

GPLUS EDUCATION

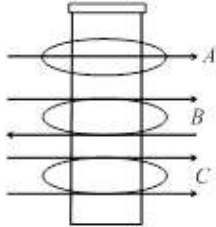
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BIOLOGY

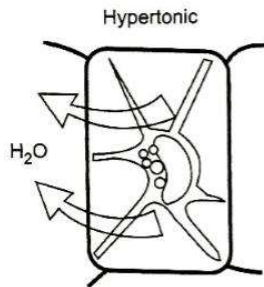
TRANSPORT IN PLANTS

Single Correct Answer Type

1. The given diagram shows cotransport method of two molecule. Labelled it correctly and choose the correct option accordingly

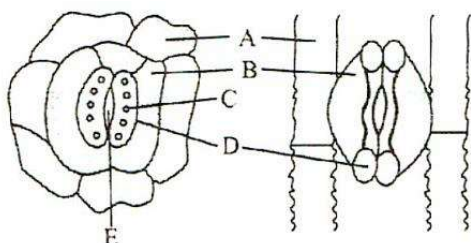


- a) A-Uniport, B-Symport, C-Antiport
b) A-Uniport, B-Antiport, C-Symport
c) A-Symport, B-Uniport, C-Antiport
d) A-Antiport, B-Uniport, C-Uniport
2. What are the aquaporins in facilitated diffusion process?
a) Membrane proteins b) Carrier proteins c) Channel proteins d) Carrier lipids
3. Which of the following osmotic situations does the figure demonstrate?



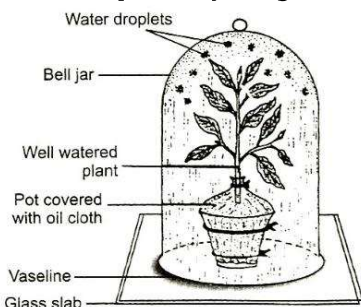
- a) Plasmolysis
b) Turgid
c) Reverse plasmolysis
d) Diffused
4. Read the following statement and choose the correct one from the codes given below
- I. The apoplastic movement of water takes place exclusively through intercellular spaces and cell wall without crossing any membrane
- II. Symplastic movement occurs from cell to cell through plasmodesmata, *i. e.*, adjacent cells are connected through plasmodesmata
- III. Permeability of a membrane depends on its composition and chemical nature of the solute
- IV. Solute present in a cell increases the free energy of the water or water potential
- a) I, II and III b) I, II and IV c) II and IV d) I and IV
5. When sugars enter sieve tubes, water flows by osmosis, resulting in
- a) Water potential b) Osmotic gradient c) Turgor pressure d) DPD
6. The evaporative loss of water from the exposed part of plant is called
- a) Transpiration b) Guttation c) Loss of water d) Water bleeding
7. Which one of the following is not related to guttation?

- a) Water is given out in the form of droplets b) Water given out is impure
 c) Water is given out during daytime d) Guttation is of universal occurrence
8. Whose water potential is less than water potential of root hair during the water absorption by root hair?
 a) Gravitational water b) Soil solution c) Pure water d) Vacuolar sap
9. A thin film of water is held by the soil particles under the influence of internal attractive force. It is called
 a) Hygroscopic water b) Gravitational water
 c) Combined water d) Capillary water
10. Study the following statement and choose the correct option(s) from the codes from below
 I. Root pressure provides a light push in the overall process of water transport
 II. Root pressure causes the flow of water faster through xylem than it can be lost by transportation
 III. In symplast pathway, water move exclusively through the cell wall and intercellular spaces
 IV. Guttation is a cause of transpiration pull
 V. Most plants fulfill their water requirement by transpiration pull
 a) I, II and III are correct while IV and V are incorrect
 b) IV and V are correct while I, II and III are incorrect
 c) I and V are correct
 d) II and III are correct while I, IV and IV are incorrect
11. What is required for the transport of substances through a membrane from a region of lower concentration to higher concentration?
 a) Input of energy b) Output of energy c) Facilitated diffusion d) Nothing is required
12. Which of the following statement is correct?
 a) $DPD = OP - WP$ b) $DPD = OP + WP$ c) $DPD = WP - OP$ d) $DPD = TP + OP$
13. Choose the correct combination of labeling of stomatal apparatus of dicot and monocot leaves



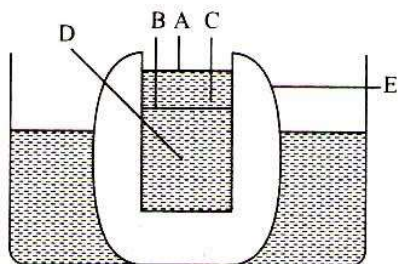
- a) A-Epidermal cells B-Subsidiary cells C-Chloroplast D-Guard cells E-Stomatal aperture
 b) A-Epidermal cells B-Guard cells C-Chloroplast D-Subsidiary cells E-Stomatal aperture
 c) A-Epidermal cells B-Subsidiary cells C-Chloroplast D- Stomatal aperture E- Guard cells
 d) A- Subsidiary cells B- Epidermal cells C-Chloroplast D- Stomatal aperture E- Guard cells
14. In a plant organ, which is covered by periderm and in which the stomata are absent, some gaseous exchange still takes place through
 a) Aerenchyma b) Trichomes c) Pneumatophores d) Lenticels
15. Identify the correct statements from the following:
 I. Accumulation of K^+ ions in the guard cells does not require energy.
 II. A high pH favours stomatal opening.
 III. Movement of chloride ions into the guard cells accrues in the response to the electrical differential created by K^+ ions.
 IV. With the entry of several K^+ ions and chloride ions, the water potential of guard cells increases.
 a) I and III b) I and II c) II and III d) III and IV
16. Which one of the following is the reason for higher rate of transpiration in *Sorghum* as compared to maize?

- a) Increased shoot/root ratio
 b) Increased rate of respiratory quotient
 c) Increased rate of photosynthesis
 d) Decreased shoot/root ratio
17. If turgidity of a cell surrounded by water increases, the wall pressure will
 a) Increase b) Decrease c) Fluctuate d) Remain unchanged
18. In plants; which of the following are/is translocated through phloem?
 a) Hormones b) Amino acids c) Sugars d) All of these
19. Root pressure is due to
 a) Diffusion b) Passive transport c) Active transport d) Osmosis
20. What is depicted by the given diagram below?



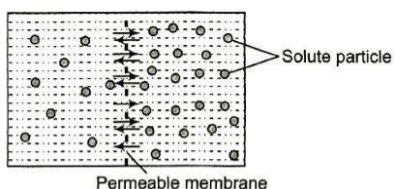
- a) Measuring the rate of transpiration b) Demonstration of ascent of sap
 c) Demonstration of transpiration d) Both (a) and (c)
21. Choose correct statements regarding the flow of sap in xylem?
 I. Flow is driven by higher concentration of sugar in the vessel elements
 II. Flow from root to twigs and leaves would be reduced if leaves are removed
 III. In the morning, sap begins to flow first in the twig then in trunk
 IV. Rapid flow of water put tissues under pressure much more than atmospheric pressure
 a) I and IV b) II and III c) I, II, III and IV d) No one is correct
22. Stomatal opening is regulated by
 a) Light b) Temperature
 c) Atmospheric humidity d) Wind
23. The direction of movement in phloem is ...A... and that of xylem is ...B....
 Choose the correct pair of options
 a) A-downwards; B-downwards b) A-only upwards; B-only downward
 c) A-unidirectional; B-bidirectional d) A-bidirectional; B-unidirectional
24. Which of the following theories for ascent of sap was proposed by an eminent Indian scientist J C Bose?
 a) Pulsation theory b) Relay pump theory
 c) Transpiration pull theory d) Root pressure theory
25. The potential energy of water is referred as
 a) Water potential b) Osmotic potential c) Gravity potential d) Pressure potential
26. If two solutions have the same osmoregularity, they are said to be
 a) Hypertonic b) Hypotonic c) Isotonic d) None of these
27. Plant obtain carbon and most of their oxygen from
 a) Soil b) Water
 c) CO₂ from the atmosphere d) Symbiotic organisation
28. When plant cell is kept in saline drip, cell
 a) Decrease in size b) Bursts out c) Increase in size d) Unchanged
29. Carrier protein, which allows the diffusion of two type of molecules in the same direction is
 a) Symport b) Antiport c) Both (a) and (b) d) Uniport
30. Hydroponics is the method of

- a) Water conservation
 c) Plant development without soil
 b) Plant development in water without soil
 d) Plant development in saline soil
31. Imbibition is always accompanied by swelling or increase in the volume of imbibant However, the increase in the volume of the imbibant is
 a) More than the volume of water imbibed
 b) Same as the volume of the water imbibed
 c) Less than the volume of the water imbibed
 d) Depends upon the type of imbibant
32. Which of the following is responsible for the transport of water and minerals from roots to stems, leaves, flowers and fruits in rooted plants?
 a) Xylem
 b) Phloem
 c) Either (a) or (b)
 d) Both (a) and (b)
33. Loss of liquid water by guttation occurs through
 a) Hydathodes
 b) Stomata
 c) Cuticle
 d) Bark
34. The process by which water is absorbed by solids like colloid causing them to increase in volume, is called
 a) Osmosis
 b) Plasmolysis
 c) Imbibition
 d) Diffusion
35. Choose the correct combination of labeling of the potato osmoscope experiment.

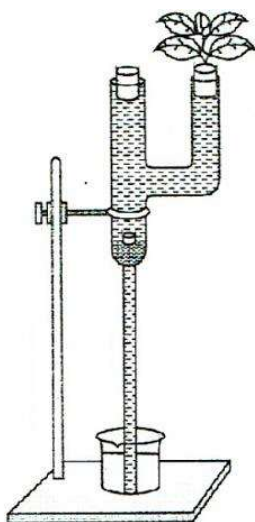


- a) A-Final level
 C-Initial level
 E-Potato tuber
 b) A-Initial level
 C-Final level
 E-Potato tuber
 c) A-Final level
 C-Initial level
 E-Potato tuber
 d) A-Final level
 C-Initial level
 E-Container
- B-Dotpin
 D-Sugar solution
36. How will you distinguish between the method of transport between xylem and phloem?
 a) Active transport move xylem but not phloem sap
 b) Transport, in xylem is unidirectional and saps move upward, while phloem sap moves ups and down
 c) Transpiration does not move xylem sap, but it moves phloem saps
 d) Transport of substances take place from source to sink by both the tissues
37. Which one of the following is not an antitranspirant?
 a) PMA
 b) BAP
 c) Silicon oil
 d) Low viscosity
38. Statoliths are involved in
 a) Phototropism
 b) Hydrotropism
 c) Chemotropism
 d) Gravitropism
39. In plasmolysed cell, the space between nucleus and plasma membrane is occupied by
 a) Hypotonic solution
 b) Hypertonic solution

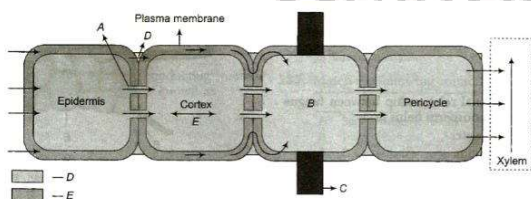
- c) Isotonic solution
d) Air
40. The sugarcane plant has
a) Dumb bell-shaped guard cells
b) Pentamerous flowers
c) Reticulate venation
d) Capsular fruits
41. Water potential and osmotic potential of pure water is
a) Zero and zero
b) 100 and zero
c) 100 and 100
d) Zero and 100
42. When pea seeds and wheat seeds are put in water, which of the two will imbibe more water?
a) Wheat seeds
b) Pea seeds
c) Both will imbibe equal amount of water
d) Pea seeds imbibe water only at alkaline pH
43. Nyctinasty and seismonasty in plants like bean and touch me not are produced due to
a) Reversible osmotic potential in the cells
b) Reversible turgor pressure in the cell of their pulvini
c) Due to less pressure potential in the cells
d) Presence of less turgidity in the cells
44. Following statements are related with the diffusion of coloured molecules across a membrane. Select the correct statement, which shows the fastest rate of diffusion?
a) An internal concentration of 15% and external concentration of 10%
b) An internal concentration of 25% and external concentration of 50%
c) An internal concentration of 50% and external concentration of 25%
d) Both (b) and (c) shows fastest rate of diffusion
45. Choose the false statement
a) If bark of tree is girdled from main stem, the plant dies because ascent of sap is stopped
b) If xylem is girdled from main stem, wilting of leaves takes place
c) In the flowering plant food is transported in the form of disaccharide sucrose
d) In Girdling experiment, in a plant, root dies first
46. Sunken stomata is found in the leaves of
a) *Trifolium*
b) *Lemma*
c) *Nerium*
d) *Lilium*
47. Who proposed cohesion theory of water movement in plants?
a) JC Bose
b) Priestly
c) Dixon and Jolly
d) TV Englemann
48. Study the following picture and the statements given below and choose the correct option



- I. The above diagram shows the net movement of water from the dilute to concentrated solution
II. The two solutions are separated by a differentially permeable membrane
III. Water molecule strikes the membrane randomly on both the sides and pass through the same
IV. Diffusion of water does not occur from its lower chemical potential to higher chemical potential
- a) I, II, III and IV
b) I, II and III
c) I, II and IV
d) I and IV
49. Read the following statements and choose the correct option given below
I. Major account of transpiration takes place through surface/margin of leaves
II. A little amount of water is lost through stem, this is referred to as cauline transpiration
III. Transpiration is comparatively a slow process than evaporation
IV. Transpiration driven ascent of sap does not depend on cohesion, adhesion and surface tension properties of water
- a) I, II, III and IV
b) I, III and II
c) I, II and IV
d) II, III and IV
50. Direction of translocation of organic food or solutes, is
a) Upward
b) Downward
c) Radial
d) All of these

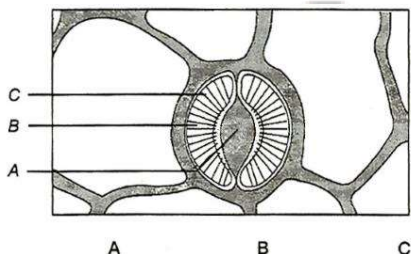


- a) The demonstration of development of suction force due to transpiration
 b) Measuring the rate of transpiration
 c) The demonstration of ascent of sap
 d) The demonstration of anaerobic respiration
62. Arrange the events of opening stomata in correct sequence and choose the correct option accordingly
- I. Lowering of osmotic potential of guard cells
 - II. Decline in guard cell solute
 - III. Rise of potassium ion level in guard cells
 - IV. Guard cells absorb water from neighbouring epidermal cells
 - V. Guard cells become flaccid
 - VI. Guard cells swells and make a pore between them
- a) III, I, IV, V b) I, II, III, IV, V, VI c) III, I, IV, VI d) III, I, IV, VI, II, V
63. In the given flow chart, the pathway of water movement is shown from soil to xylem. Identify A-E and choose the correct option accordingly



- a) A-Stomatal pore, B-Endodermis, C-Casperian strip, b) A-Plasmodesmata, B-Palisade, C-Medullary rays, D-Symplast, E-Apoplast
 c) A-Plasmodesmata, B-Endodermis, C-Casperian strip, D-Apoplast, E-Symplast d) A-Stomatal pore, B-Guard cell, C-Medullary rays, D-Apoplast, E-Symplast
64. Water potential increases due to
- a) Addition of solute b) Evaporation
 c) Addition of inorganic substances d) Increase in pressure
65. Why seeds imbibe and swell after keeping in water?
- a) OP inside the seed is low
 b) OP of water is high
 c) Water potential gradient develops between the seed coat and water
 d) Diffusion pressure deficit of seed is very high
66. If you are given a task to analyse phloem sap chemical, which of the following will be present in least concentration?
- a) Water b) Sugar
 c) Minerals and nitrogen d) Hormones

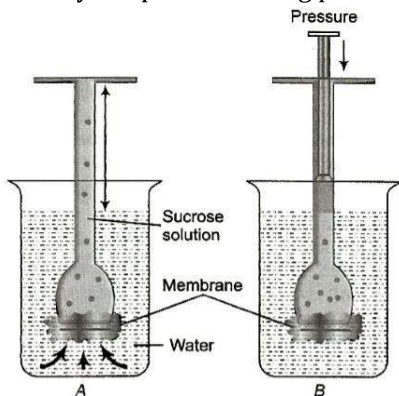
67. Some elements like calcium are not remobilised because they are
 a) Structural component b) Heavy metals c) Less charged d) Macromolecules
68. Movement of molecules in three forms of matter, from a region higher concentration to a region of lower concentration can be termed as
 a) Osmosis b) Passive transport c) Diffusion d) Active transport
69. In plants, water supply is due to
 a) Osmosis b) Imbibitions c) Guttation d) Adhesion force
70. Which part of root absorbs both water and minerals?
 a) Zone of cell differentiation b) Zone of cell formation
 c) Zone of cell elongation d) Terminal portion of root
71. Diffusion pressure deficit is also called
 a) Suction pressure b) Turgor pressure c) Osmotic pressure d) None of these
72. Which of the following transport induces conformational changes in proteins?
 a) Simple diffusion b) Osmosis c) Facilitated diffusion d) Plasmolysis
73. Diffusion, a process occur(s) along the concentration gradient is actively involved in
 a) Transpiration b) Respiration c) Photosynthesis d) All of these
74. Which of the following mechanism can explain the transport of sucrose from source to sink?
 a) Osmotic movement of water into sugar loaded sieve tube cells which create a higher hydrostatic pressure into the source than in the sink
 b) Tension created by differences in pressure potential between source and sink
 c) Active absorption of sucrose through sieve tube membrane driven by a specific pump
 d) Transpiration and active transport of sugar from source to sink
75. Which of the following cells are not related to the structure of stomata?
 a) Sclerenchymatous cells b) Epidermal cells
 c) Guard cells d) Accessory cells
76. Choose the correct option to label A-C in the given diagram of stomatal apparatus



- | A | B | C |
|----------------------------|------------------|--------------------------|
| a) Stomatal aperture | Subsidiary | Guard cells |
| b) Cellulose micro fibrils | Subsidiary cells | Stomatal aperture |
| c) Stomatal aperture | Guard cell | Epidermal cells |
| d) Stomatal aperture | Guard cell | Cellulosic micro fibrils |
77. Water lost in Guttation is
 a) Pure water b) Impure water c) In vapour form d) Either (A) or (B)
78. The approximate length of root hair zone in plants
 a) 1-10 cm b) 1-15 cm c) 1-6 cm d) 1-20 cm
79. When the conditions are dry, a grass leaf curls inward to minimize water loss due to the pressure of
 a) Thick cuticle b) Large xylem cavities
 c) Parallel venation d) Bulliform cells
80. Cell A has $\Psi_w = -3$ bars and cell B has $\Psi_w = -8$ bars. The movement of water will be from
 a) Cell A to cell B
 b) Cell B to cell A

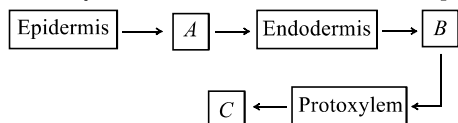
- c) Data insufficient
d) Water can not move in negative value of Ψ_w
81. Transpiration is measured by
a) Photometer b) Porometer c) Auxanmeter d) Respirometer
82. A cell swells up when kept in
a) Hypotonic solution b) Hypertonic solution
c) Isotonic solution d) All of the above
83. Which of the following statements are true/false?
I. The positive hydrostatic pressure is called turgor pressure.
II. Wall pressure exerts to prevent the increase of protoplasm size.
III. Diffusion is more rapid in liquids than in gases.
IV. Diffusion of water through a semi-permeable membrane is called imbibition.
V. Osmosis is movement of substance, which takes place along a diffusion gradient.
a) I and II are true, while III, IV and V are false
b) I and III are true, while II, IV and V are false
c) I and IV are true, while II, III and V are false
d) I and IV are true, while II, III and IV are false
84. When a plasmolyzed cell is placed in a hypotonic solution then water will move inside the cell. Which force causes this?
a) DPD b) OP c) WP d) None of these
85. Which one of the following denotes the water potential of the mesophyll cell in wilted condition?
a) Equal to the value of osmotic potential
b) Equal to the value of pressure potential
c) Greater than the value of its osmotic potential
d) Equal to zero
86. Sugar stored in roots may be mobilised to become a source of food in the
a) Winters b) Early spring c) Summers d) Early summers
87. Choose true and false statements from the following
I. Mycorrhizal association between fungus and root of plant (*Pinus*) is often obligate
II. *Pinus* and orchid seeds can germinate and grow into plant in absence of mycorrhizal association
III. Absorption of water along with mineral solute by root hairs is purely a process of diffusion
IV. In apoplast pathway, movement of water takes place through cell wall and intercellular spaces
V. Fungal hyphae provide sugar and organic internal to root
Choose the correct option
a) I, II and III are true while IV and V are false
b) IV, and V are true while I, II and III are false
c) I and IV are true
d) I, II and V are true
88. Which of the following is the unit of measurement of water potential?
a) Watt b) Joule c) Pascal d) Litre
89. Which type of water is used by the plants?
a) Gravitational water b) Capillary water c) Hygroscopic water d) Bound water
90. Water in the vessel of xylem in tall plant is
a) Pushed
b) Pulled
c) Pulled and pushed
d) First pushed and it is pulled slowly
91. Sunken stomata are usually found in the leaves of

- a) Xerophytes b) Hydrophytes c) Mesophytes d) Sciophytes
92. 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 cells bursting out
c) Diffusion of NaCl into the cell d) Exit of water from the cell
93. Identify the process taking place in the given experimental setup and choose the correct option



- a) Osmosis b) Plasmolysis c) Imbibition d) Diffusion
94. Stomata which can open at night, are present in
- a) Xerophytes b) Gametophytes c) Hydrophytes d) None of these
95. This hormone affects opening and closing of stomata.
- a) Zeatin b) Abscisic acid c) Ethylene d) GA
96. Transport of gases, hormones, photosynthetase and organic solutes in plants is
- a) Multidirectional
b) Unidirectional
c) In two direction
d) First unidirectional then divides to many direction
97. Fensom and Jones suggested, which of the following method for translocation of solute?
- a) Osmosis b) Plasmolysis c) Diffusion d) Electro-osmosis
98. Which statement can be shared by facilitated diffusion and active transport?
- a) Both need carrier transporter, which are sensitive to inhibitors that reacts with protein side chains
b) Energy is required by both the processes
c) No energy expenditure in these processes d) Both use carbohydrates to move molecules across the membrane
99. Which of the following has maximum water potential?
- a) Pure water b) 2% sucrose solution
c) 4% glucose solution d) 10% sodium chloride solution
100. In plants, long distance transport of organic and inorganic substances occur through
- a) Simple permanent tissues
b) Complex permanent tissues
c) Meristematic tissues
d) Epithelial tissues
101. Xylem sap is made up of
- a) Water alone b) Water and minerals c) Minerals alone d) Sugar and water
102. Passive absorption of mineral salts is not dependent on
- a) Diffusion b) Osmosis
c) Donnan equilibrium d) Ionic exchange
103. The pressure exerted by the protoplast due to the entry of water against the rigid cell wall is termed as
- a) Turgor pressure b) Osmotic potential c) Solute potential d) Water potential

104. In the given schematic diagram, pathway of water movement inside the root is shown from soil to xylem. Identify the tissue involved in the steps A-C and choose the correct option accordingly



- a) A-Hypodermis, B-Medullary rays, C-Metaxylem
 b) A-Cortex, B-Pericycle, C-Metaxylem
 c) A-Pericycle, B-Cortex, C-Metaxylem
 d) A-Hypodermis, B-Cortex, C-Vascular tissues
105. Some statements are given regarding the active transport in plants. Choose the incorrect statement
 a) Active transport need energy to pump molecules against the concentration gradient
 b) It is carried out with the help of membrane protein
 c) Due to more concentration of charged particles in soil then the concentration in roots, active absorption of mineral takes place
 d) All of the above
106. Root endodermis has the ability to actively transport ions ...A... because of ...B... . Choose the correct pair
 a) A-bidirectionally; B-plasmodesmata
 b) A-undirectionally; B-casparion strips
 c) A-undirectionally; B-plasmalemma
 d) A-bidirectionally; B-casparion strips
107. The shape of guard cells in stomata in sugarcane plant is
 a) Dumb bell-shaped b) Bean shaped c) Horse shoe shaped d) Irregular shaped
108. Plants develops force for upward conduction of water against gravity is derived from
 a) Photosynthesis process b) Transpiration
 c) Root pressure d) Both (b) and (c)
109. How translocation of organic material is explained in plants?
 a) By transpiration pull/cohesion adhesion theory
 b) Imbibition theory
 c) Mass flow hypothesis
 d) Root pressure theory
110. Two cell (A and B) have osmotic potential and pressure potential – 18 bars and 8 bars, and – 14 bars and 2 bars respectively. What will be the direction of water flow?
 a) From cell A to cell B b) Flow of water does not takes place
 c) In both direction d) From cell B to cell A
111. Which one of the following acts as a barrier in a apoplastic pathway?
 a) Epidermis b) Plasmodesmata c) Casparian strips d) Metaxylem
112. Go through the following pairs and choose the correct pairs from the option given below
- | | | |
|-----------------------|----------------|--|
| I. <i>Nerium</i> | Sunken stomata | lower epidermis of leaves to reduces loss of water |
| II. <i>Calotropis</i> | Non-succulent | Root cells with thickened cell walls |
| III. <i>Peperomia</i> | Leaf succulent | Leaf epidermal cell, store water |
| IV. <i>Ammophila</i> | Dicot | Curl their leaves to minimise loss of water |
| V. <i>Tribulus</i> | Ephemeral | Water is stored in stem |
- a) All pairs are correct b) I, II and III are correct pairs
 c) IV and V pairs are correct d) I, IV and V are correct pairs only
113. Which pathway applies least resistance to the movement of water?
 a) Apoplast pathway
 b) Symplast pathway

