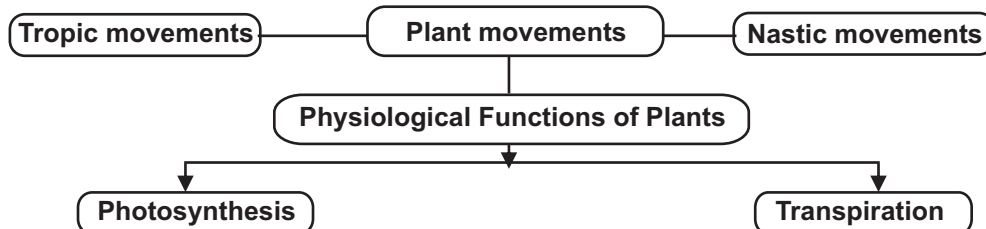


UNIT - 19. Plant physiology

Mind Map



TEXT BOOK EXERCISES

I. Choose the correct answer.

1. The tropic movement that helps the climbing vines to find a suitable support is

- a) phototropism b) geotropism c) thigmotropism d) chemotropism

Ans : c) thigmotropism

2. The chemical reaction occurs during photosynthesis is

- a) CO_2 is reduced and water is oxidized b) water is reduced and CO_2 is oxidized
c) both CO_2 and water are oxidized d) both CO_2 and water are produced

Ans : a) CO_2 is reduced and water is oxidized

3. The bending of root of a plant in response to water is called.....

- a) Thigmonasty b) Phototropism c) Hydrotropism d) Photonasty

Ans : c) Hydrotropism

4. A growing seedling is kept in the dark room. A burning candle is placed near it for a few days. The tip part of the seedling bends towards the burning candle. This is an example of.....

- a) Chemotropism b) Geotropism c) Phototropism d) Thigmotropism

Ans : c) Phototropism

5. The root of the plant is.....

- (i) positively phototropic but negatively geotropic
(ii) positively geotropic but negatively phototropic
(iii) negatively phototropic but positively hydrotropic
(iv) negatively hydrotropic but positively phototropic
a) (i) and (ii) b) (ii) and (iii) c) (iii) and (iv) d) (i) and (iv)

Ans : b) (ii) and (iii)

6. The non-directional movement of a plant part in response to temperature is called.....

- a) thermotropism b) Thermonasty c) chemotropism d) thigmonasty

Ans : b) Thermonasty

7. Chlorophyll in a leaf is required for

- a) photosynthesis b) tropic movement c) transpiration d) nastic movement

Ans : a) photosynthesis

8. Transpiration takes place through.....

- a) fruit b) seed c) flower d) stomata

Ans : d) stomata

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II. Fill in the blanks.

- The shoot system grows upward in response to _____.
Ans : sunlight
- _____ is positively hydrotropic as well as positively geotropic.
Ans : Root
- The green pigment present in the plant is _____.
Ans : chlorophyll
- The solar tracking of sunflower in accordance with the path of sun is due to _____.
Ans : photonasty
- The response of a plant part towards gravity is _____.
Ans : Geotropism
- Plants take in carbondioxide for photosynthesis but need _____ for their living.
Ans : Oxygen

III. Match column A with column B

S.No.	Column A		Column B
1.	Roots growing downwards into soil	a)	Positive phototropism
2.	Shoots growing towards the light	b)	Negative geotropism
3.	Shoots growing upward	c)	Negative phototropism
4.	Roots growing downwards away from light	d)	Positive geotropism

Ans :

S.No.	Column A		Column B
1.	Roots growing downwards into soil	d)	Positive geotropism
2.	Shoots growing towards the light	a)	Positive phototropism
3.	Shoots growing upward	b)	Negative geotropism
4.	Roots growing downwards away from light	c)	Negative phototropism

IV. State whether true or false. If false, correct statement.

- The response of part of plant to the chemical stimulus is called phototropism.
Ans : False. Correct statement: The response of a part of plant to the chemical stimulus is called chemotropism.
- Shoot is positively phototropic and negatively geotropic.
Ans : True
- When the weather is hot, water evaporates lesser which is due to opening of stomata.
Ans : False. Correct statement: When the weather is hot, water evaporates more which is due to opening of stomata.
- Photosynthesis produces glucose and carbon dioxide.
Ans : False. Correct statement: Photosynthesis produces glucose and Oxygen.
- