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Ch - 5 : Transpiration

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TRANSPIRATION

Short Questions

Question 1: Define transpiration.

Question 2: Name the three types of transpiration.

Question 3: What is meant by the term transpiration stream ?

Question 4: Where are stomata generally found ?

Question 5: State the functions of guard cells.

Question 6: How does a stomata differ from a lenticel ?

Question 7: What are lenticels ? Where are they found ?

Question 8: (i) Name the organ in which guard cells are located and mention the main functions of these.

(ii) Give the function of thick cuticle layer in desert plants.

Question 9: What is the advantage of wilting to a plant ?

Question 10: Briefly explain how the rate of transpiration is affected by:

Question 11: Describe any three conditions which affect transpiration.

Question 12: What are the advantages of transpiration to the plant ?

Question 13: What are the disadvantages of transpiration ?

Question 14: "A higher rate of transpiration is recorded on a windy day rather than on a calm day." Explain.

Question 15: Explain the relationship between transpiration through the aerial parts and absorption by the root hairs.

Question 16: Describe an experiment to prove that transpiration occurs more from the under surface of dorsiventral leaves.

Give Reasons

Question 1: Transplanting of seedlings to flowerbed in the evening is better than doing so in the morning.

Question 2: Land plants die if their foots remain water logged.

Question 3: Young plants will an a hot sunny day.

Question 4: Plants absorb more water than their requirement.

Question 5: Balsam plants wilt during midday even if the soil is well watered.

Question 6: Why do plants absorb more water than what is required by them ?

Question 7: Forest bring in the rain, transpiration is the cause. Explain why.

Question 8: Why do some herbaceous plants show wilting of leaves during mid-day which again recover in the evening ?

Question 9: Guard cells are small in size and are kidney shaped in outline.

Differentiate

Question 1: Transpiration and Guttation.

Question 2: Transpiration and Evaporation.

Question 3: Stomata and Lenticels.

Question 4: Cuticular and Lenticular transpiration.

Question 5: Transpiration and Translocation.

Question 6: Transpiration and Perspiration.

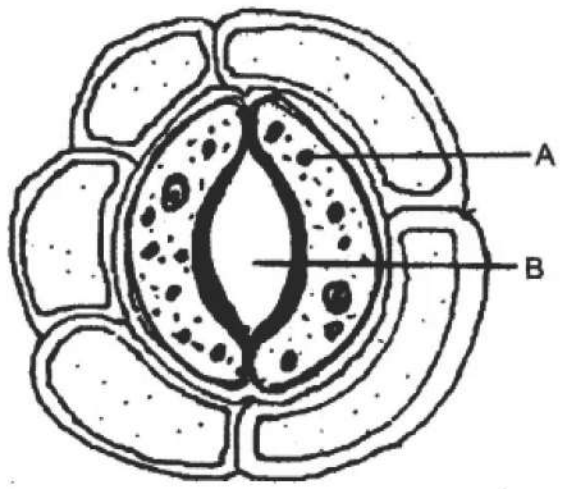
Question 7: Stomata and Hydathodes.

Question 8: Guttation and Bleeding.

Question 9: Cobalt chloride paper and Goat's bladder.

Diagram Based Questions

Question 1: The diagram below represents a structure found in a leaf.



Study the same and answer the questions that follow:

(i) Name the pis labeled A and B.

(ii) What is the biological term for the above structure?

(iii) What is the function of the part labeled A?

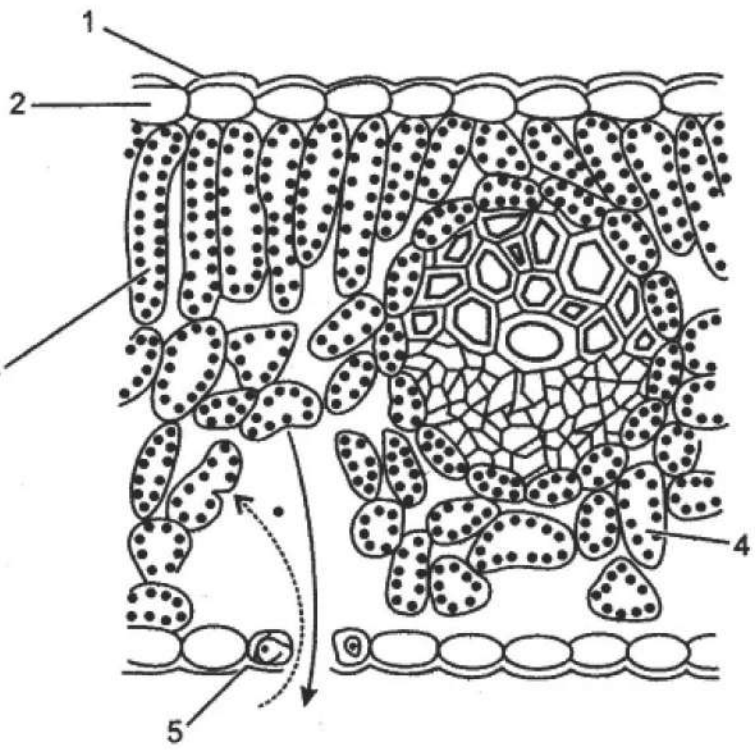
(iv) Mention two structural features of A, which help in the function mentioned in (iii) above.