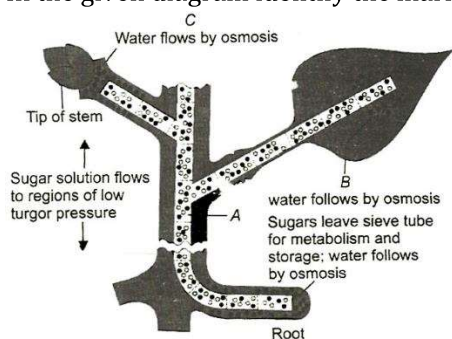
- c) Trans membrane pathway
d) Vacuolar pathway
114. Examples of bulk flow by a positive hydrostatic pressure gradient and a negative hydrostatic pressure gradient are
a) Suction through straw and swelling of wood, respectively
b) Imbibition and a garden hose
c) Garden hose and suction through a straw, respectively
d) Swelling of wood and imbibition, respectively
115. During flowering, fruit ripening and development period in plants, which part of the plant act as source?
a) Whole plant
b) Stem and leaves and the plant
c) Photosynthesising leaves and older leaves
d) Growing parts of the plants
116. Plants growing on hills are likely to show
a) Higher rates of transpiration
b) Lower rates of transpiration
c) Same rate of transpiration as in plains
d) Lower rates of transpiration provided the stomata are sunken
117. The transport of ions up the stem to all parts is through
a) Transpiration stream b) Mass flow c) Diffusion d) None of these
118. How much of absorbed water is lost during transpiration in a plant?
a) 99% b) 98-99% c) 99.9% d) 90-95%
119. Which one of the following is part of symplast?
a) Cytoplasm b) Protoplast c) Plasmodesmata d) All of these
120. The real forces responsible for the movement of water from one cell to another cell is mainly
a) Osmotic pressure b) Turgor pressure
c) Diffusion pressure deficit d) Imbibitions
121. Water occur freely in previous rocks and deep in soil above the impermeable strata is
a) Ground water b) Soil water c) Deep stratum water d) Hygroscopic water
122. A twig kept in water having some salt remains fresh for longer period due to
a) Decrease in bacterial degradation b) Exosmosis
c) Decrease in transpiration rate d) Absorption of more water
123. If stem of plant is cut under a state of tension in xylem sap, what will be the result?
a) The xylem sap sprout out b) Xylem sap will accumulate at cut surface
c) The cut surface will form air bubbles, when placed d) Air will be pulled into the xylem in water
124. One factor responsible for water rise up to 100 m of tall plant, is
a) Root pressure b) Transpiration pull c) Pulsation d) Diffusion
125. Read carefully the following statements and choose the right answer from the options given below
I. Diffusion is a slow process and it do not depends upon the living system
II. Usually process of diffusion does not need energy
III. Diffusion can occur from one part of a cell to another part of the same cell or from one cell to another and from one tissue to another tissue
IV. Diffusion is a rapid process over short distance, but extremely slow over long distances
a) I and III b) I and II c) III and IV d) I, II, III and IV
126. Tension, one of the important factor in the movement of xylem sap in a tree is a result of
a) Cohesive nature of water b) Capillary size of xylem tube
c) Transpiration at the leaf surface d) All at the above
127. What is the approximate dry weight contained by majority of herbaceous plants?

- a) Ground 50% of fresh weight
 b) 31% of fresh weight
 c) About 10-15% of fresh weight
 d) Exactly 29% of dry weight
128. Root hair absorb water from the soil on account of
 a) Turgor pressure b) Osmotic pressure c) Suction pressure d) Root pressure
129. The space between the plasma membrane and the cell wall of a plasmolyzed cell surrounded by a hypertonic solution is occupied by the
 a) Hypotonic solution b) Isotonic solution c) Hypertonic solution d) Water
130. The first process by which water enters into the seed coat when a seed is placed in suitable environment for germination is
 a) Osmosis b) Active transport c) Absorption d) Imbibitions
131. The osmotic potential and pressure potential of three cells (A, B, C) located in different parts of an actively transpiring plant are given below.

Cell	Osmotic Potential (MPa)	Pressure Potential (MPa)
A	-0.87	0.44
B	-0.92	0.34
C	-0.68	0.27

Identify these three cells as root hair, root cortical and leaf mesophyll cells respectively. The correct answer is

- a) A, B, C b) A, C, B c) C, A, B d) B, C, A
132. In tall plants, because of which factor, continuous water column extends upward?
 a) Atmospheric pressure b) Osmotic pressure
 c) Suction pull d) Root pressure
133. In the given diagram identify the marked phenomenon/part and choose the correct option accordingly



- a) A-Phloem, B-Sugar leaves sieve tube, C-Sugar enters sieve tube
 b) A-Xylem, B-Sugars leaves sieve tube, C-Sugar enters sieve tube
 c) A-Phloem, B-Sugar enters sieve tube, C-Sugars leaves sieve tube
 d) A-Xylem, B-Sugar enters sieve tube, C-Sugars leaves sieve tube
134. What will happen, if a large amount of water enters in a plant cell?
 a) TP of cell gets reduced b) TP opposes the entry of water
 c) Water potential of the cell become more negative d) Water potential of the cell increases simultaneously
135. Identify true and false statements and select the correct option from the codes given below
 I. As suction pressure increases, water absorption also increases which in turn increases the absorption of ions
 II. Absorption of ions is affected by transpiration pull
 III. Large amount of charged particles are absorbed along with absorption of water
 IV. Pressure flow hypothesis depends entirely on the existence of mechanism for loading sugars into phloem at the source region and unloading it at the sink

- V. Contents in the sieve tube move unidirectionally
 a) I, II, III and IV are true while V as false
 c) I, II, IV and V are true while III is false
- b) I, III, IV and are true while II is false
 d) II, III, IV and V are true while I is false
136. Opening of stomata is not affected by
 a) N₂ b) K⁺ ions c) Starch d) None of these
137. Osmosis involves flow of
 a) Water without a membrane
 b) Solute from a semi-permeable membrane
 c) Solvent (H₂O) through a semi-permeable membrane
 d) None of the above
138. Cohesion force, a feature of cohesion theory is also called
 a) Tensile strength b) Surface tension c) Mutual force d) Transpiration pull
139. A plant cell becomes turgid due to
 a) Plasmolysis b) Exosmosis c) Endosmosis d) Electrolysis
140. Which of the following experiments is called physiological demonstration of osmosis?
 a) Thistle funnel, whose mouth is tied with egg membrane
 b) Thistle funnel, whose mouth is tied with parchment paper
 c) Photometer
 d) Bell jar experiment
141. Which of the following statements is/are true?
 I. The apoplastic movement of water occurs exclusively through the cell wall without crossing any membranes.
 II. Solutes present in a cell (or in any solution) increase the free energy of water or water potential.
 III. The symplastic movement occurs from cell to cell through the plasmodesmata.
 IV. Membrane permeability depends on the membrane composition, as well the chemical nature of the solute.
 a) I and II only b) II and IV only c) I, III and IV only d) I, II and IV only
142. Which of the following maintains the shape of cell?
 a) Osmotic pressure b) Turgor pressure c) Wall pressure d) Osmosis
143. Consider the following statements and choose the correct answer
 I. Carrier proteins are needed by both facilitated diffusion and active transport and are sensitive to inhibitors that react with protein side chain
 II. Different types of proteins present in the membrane plays a major role in both active as well as passive transport
 III. The carrier proteins needed by facilitated and active transport are specific
 IV. There is no need of energy to pump molecule against a concentration in active transport
 V. Transport rate reaches to saturation point, when all the active proteins are used
 a) I, II, III, IV and V b) I, II and III c) V, IV and I d) I, II, III and V
144. Root hair absorbs water from soil through
 a) Turgor pressure b) Ion exchange c) Osmosis d) DPD
145. Which type of soil has least water retaining capacity?
 a) Sandy soil b) Black or alluvial soil c) Laterite soil d) Loam soil
146. Phloem sap is mainly and Choose the correct pair of options?
 a) Water, sucrose b) Sugars, water c) Sucrose, sugars d) Amino acids, sugars
147. Passive absorption of water by the root system is the result of
 a) Forces created in the cells of the root b) Increased respiratory activity in root cells

