , potassium and chloride ions

C. Malate , sodium and potassium ions

D. Malate , potassium and chloride ions

Answer: D

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33. The movement of water from one cell of the cortex to the adjacent one in roots is due to

A. Accumulation of inorganic salts in the cells

B. Accumulation of organic compounds in the cells

C. Water potential gradient

D. Matrix potential gradient

Answer: C

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34. Which of the following is the most accepted theory for movement of water through plants ?

A. Cohension tension theory

B. Capillarity

C. Imbibition theory

D. Root pressure

Answer: A

Watch Video Solution

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

A. Cytoplasmic streaming

B. Root pressure and transpiration pull

C. P-proteins

D. Mass flow involving a carrier and ATP

Answer: D

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36. Loading of phloem is related to

A. Increase of sugar in phloem

B. Elongation of phloem cell

C. Separation of phloem parenchyma

D. Strengthening of phloem fiber

Answer: A

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37. Bidirection translocation of minerals takes place in

A. Parenchyma

B. Cambium

C. Xylem

D. Phloem

Answer: D

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Assignment Section D Assertion Reason Type Questions

1. A : Xerophytes have high water retaining capacity .

R: They have high OP .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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2. A : There is indirect relationship between rate of respiration and water absorption

R : Increased metabolism increases mineral uptake .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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3. A : Root pressure is dynamic and is always a positive hydrostatic pressure .

R : It is universal phenomenon and develops under absorption lag.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: C

Watch Video Solution

4. A : Stomata have delegated the task of providing food while preventing thirst .

R : They are made for gaseous exchange .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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5. A : During stomatal opening there is relative change in TP of guard cell and subsidiary cell.

R: TP of subsidiary cell decreases during opening and that of guard cells increase .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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6. A : Pumps are proteins that use energy to transport substances .

R : Pumps are highly specific like enzyme .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: B

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7. A : Endodermis onwards movement of water occurs through living part of cell.

R: Inner boundary of cortex possess impermeable band of lignified matrix .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: C

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8. Water is transient in plants, less than 1 percent of the water reaching the leaves is used in photosynthesis and plant growth.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: C

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9. A : The translocation in phloem is bidirectional .

R : The source and sink relationship is variable .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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10. A : Most minerals must enter the root by active absorption into the cytoplasm of epidermal cells.

R : Minerals are present in the soil as charged particles.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are true but the reason is not the correct explanation of the assertion, then mark (2)

C. Assertion is true statement but Reason is false, then mark (3)

D. If both Assertion and Reason are false statements , then mark (4)

Answer: A

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