(v) Where is this structure likely to be found in a leaf?

(vi) The above structure helps in the process of transpiration. Explain the term transpiration.

(vii) How many other cells are found surrounding this structure as seen in the diagram?

Question 2: The figure below represents the vertical section of a leaf:



(i) Name the parts labeled 1 to 5.

(ii) What do the two arrows (dotted and solid) indicate in the day time and at night ?

(iii) Could you add one more arrow in the figure ? If yes, what for ?

(iv) How many leaf veins have been shown in this section ?

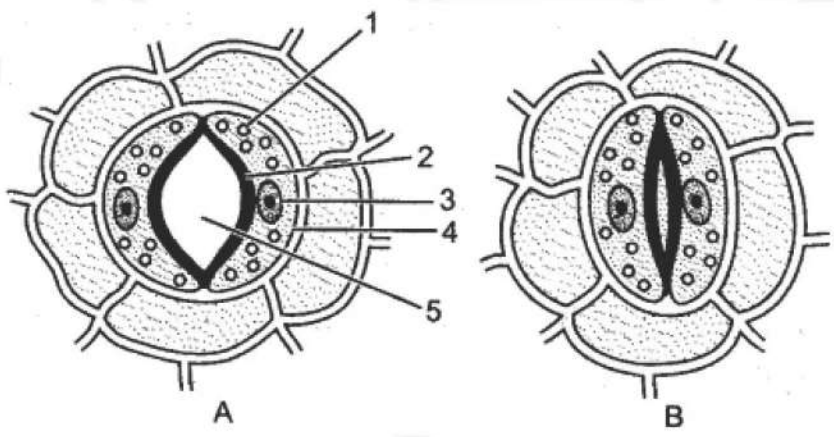
Question 3: Given below are the diagrams of a certain structure in plants in two conditions.

(i) Name the structure shown.

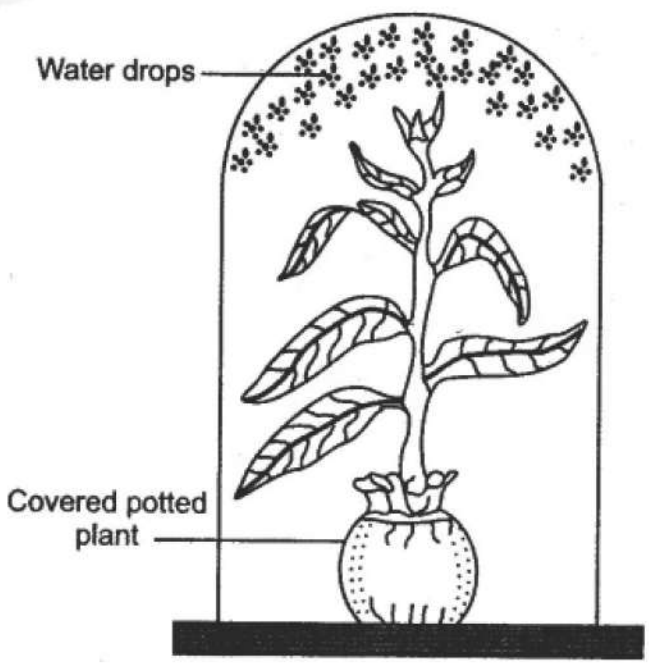
(ii) Name the parts numbered 1-5.

(iii) What is the most apparent difference between A and B in the structure shown ?

(iv) Describe the mechanism which brings about the change in the structure depicted in A and B.



Question 4: Given below is an experimental set up to study a particular process :



(i) Name the process being studied.