- I. Sugars are transported from cell to cell in the leaf
 II. Food is synthesised in form of glucose by leaf cells
 III. Movement of water takes place into sieve tube elements
 IV. Downward movement of sugar occurs in the stem
 V. Solutes are actively transported into the sieve elements
- a) I, II, III, V, IV b) II, I, V, III, IV c) II, III, I, V, IV d) I, II, V, IV, III
157. Which of the following lacks stomata?
 a) Aquatic plants with floating leaves b) Xerophytes
 c) Aquatic submerged plants d) Sciophytes
158. Guard cells control
 a) Intensity of light entering b) Photosynthesis
 c) Closing and opening of stomata d) Change in green color
159. Wilting occurs when
 a) Rate of transpiration is higher than absorption
 b) Rate of absorption is higher than transpiration
 c) Excess root pressure
 d) High relative humidity in air
160. Which among the following represents the correct relationship for a plasmolysed cell?
 a) $\Psi_W = \Psi_S + \Psi_P$ b) $\Psi_S = \Psi_W + \Psi_P$ c) $\Psi_W = \Psi_S$ d) $\Psi_W = \Psi_P$
161. Water in the soil available to plants is
 a) Gravitational water b) Capillary water c) Hygroscopic water d) None of these
162. If two types of seeds, like pea and maize are kept in water at the same time. Which among the two will imbibe more water?
 a) Maize seed
 b) Pea seed
 c) Both imbibe equal amount of water
 d) Pea seed imbibe more water only at alkaline pH
163. The magnitude of root pressure ranges between
 a) 2-5 atm b) 1-5 atm c) 0.1-0.2 atm d) 4-6 atm
164. Read the following statements regarding porins and select the correct option given below
 I. Porins are transport proteins
 II. Channel proteins are a type of transport protein, which are usually gated
 III. Carrier protein binds the particular solute to be transported
 IV. Particular solute is delivered to the other side of the membrane by carrier proteins
 a) I, II and III b) I, III and IV c) I, II, III and IV d) I and IV
165. RBC and a plant cell (with thick cell wall) are placed in distilled water. The solute concentration is the same in both the cells. What changes would be observed in them?
 a) Both plant cell and RBC would not undergo any change
 b) The RBC would increase in size and burst, while the plant cell would remain about the same size
 c) The plant cell would increase in size and burst, while the RBC would remain about the same size
 d) Both plant cell and RBC would decrease in size and collapse
166. Osmotic pressure is highest in which of the following plant type?
 a) Mesophytes b) Xerophytes c) Halophytes d) Hydrophytes
167. When a cell is plasmolysed, it becomes
 a) Flaccid and its TP becomes zero b) Turgid and its becomes zero
 c) Turgid and TP becomes equal to OP d) Flaccid and DPD becomes zero

168. Water is lost in a liquid state in some plants through hydathodes. These hydathodes
- Remain closed at night
 - Remain closed during day
 - Remain always open
 - Do not show any specificity in opening and closing
169. Cell-A has osmotic potential of -18 bars and pressure potential of 8 bars, whereas, cell-B has osmotic potential of -14 bars and pressure potential 2 bars. The direction of flow of water will be
- From cell-B to cell-A
 - From cell-A to cell-B
 - No flow of water
 - In both the directions
170. Which type of transpiration continues throughout day and night?
- Cuticular transpiration
 - Lenticular transpiration
 - Bark transpiration
 - All of these
171. The first process responsible for the entry of water into a seed, when it is placed in a suitable environment for germination is
- Absorption
 - Imbibition
 - Active transport
 - Osmosis and diffusion
172. Read the given statements regarding the different stages of plasmolysis and choose the correct option
- I. First stage of plasmolysis, when osmotic concentration of cell sap is just equivalent to that of external solution
- II. Protoplast withdraws itself from corners of the cell wall
- III. Protoplast gets detached from the cell wall and attains a spherical shape
- | I | II | III |
|--------------------------|-----------------------|-----------------------|
| a) Incipient plasmolysis | Limiting plasmolysis | Evident plasmolysis |
| b) Limiting plasmolysis | Incipient plasmolysis | Evident plasmolysis |
| c) Limiting plasmolysis | Evident plasmolysis | Incipient plasmolysis |
| d) Evident plasmolysis | Incipient plasmolysis | Limiting plasmolysis |
173. Water composition in a water-melon is approximately
- 95%
 - 97%
 - 90%
 - 92%
174. The membrane, which allows passage of certain substances more readily than others is termed as
- Permeable
 - Selectively permeable
 - Semi-permeable
 - Impermeable
175. Which one of the following is not a part of symplast?
- Cell wall
 - Plasma membrane
 - Plasmodesmata
 - Cytoplasm
176. What is mandatory in the process of facilitated diffusion?
- Presence of concentration gradient
 - A carrier protein
 - A hydrophilic moiety
 - All of the above
177. A special type, which occurs when water is absorbed by solids causing them to increase in volume is called
- Osmosis
 - Translocation
 - Imbibition
 - Transpiration
178. Which of the following does not affect water potential of water?
- Concentration of dissolved substances
 - Atmospheric pressure
 - Gravitation
 - Capillarity
179. Study the following pairs.
- VI. Peperomia Leaf succulent Leaf epidermal cells store water.

- VII. Calotropis Non-succulent Root cells with thickened cell walls.
 VIII. Tribulus Ephemeral Stem stores water.
 IX. Ammophila Dicot plant Rolling in of leaves to check water loss

Identify the correct pair of answer.

- a) I, II b) I, III c) II, III d) II, IV

180. Consider the following statements and choose the correct option from codes given below

- I. Loading of phloem is related to increase of sugar in phloem
 II. Active loading of sugar in sieve tube of phloem is driven by proton pump
 III. Pressure may be positive or negative in sieve tube cells
 IV. Water and solutes move through the sieve tube against pressure gradient
 V. Cytoplasmic strand passes through the holes in sieve plates and form continuous filaments

- a) I, II, V are incorrect, while III and IV are correct
 b) III and IV are incorrect while I, II and V are correct
 c) I, II and III are incorrect while IV and V are correct
 d) IV and V are incorrect while, I, II and III are correct

181. Path of water movement from soil to xylem is

- a) Soil→root hair→cortex→ pericycle → endodermis →metaxylem→protoxylem
 b) soil→root hair→cortex→endodermis→pericycle→protoxylem→metaxylem
 c) soil→root hair→epidermis→endodermis→phloem→xylem
 d) soil→root hair→epidermis→cortex→phloem→xylem

182. The stomata in CAM plants open during

- a) Day b) Night c) Day and night d) Always closed

183. What will be the effect of accumulation of potassium ions in guard cells?

- a) Decrease in turgor pressure b) Exosmosis
 c) Increase in water potential d) Decrease in water potential

184. Through which process, starch of the guard cell is converted into PEP ions?

- a) Dephosphorylation b) Decarboxylation c) Hydrolysis d) Oxidation

185. Which one of the following does not help in molecular transport?

- a) Diffusion b) Osmosis c) Surface tension d) Active transport

186. Ascent of sap is

- a) Active and requires energy expenditure by the soil b) Passive, and no requirement of energy by the plants
 c) Active and requires energy expenditure by the plants d) Passive unless soil is dry

187. Passage cells are thin-walled cells found in

- a) Endodermis of roots facilitating rapid transport of water from cortex to pericycle
 b) Phloem elements that serve as entry points for substances for transport to other plant parts
 c) Testa of seeds to enable emergence of growing embryonic axis during seed germination
 d) Central region of style through which the pollen tube grows towards the ovary

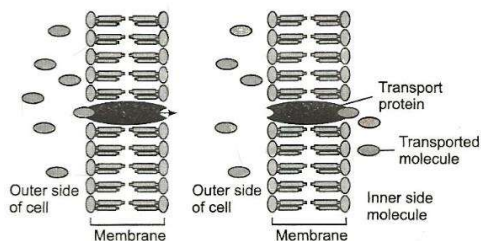
188. The term apoplast signifies

- a) Cell wall, intercellular space and water filled channel b) Protoplasts inter connected by plasmodesmata
 c) Cell wall, cytoplasm and central vacuole d) None of the above

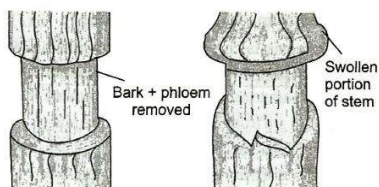
189. Select the correct option in reference with the statements given below

- I. Facilitated diffusion cannot cause net transport
 II. Transport rate in case of facilitated diffusion never reaches to a maximum level
 III. Facilitated transport is selective to inhibition proteins
 IV. Concentration gradient is not required in case of facilitated diffusion

- a) II and IV b) I, II, III and IV c) I and III d) None of these
190. Osmotic pressure of a solution is
 a) Greater than pure solvent b) Less than pure solvent
 c) Equal to pure solvent d) Less than or greater than pure solvent
191. Potometer works on the principle of
 a) Amount of water absorbed equals the amount transpired
 b) Osmotic pressure
 c) Root pressure
 d) Potential difference between the tip of the tube and that of the plant
192. In which of the following path, flow of water occurs from cell to cell through their protoplasm?
 a) Apoplast pathway b) Symplast pathway
 c) Both (a) and (b) d) Transmembrane pathway
193. Transport of minerals through xylem is
 a) Active and energy is provided by ATP b) Passive and no energy is provided
 c) Active and no requirement of energy d) Passive and energy is provided by ATP
194. Mechanism of opening and closing of stomata is controlled by
 a) Guard cells b) Accessory cells c) Epidermal cells d) None of these
195. Stomata are also called as
 a) Stomates b) Lenticels c) Hydathodes d) Bark
196. Identify the following process and choose the correct option



- a) Simple diffusion b) Facilitated diffusion c) Osmosis d) Deplasmolysis
197. The diagram given below represents the simple ringing or girdling experiment. Bark containing phloem is removed. This experiment proves and justify that phloem is the path for translocation of food. In the given diagram, swollen part of stem has been indicated. What is cause of swollen part?