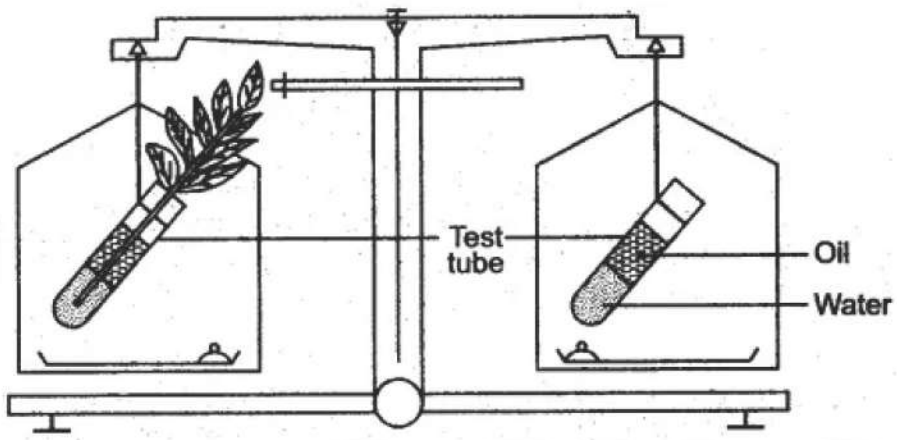
(ii) Explain the process named in (i) above.

(iii) Why is the pot covered with a plastic sheet ?

(iv) Mention one way in which this process is beneficial to the plant.

(v) Suggest a suitable control for this experiment.

Question 5: The figure given below represents an experimental set up with a weighing machine to demonstrate a particular process in plants. The experimental set up was placed in bright sunlight. Study the diagram and answer the following questions:



(i) Name the process intended for study.

(ii) Define the above mentioned process.

(iii) When the weight of the test tube (A & B) is taken before and after thee experiment, what is observed ?Give reasons to justify your observation in A & B.

(iv) What is the purpose of keeping the test tube B in the experimental set up?

Question 6: Study the diagram given alongside and answer the questions that follow:

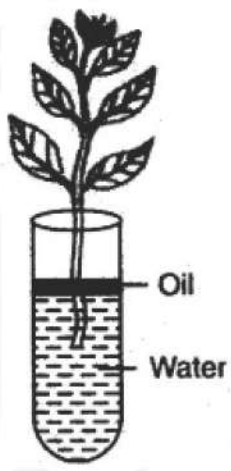
(i) Explain the physiological process being study.

(ii) What will be the observations in the two test-tubes after about 2-3 days?

(iii) Give a reason for your answer in (ii) above.

(iv) Why is the surface of water covered with oil.

(v) State the purpose of setting up test tube B.



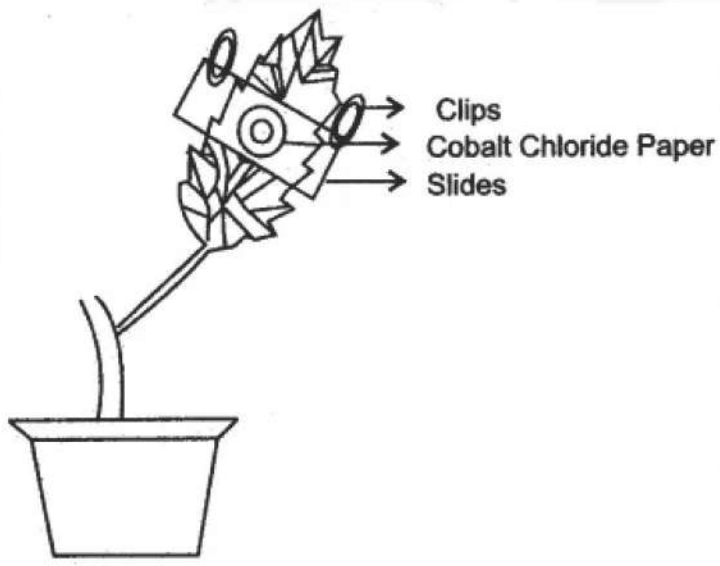
Question 7: Study the diagram given below and answer the questions that follows:

(i) Name the process being studied in the above experiment.

(ii) Explain the process mentioned in (i) above.

(iii) Why is oil placed over water?

Question 8: Given below is the diagram of an experimental set up to study the process of transpiration in plants. Study the same and then answer the questions that follow:



(i) What is the colour of dry cobalt chloride paper?

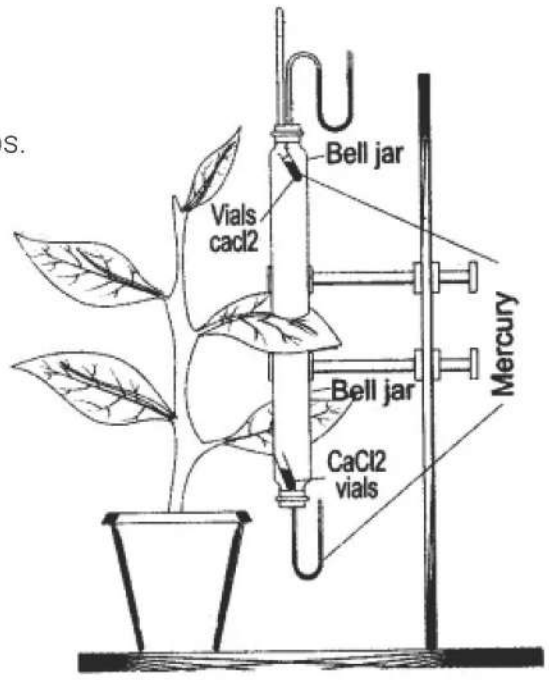
(ii) Is the experimental leaf a monocot or a dicot? Give a reason to support your answer.

(iii) Why axe glass slides placed over the dry cobalt chloride papers?

(iv) After about half an hour what change, if any, would you expect to find in the cobalt chloride paper placed on the dorsal and ventral sides of the leaf? Give a reason to support your answer.

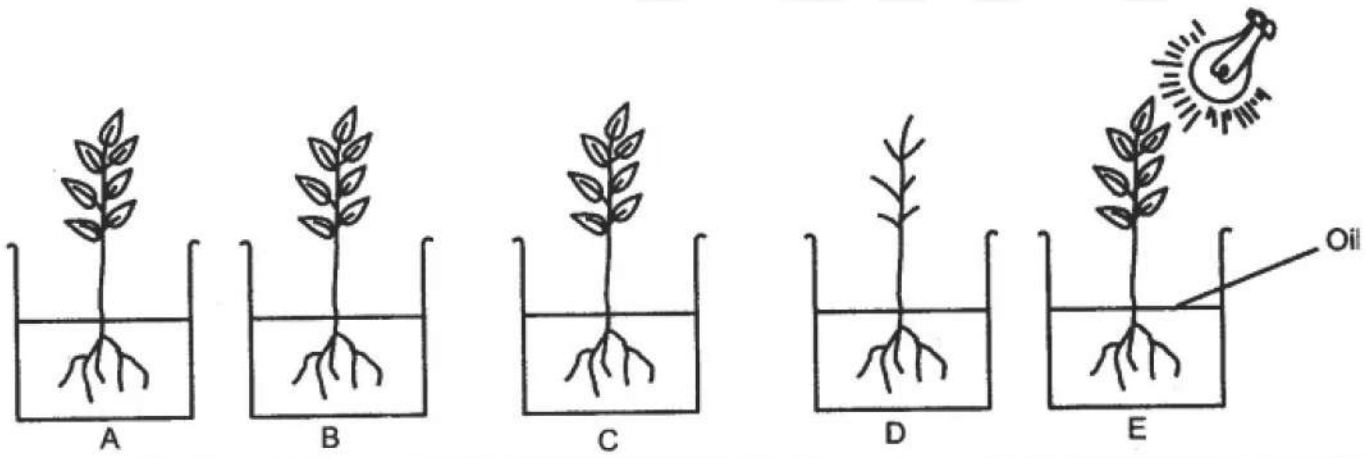
(v) Define the term 'transpiration'.

Question 9: The apparatus shown here is Girreau's poto-meter designed to demonstrate unequal transpiration from the two surfaces of a dorsiventral leaf. Before keeping the leaf in between the cups, anhydrous calcium chloride ($CaCl_2$) contained in two small vials were weighed and placed in both the cups. The ends of the cups were closed with corks through which two mercury manometers were connected. After a few hours, $CaCl_2$ vials were taken out and weighed again.



(i) What is the purpose of keeping $CaCl_2$ vials inside the cup?
(ii) After a few hours, the $CaCl_2$ vials were taken out and weighed again. Will you expect any difference in weight ? If so, give reasons.
(iii) What was the purpose of using a mano-meter?
(iv) What do you mean by transpiration?