- Choose the correct option
- a) Accumulation of food material just above the ringing space
 b) Accumulation of minerals and water just above the ringing space
 c) A repairing mechanism is taken
 d) Injured part undergo turgor change
198. Hydathodes are also called
 a) Water stomata b) Sunken stomata c) Guard cells d) Subsidiary cells
199. What happens when concentration of solutes decreases in guard cells?
 a) Water potential increases b) Osmotic pressure increases
 c) Water potential decreases d) None of the above
200. During water absorption from the soil, the water potential of the root cell is.....than the soil
 a) Higher b) Lower c) Slightly higher d) Slightly lower

201. Water potential gradient can be best defined as
 a) Pressure gradient minus water potential
 b) The overall movement of water
 c) Evaporation of water from stem and leaves
 d) The overall movement of solutes
202. Humidity in atmosphere decreases rate of
 a) Transpiration b) Photosynthesis c) Glycolysis d) Growth
203. Guard cells help in
 a) Protection against grazing b) Transpiration
 c) Guttation d) Fighting against infection
204. Both minerals and water are absorbed by
 a) Zone of elongation in root
 b) Growing point in root
 c) Root hair zone
 d) Zone of mature cells
205. Fensom and Jones suggested which of the following method for translocation of solute?
 a) Osmosis b) Plasmolysis c) Diffusion d) Electrosmosis
206. Mycorrhiza, a mutual relationship between fungus and a root of gymnosperm helps in
 I. absorption of water
 II. mineral absorption
 III. translocation
 IV. gaseous exchange
 Choose the correct option
 a) Only I b) II and I c) III and IV d) Only II
207. Which of the following pair is selective and specific mode of transport?
 a) Passive transport and active transport
 b) Passive transport and facilitated diffusion
 c) Facilitated diffusion and active transport
 d) Simple diffusion and facilitated diffusion
208. Consider the following statements and choose the correct answer from the options given below
 I. A dry live seed still contains water
 II. A mature maize plant absorbs about 3 L water per day
 III. A mustard plant take up water equal to its weight in about five hours
 IV. Water is not considered as the limiting factor for plant growth and productivity
 a) I, II, III and IV b) IV and II c) I, II and III d) Only IV
209. Which one is true about guttation?
 a) It occurs through specialized pores called hydathodes
 b) It occurs in herbaceous plants when root pressure is low and transpiration is high
 c) It only occur during the day time
 d) It occurs in plants growing under conditions of low soil moisture and high humidity
210. What are the location of casparian strips-which interrupts the movement of water inside a root?
 a) Endodermis b) Pericycle c) Cortex d) Hypodermis
211. Select the correct statement from the following
 a) Only the net direction of osmosis, not the rate of osmosis depends on both the pressure gradient and concentration gradient
 b) The rate of osmosis depends only on pressure gradient
 c) The net direction and rate of osmosis depends upon both the pressure gradient and concentration gradient
 d) The net direction and rate of osmosis do not depend on the pressure gradient and concentration

gradient

212. Which one of the following doesn't help in molecule transport?
 a) Diffusion b) Osmosis c) Surface tension d) Active transport
213. What type of material do not diffuse or find it difficult to pass through the membranes?
 a) Hydrophobic substance
 b) Hydrophilic substances
 c) Inorganic solute
 d) Both hydrophilic and hydrophobic substances
214. When the concentration of the soil solutes is low, the absorption of water
 a) Remains normal b) Is stopped c) Is increased d) Is decreased
215. If sugars are actively moving into a cell, what will happens to the turgor pressure of the cell?
 a) TP increases, due to the entry of water
 b) TP decreases because water exits
 c) TP increases as sugar concentration affects it directly
 d) No effect of sugar concentration of turgidity hence no change
216. Read the following statements and choose the correct answer from the options given below
 a) In the absence of casparian strips, plants are unable to control amount of water and solute it absorbs
 b) Guttation is generally occur during low atmospheric humidity and plentiful soil water
 c) Role of Na^+ in stomatal opening is universally accepted
 d) In CAM, plant stomatal remains open in day and night
217. Movement among cells against concentration gradient is called
 a) Osmosis b) Active transport c) Diffusion d) Passive transport
218. Transport proteins of endodermal cells are ...A... where a plant adjusts the ...B... and ...C... of solutes that reaches the ...D...
 Choose the correct combination of A-D from the given options
 a) A-control points, B-ratio, C-type, D-xylem
 b) A-regulators, B-quantity, C-type, D-phloem
 c) A-control points, B-quantity, C-type, D-xylem
 d) A-regulators, B-quantity, C-size, D-phloem
219. Select the correct events leading to the opening of the stomata.
 I. Decline in guard cell solutes.
 II. Lowering of osmotic potential of guard cells.
 III. Rise in potassium levels in guard cells.
 IV. Movement of water from neighbouring cells into guard cells.
 V. Guard cells becoming flaccid.
 a) I and V b) II, III and IV c) I, III and IV d) II, IV and V
220. Choose, true and false statements from the following and select the correct option from the set (a-d) given below
 I. Diffusion is an important process of transport in plants since it is the only means for gaseous movement within the plant body
 II. In active transport, pumps are proteins that use energy to carry substance across the cell membrane against concentration gradient
 III. In facilitated diffusion, special proteins helps hydrophilic substances to be transported across the membrane
 IV. In diffusion, molecules move against concentration gradient in a random manner
 V. Facilitated diffusion is faster than active transport
 a) I, II, III and IV b) I, II, III are true, while IV and V are false
 c) IV and V are true, while I, II and III are false d) Only II, III, IV are true while I and V are false
221. Which one of the following is the most accepted theory of ascent of sap?

- a) Root pressure theory b) Root pressure theory c) Passive transport d) Cohesion theory
222. At the time of seed germination, when water is absorbed by the seed due to imbibition, the seed coat breaks as it swells to a lesser degree than the kernel because
- a) The kernel is made up of cellulose while the seed coat is made up of proteins lipids and starch b) The kernel is made up of proteins, lipids and starch, while the seed coat is formed of cellulose
- c) Both kernel and seed coat are made up of same constituents, it depends on the nature of medium d) None of the above
223. Unloading of minerals occur at
- a) Apical meristem b) Fine vein ending c) Fruits d) All of these
224. Why the tropical deciduous forest trees shed their leaves?
- a) To save energy b) To protect itself from chat
- c) To enhance rate of respiration d) To prevent loss of water
225. Which of the following affects the rate of diffusion?
- a) Concentration gradient b) Permeability of the membrane
- c) Temperature and pressure d) All of the above
226. A student has taken a twig from a plant. She/he observe a droplet of fluid exuding from the cut surface of twing. What is this fluid?
- a) Plant latex b) Phloem sap c) Xylem sap d) Both (b) and (c)
227. The translocation of organic solutes in sieve tube members is supported by
- a) Root pressure and transpiration pull b) P-proteins
- c) Mass-flow involving a carrier and ATP d) Cytoplasmic streaming
228. Active transport
- a) Releases energy b) Requires energy
- c) Produces ATP d) Produces a toxic substance
229. Some cells are placed in a solution of glucose to measure the rate of diffusion. As the concentration of glucose solution is being increased, the diffusion rate increases simultaneously. However, when the concentration of glucose solution reaches above 10 m, the diffusion rate no longer increases
- Which statement best define the mechanism of glucoses transport in the cells?
- a) Transport of hydrophilic substances along the concentration gradient through fixed membrane transport protein without the involvement of energy expenditure
- b) Transport of hydrophilic substances along and against the concentration gradient *via* carrier proteins
- c) Active transport *via* transporter proteins
- d) Facilitated diffusion without carrier proteins
230. The plants, which are able to send their roots up to the fringe of water table are called
- a) Xerophytic plants b) Terrestrial plants c) Phreatophytes d) Mesophytes
231. Transport of different types of solute substances takes place by
- a) Bulk flow system b) Combind response c) Facilitated diffusion d) Pressured transport
232. Phloem sap is made up of
- a) Water and minerals b) Water and sucrose c) Water and glucose d) Both (b) and (c)
233. Which of the following affect the transport of molecules when carrier mediated facilitated diffusion is involved?
- a) Solubility of molecule in lipids b) Concentration gradient
- c) Availability of carrier molecule d) All of the above
234. Who coined the term diffusion pressure deficit?
- a) Slatyer b) Taylor c) Meyer d) Slatyer and Taylor
235. Which one of the following does not play a major role in upward movement of xylem sap in tall trees?
- a) Transpiration b) Tension
- c) Cohesion and Adhesion d) Plasmodesmata
236. Why the rate of diffusion of a substance along the concentration gradient does not increase continuously,