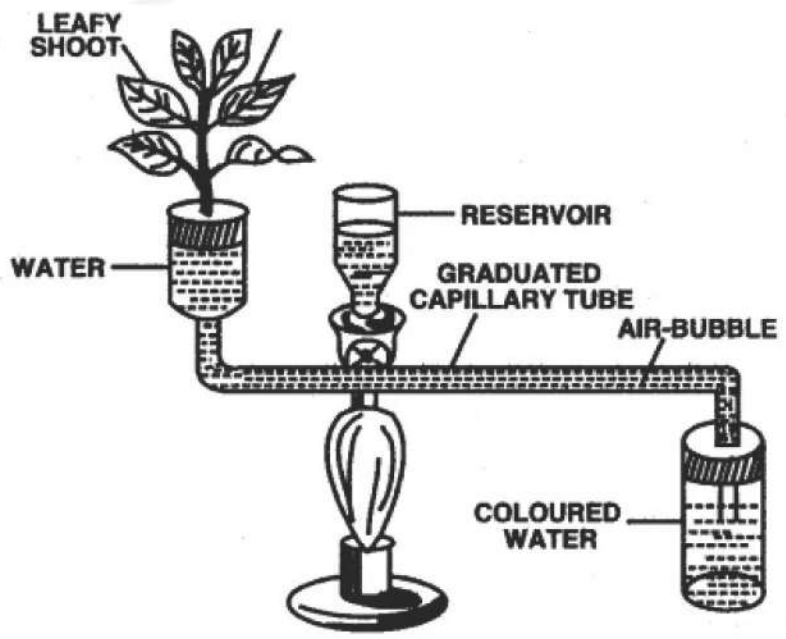
Question 10: The following diagram is set up to demonstrate an experiment.



Five plants A, B, C, D and E were placed in a beaker containing water. The water in each beaker was covered with a layer of oil. The leaves were removed from plant D in plant B, upper surfaces of all the leaves were covered with Vaseline, in plant C the lower surfaces of all the leaves were covered with Vaseline and plant E was exposed to strong light. The beakers were then left for few hours and at the end of the experimental period, weights of each beaker were
taken.
Write the correct answer out of the five available choices given under each question:
I. In which beaker would you expect the greatest decrease in weight?
(i) A (ii) B (iii) C (iv) D (v) E
II. In which beaker the change of weight would be minimum?
(i) A (ii) B (iii) C (iv) D (v) E
III. Which plant would remain healthy for a longer period of time?
(i) A (ii) B (iii) C (iv) D (v) E
IV. In this experiment which plant can be considered as the uncontrolled one?
(I) A (ii) B (iii) C (iv) D (v) E
V. The difference of weight would b maximum between:
(i) A and B (ii) A and C (iii) A and D (iv) A and E (v) D and E

Question 11: Given below is an apparatus used to study a particular process in plants. Study the same and ansvver the questions that follow :

(i) Name the apparatus.
(ii) Mention one limitation of this apparatus.
(iii) Which phenomenon is studied with the help of this apparatus?
(iv) What is the function of the part marked 'reservoir'?
(v) What is the role of the air bubble in the experiment?



Sketch and Label the Diagram

Question 1: Draw a labeled diagram of the stomatal apparatus and label the following in it: Stoma, Guard cells, Chloroplast, Epidermal cells and Cell wall.

Question 2: Draw a neat diagram of the stomatal apparatus found in the epidermis of leaves and label the Stoma, Guard cells, Chloroplast, Epidermal Cells, cell wall and Nucleus.

Explain the Terms

Question:

1. Transpiration
2. Cuticular transpiration
3. Lenticular
4. Stomatal transpiration
5. Guttation
6. Bleeding
7. Lenticel
8. Hydathode
9. Wilting

Name the Following

Question:

1. The process of getting rid of excess water in the form of water vapour through the stomata.
2. Season in which transpiration rate is the highest.
3. Holes present on the surface of the stems and twigs for transpiration.
4. Potometer is an instrument for measuring the rate of the most transpiration in a herbaceous plant like Balsam occurs through which part.
5. Plants in which lenticular transpiration.
6. A plant having sunken stomata.
7. Loss of water as droplets through leaves of an intact plant.
8. The structures through which guttation occurs.
9. The escape of plant sap from the ruptured or cut surfaces of the plant due to root pressure.