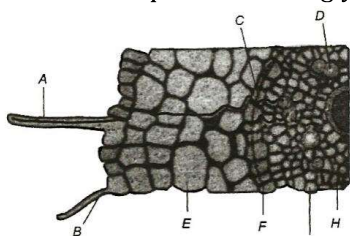
- while the concentration difference of the molecules across the membrane increases?
- Process of facilitated diffusion need ATP
 - As concentration difference increases, molecule interfere with one another
 - 100% saturation of carrier protein after some time
 - Transport proteins must be of channel protein type
237. Which of them is/are correct regarding pressure flow model for translocation?
- Sugar is transported through phloem as glucose
 - Movement of sugar is carried out through sieve tube near the source region
 - Concentration of sugar is always highest near the sink region
 - Water from the adjacent xylem moves into phloem by osmosis
- II and IV
 - II and III
 - I, II and III
 - Only IV
238. After heavy rain fall with poor drainage, laves of many plants wilt due to
- Root rot
 - Poor aeration
 - High salt concentration
 - Low soil temperature
239. Graham's law is correlated with
- Diffusion
 - Osmoregupation
 - Osmosis
 - Absorption
240. Who proposed the 'Cohesion Theory' of ascent of sap?
- Strasburger
 - Godlewski
 - Western
 - Dixon andJolly
241. Which of the following statements is/are not true?
- In CAM plants, stomata open during dark and remain closed during the day.
 - Role of Na^+ in stomatal opening is now universally accepted.
 - The water potential of root cells is higher than the water potential of soil.
 - Capillarity theory is the most accepted theory of water movement through plants.
 - The walls of xylem vessels made up of lingo-cellulose have strong affinity for water molecules.
- II, III and V
 - II, III and IV
 - I, II and III
 - II and III
242. How would you differentiate between apoplast and symplast?
- Apoplast relies on active transport
 - Symplast deals in non-living spaces and cell walls
 - Apoplast prevents passive diffusion
 - Apoplasts deals in non-living spaces and cell walls
243. Water potential of a solution is denoted by
- Ψ_x
 - Ψ_p
 - $\Delta\psi$
 - Ψ_w
244. Which one of the following statements is wrong?
- Water potential is the chemical potential of the water
 - Solute potential is always negative
 - Pressure potential is zero in a flaccid cell
 - Water potential equals solute potential in a fully turgid cell
245. Cell wall present in water conducting tissues, represented by swollen nodules, is known as
- Tertiary wall
 - Middle lamella
 - Plasmalemma
 - Primary cell wall
246. Transport of organic solutes is supposed to take place by pressure flow hypothesis through phloem tissue from source to sink. Choose the false statement about vascular tissue transport
- Phloem transport mainly water and sucrose but other sugars, hormone and aminoacids are also transported
 - Water enters into the sieve tube by the process of osmosis
 - Water and solute move through the sieve tube along the pressure gradient
 - Sieve tube in the source have a low turgor pressure (pressure potential)

- c) I, II, III and IV
d) Only I
255. Ascent of sap in plants was demonstrated by
a) Girdling experiment
b) Ganong's experiment
c) Went experiment
d) Lever auxanometer
256. The value of pure water potential is
a) Always positive or more than zero
b) Always negative or less than zero
c) Always zero
d) Variable in different solution
257. Loss of water in liquid phase (in form of droplets) from the margin of leaves in many herbaceous plants is
a) Guttation
b) Root pressure
c) Transpiration
d) Transpiration pull
258. The relationship among different types of soil water can be summed up of the following equation:
a) Chresard=Echard+Hollard
b) Chresard=Hollard+Echard
c) Echard=Hollard+Chresard
d) Hollard= Chresard-Echard
259. A cell dipped in 0.5 M sucrose solution has no effect but when the same will be dipped in 0.5 M NaCl solution, the cell will
a) Increase in size
b) Decrease in size
c) Will be turgid
d) Will get deplasmolysed
260. Transpiration is manifestation of
a) Turgor pressure
b) Wall pressure
c) Root pressure
d) None of these
261. 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 from cell-B to A
b) No movement of water
c) Equilibrium between the two
d) Movement of water from cell-A to B
262. Plasmolysis is the result of
a) Exosmosis
b) Endosmosis
c) Reverse osmosis
d) Diffusion
263. Stomata open and close due to
a) Turgor pressure change
b) Hormonal change
c) Temperature change
d) All of these
264. Which one is incorrect statement?
a) Movement of water is expressed in terms of free energy
b) Free energy determines the direction by which physical and chemical changes should occur
c) Water potential is the sum of free energy of water molecules in pure water and in any other system
d) Water potential of pure water is zero
265. Which of the following is appropriate for mass-flow hypothesis?
a) Transpiration pull is responsible for absorption of ions
b) Large amount of ions are also absorbed along with the absorption of water
c) As suction pressure increases, absorption of water increases and along with water, absorption of ion also increases
d) All of the above
266. The antitranspirant is
a) PMA
b) ABA
c) Both (A) and (B)
d) None of these
267. The rupture and fractionation do not usually occur in the water column in vessels/tracheids during the ascent of sap because of

- a) Lignified thick walls
c) Weak gravitational pull
- b) Cohesion and adhesion
d) Transpiration pull
268. The rate of diffusion of any substance is not affected by
a) Electrical charges of diffusing substances
b) Presence of other substances in the solution
c) Molecular size of substances in a solution
d) Solubility to diffusing substance in lipids
269. Cohesion and adhesion theory, is otherwise called
a) Relay pump theory
b) Pulsation theory
c) Root pressure theory
d) Transpiration pull theory
270. Stomata open due to accumulation of
a) K^+
b) Na^+
c) Mg^+
d) Ca^{2+}
271. Which of the following in guard cell is responsible for opening of stomata?
a) Decrease in CO_2 concentration and more H^+ ion concentration
b) Decrease in CO_2 concentration and less H^+ ion concentration
c) Increase in CO_2 concentration and more H^+ ion concentration
d) More free H^+ ions and less Cl^- ions
272. Which of the following is the most accepted theory for movement of water through plants?
a) Cohesion theory
b) Capillarity
c) Passive transport
d) Root pressure
273. The force responsible for the water movement against gravity even up to a 130 m of tall tree comes from
a) Root pressure
b) Transpiration pull
c) Diffusion pressure
d) Pulsation
274. A leaf with more stomata on lower surface belongs to
a) Potato type
b) Oat type
c) Apple-mulberry type
d) *Nymphaea* type
275. When a plant cell is placed in pure water, it
a) Expands until the osmotic pressure reaches that of water
b) Becomes less turgid until the osmotic potential reaches that of pure water
c) Becomes more turgid until the pressure potential of cell reaches its osmotic potential
d) Becomes more turgid until the osmotic potential reaches that of pure water
276. The loosely arranged non-chlorophyllous parenchyma cells present in lenticels, are called
a) Complementary cells
b) Passage cells
c) Water stomata
d) Albuminous cells
277. Select the wrong statement regarding membrane channels
a) They are proteins
b) They are usually gated, *i.e.*, may be open or closed
c) All ions pass through the same type of channel
d) They form a huge pore in the outer membrane of plastids, mitochondria and some bacteria
278. A group of students are studying transport of certain type of molecules in a cell and observe that transport slows down when the cells are treated with poison, a chemical, which inhibits energy production. Under normal conditions, the molecules are being studied and it is estimated that molecules probably transported by
a) Osmosis
b) Process of active transport
c) Process of facilitated diffusion
d) Process of simple diffusion
279. In symplast pathway of water movement, water passes from cell to cell, whose cytoplasm are connected through
a) Plasma membrane
b) Plasmodesmata
c) Transmembrane
d) Plasmalemma
280. Select the correct statement
a) Water can be absorbed passively by roots

- b) Ions are generally absorbed from soil by both active and passive transport
c) C_4 photosynthetic system is evolved for maximising the availability of CO_2 and to minimise loss of water
d) All of the above
281. Which ion helps in opening and closing of stomata?
a) Mn^+ b) Mg^{2+} c) Ca^{2+} d) K^+
282. Which theory is considered best to explain ascent of sap
a) Bulk flow system b) Transpiration pull c) Transpiration d) Root pressure theory
283. 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
284. Transpiration is the manifestation of
a) Root pressure b) Turgor pressure c) Wall pressure d) Suction pressure
285. Which among the following has highest water potential?
a) 1 m salt solution b) 1 m glucose solution c) Distilled water d) Both (a) and (b)
286. 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
287. Stoma opens, when
a) Guard cells swell due to an increase in their water potential
b) Guard cells swell by endosmosis due to influx of hydrogen ions (protons)
c) Guard cells swell by endosmosis due to efflux of potassium ions
d) Guard cells swell due to a decrease in their water potential
288. If solute particles are added in pure water, its diffusion pressure will be
a) Increased b) Decreased
c) Remain constant d) Become less than zero
289. A red blood cell (RBC) was kept in a certain solution for few minutes and it got burst. The said solution was
a) Isotonic b) Concentrated sugar solution
c) Hypertonic d) Hypotonic
290. The rate of transpiration will be very less in a situation where
a) Ground water is sufficiently available b) Wind is blowing with a very high velocity
c) Environment is very hot and dry d) Relative humidity is very high
291. The factor, most important in regulating transpiration, is
a) Temperature b) Light c) Wind d) Relative humidity
292. Wooden doors and logs swells up, and get stuck up during rainy season due to
a) Imbibition b) Endosmosis c) Exosmosis d) Both (a) and (c)
293. If water enters in a cell, the pressure exerted by its swollen protoplast is
a) Turgor pressure b) DPD c) Osmotic pressure d) Imbibition
294. What is the most efficient region of water absorption in roots?
a) Root cap b) Growing point
c) Zone of elongation d) Zone of differentiation
295. Regarding root pressure, which one is not correct?
a) It is sufficient to rise water above ground level
b) It is positive in all except the tallest trees
c) It do not act as driving force for the mass flow of sugar

- d) It is not able to push water up to small height in the stem
296. Choose the correct statements regarding guttation and pick the correct option from the codes given below
- I. It occurs through specialised pore called hydathode
 II. Hydathodes can be located on the margin and tips of leaves
 III. It occurs in plants growing under condition of low soil moisture and high humidity
 IV. It occurs in herbaceous plants when root pressure is low and transpiration is high
- a) I and II b) III and IV c) I, II, III and IV d) I, II and IV
297. What is the value of DPD?
- a) $DPD = TP$ b) $DPD = OP - SP$
 c) $DPD = OP - WP$ d) Equal to wall pressure
298. The transport of organic and inorganic substances in plants over longer distance occurs through vascular tissue by the means of
- a) Diffusion
 b) Facilitated diffusion
 c) Active transport
 d) Mass flow
299. Choose the correct statement regarding casparian strips
- I. It surrounds pericycle
 II. It is made up of lignosuberin
 III. It limits the pathway available to water solutes, forcing them to enter the symplast
- a) I and III b) I, II and III c) 1 and II d) None of these
300. Translocation of organic materials in plants is explained
- a) Active transport b) Transpiration pull
 c) Inhibition theory d) Mass-flow hypothesis
301. Choose the correct option given below
- a) Diffusion needs ATP
 b) Diffusion is an active and rapid process
 c) Diffusion is rapid over short distance but extremely slow over long distance transport
 d) Diffusion is slow over short distance, but rapid over long distance transport
302. Movement of water through cell wall, is
- a) Apoplast b) Symplast c) Tonoplast d) None of these
303. Adhesion is caused by
- a) Formation of hydrogen bond between water molecules b) Transpiration pull
 c) Higher surface tension d) Attraction of water molecule to polar surface
304. Short distance transport of substances like nutrients, water etc., in plants occur through
- a) Diffusion
 b) Cytoplasmic streaming supplemented by active transport
 c) Both (a) and (b)
 d) Passive transport only
305. A portion of transverse section of root is shown in the diagram. Label A-H in the given diagram and choose the correct option accordingly



- a) A-Apoplastic, path; B-Symplastic, path; C-Endodermis; D-Phloem; E-Cortex; F-Casparian strip; G-

- Pericycle; H-Xylem
- b) A-Symplastic, path; B-Apoplastic, path; C-Xylem; D-Phloem; E-Endodermis; F-Cortex; G-Casparian strip; H-Pericycle
- c) A-Symplastic, path; B-Apoplastic, path; C-Endodermis; D-Xylem; E-Cortex; F-Casparian strip; G-Pericycle; H-Phloem
- d) A- Apoplastic, path; B-Symplastic, path; C-Endodermis; D-Cortex; E-Casparian strip; F-Xylem; G-Phloem; H-Stele
306. With the increase in temperature, the process of imbibition
- a) Decreases b) Increases c) Remains the same d) No effect
307. In which form, does the food transported in plants?
- a) Sucrose b) Fructose c) Glucose d) Lactose
308. Identify the correct relationship with reference to water potential of a plant cell.
- a) $\Psi_w = \Psi_m + \Psi_s + \Psi_p$ b) $\Psi_w = \Psi_m + \Psi_s - \Psi_p$
- c) $\Psi_w = \Psi_m - \Psi_s + \Psi_p$ d) $\Psi_w = \Psi_m - \Psi_s - \Psi_p$
309. The correct relationship among different type of soil water is
- a) Chresard = Echard + Hollard b) Hollard = Chresard + Echard
- c) Echard = Hollard + Chresard d) Hollard = Chresard - Echard
310. In a fully turgid cell
- a) TP=0 b) WP=0 c) DPD=0 d) OP=0
311. In which of the following plants, there will be no transpiration?
- a) Aquatic, submerged plants b) Plants living in deserts
- c) Aquatic plants with floating leaves d) Plants growing in hilly regions
312. The value of osmotic potential of an electrolyte is always
- a) More than the electrolyte b) Less than the electrolyte
- c) Same as the electrolyte d) None of these
313. Carrier protein, which allows the movement of molecules in opposite direction is
- a) Antiport b) Symport c) Both (a) and (b) d) Uniport
314. In osmosis, there is movement of
- a) Solute only b) Solvent only c) Both (A) and (B) d) Neither (A) nor (B)
315. If the osmotic pressure of cytoplasm in a cell is balanced by external solution, the solution must be
- a) Hypotonic b) Hypertonic c) Atonic d) Isotonic
316. In thistle funnel experiment, what will occur if sugar solution is added to beaker, after the process of osmosis stops?
- a) The level of solution in thistle funnel rises up
- b) The level of solution in thistle funnel lowers
- c) The level of solution in beaker lowers
- d) The level of solution remains unaffected in beaker
317. Water rises in the stem due to
- a) Cohesion and transpirational pull b) Turgor pressure
- c) Osmotic pressure d) Root absorption
318. Term osmosis is specifically used to refer
- a) Diffusion across the semipermeable membrane b) Diffusion across the permeable membrane
- c) Secondary active transport d) Facilitated diffusion
319. Guttation is mainly due to
- a) Root pressure b) Imbibition c) Osmosis d) Transpiration
320. Read the following statement carefully and choose the right answer from the codes given below
- I. PMA and silicon oil of low viscosity are considered as antitranspirant
- II. BAP, NAA and cobalt chloride is also used as antitranspirant

- III. Abscisic acid affects the mechanism of opening and closing of stomata
 IV. Starch of guard cells is converted into PEP ions by the process of hydrolysis
 V. Potometer works on the principle of potential difference between the tip of the tube and that of plant
 VI. Transpiration rate is directly proportional to the relative humidity

- a) I, II, III, IV, V and VI
 b) I, II, III and IV are correct while V and IV are incorrect
 c) V and VI are correct, while, I, VI, III and IV are incorrect
 d) I, III, VI are correct, while II, IV, V are correct

321. When pea seeds and wheat grains are soaked in water, pea seeds showed more swelling than the wheat. The reason is

- a) Imbibitions capacity of proteins is more than that of starch
 b) Presence of less hydrophilic colloids in the wheat grains
 c) Cell membrane of pea seeds is more permeable
 d) Cell wall of wheat grains are less permeable

322. The phytohormone, which increases the concentration of potassium in guard cells is also responsible for the induction of

- a) Apical dominance
 b) Triple response growth
 c) Cell division
 d) Abscission

323. Choose the correct option in accordance to the statements given above

- I. The positive hydrostatic pressure is also called as turgor pressure
 II. Wall pressure is exerted to prevent any increase in protoplasm size
 III. Osmosis is the movement of substances, which takes place along a diffusion gradient
 IV. Plasmolysis is the result of reverse osmosis

- a) I, II, III are correct IV is incorrect
 b) II, I are correct, while IV and III are incorrect
 c) III and IV are correct, while I and II are incorrect
 d) Only II is correct

324. Water channels are possessed by a membrane to facilitate the movement of hydrophilic substances. These channels are made up of

- a) Eight similar type of aquaporin
 b) Eight different type of aquaporin
 c) Eight similar and eight different aquaporin
 d) Do not possess any water channel

325. Who described mass flow hypothesis?

- a) Munch
 b) Sir JC Bose
 c) Kursanov
 d) Buchmann and Priestly

326. Water can be absorbed from a hypertonic external solution by

- a) Withdrawing more water from the external solution
 b) Auxin treated cells
 c) Adding a buffer in the external solution
 d) Cytokinin treated cells

327. In a fully turgid cell, is zero.

- a) OP
 b) TP
 c) WP
 d) DPD

328. Why the transport of organic food through phloem is bidirectional?

- a) Roots serve as source while leaves are the sink region
 b) Source and sink region are irreversible
 c) The relationship between the two region (source and sink) is variable and is dependent on season and plant needs
 d) Translocation of organic solute is regulated by energy

329. Cohesion theory of water movement in plants was put forth by