Give Technical Terms

Question:

1. Loss of water from the aerial parts of a plant.
2. Opening found on the under surface of dorsiventral leaf.
3. Which side of the leaf has more stomata ?
4. When cobalt chloride paper is placed on lower and upper surface of the leaf, the paper of which side becomes more pink ?
5. The substances which check the rate of transpiration.
6. The paper which is used to show loss of water through stoma of a leaf.
7. A chemical used to prevent excessive transpiration in plants.
8. Main function of lenticel.
9. The apparatus used to compare the rate of transpiration in cut shoot.
10. The process by which excess of water is forced out directly from the tips of veins in the leaf.

Fill in the Blanks

Complete the following sentences with appropriate words :

1. Plants become cool as a result of _____
2. Transpiration is the loss of water _____from the leaves of the plant.
3. Transpiration normally takes place in the presence of _____.
4. 95% of the total transpiration takes place through _____.
5. In Nerium, the stomata are present in _____.
6. Openings found on the under surface of the dorsiventral leaf are _____.
7. The leaves of the _____ plants have cuticular wax.
8. Guttation takes place generally at _____.

True & False

Mention, if the following statements are True or False. If false rewrite the wrong statement in its correct form:

1. Transpiration is a physiological process.
2. Root hairs are the extensions of the outer epidermal cells of the root.
3. More transpiration occurs from the upper surface of a leaf.
4. Transpiration takes place only in green plants.
5. The pH of the guard cells increases during day time.
6. Evaporation is a physiological process.
7. Potometer is an instrument, used for measuring the rate of transpiration.
8. Low humidity in the atmosphere results decrease in the rate of transpiration.
9. Calcium chloride paper is used to demonstrate transpiration.
10. Moist cobalt chloride paper is blue in colour.
11. Guttation occurs through stomata.

State the Location

Name	Location
Stomata	
Lenticels	
Cuticle	
Hydathodes	
Guard cells	

State the Function

Write the functional activity of the following structures:

Name	Function
Stomata	
Lenticels	
Cuticle	
Hydathodes	
Guard cells	

Choose the Odd One Out

1. Transpiration, Photosynthesis, Phagocytosis, Guttation.
2. Cuficular transpiration, Lenticular transpiration, Stomatal transpiration, Gutation.
3. Stomata, Cuticle, Lenticels, Hydathodes.

Multiple Choice Questions

1. In the mechanism of opening and closing of stomata, the important factor is :
(a) The presence of chloroplast in the guard cells
(b) The turgid and Flaccid state of the guard cells
(c) The protein content of the cells
(d) The starch content of the cells

2. Stomata open during day and close at night because :
(a) Photosynthesis occurs during day time only
(b) Enzymes convert starch into sugar at elevated pH in night
(c) Loss of sugar increases osmotic concentration of the cell sap
(d) Loss of starch in day time raises OP of subsidiary cells

3. In hot summer days, plant cooling is due to :
(a) Loss of water vapours from leaves (b) Transport of water in plant
(c) Loss of lkjuid water (d) Loss of water from entire plant

4. If the rate of transpiration becomes more than the rate of photosynthesis, plants will:
(a) Continue to live, but will not be able to store food
(b) Be killed instantly
(c) Grow more vigorously because more energy will be available .
(d) Stop growing and gradually die of starvation

5. Transpiration is very low during storms due to :
(a) Presence of moisture in the wind
(b) Low temperature during storms
(c) High velocity of wind
(d) None of the above

6. Transpiration pull will be maximum under which of the following conditions ?
(a) Open stomata, dry atmosphere and moist soil
(b) Open stomata, high humid atmosphere and well irrigated soil
(c) Open stomata, high humid atmosphere and dry soil
(d) Close stomata, dry atmosphere and dry soil

7. Plants lose water by guttation when:
(a) Rate of transpiration is high
(b) Soil is wet and the atmosphere is humid
(c) Soil is dry and atmosphere is dry
(d) Soil is wet and atmosphere is dry

8. Guttation is the elimination of excess of water from plants through :
(a) Stomata (b) Hydathodes
(c) Lenticels (d) Wounds

Match the Column

Column 'II' is a list of items related to ideas in Column 'I'. Match the term in Column 'II' with the suitable idea given in Column 'I'.

Column I	Column II
(i) Transpiration	(a) Cacti plants
(ii) Movement of water	(b) Stomata
(iii) Guttation	(c) Maize plant
(iv) Low rate of transpiration	(d)Xylem
(v) High rate of transpiration	(e) Hydathodes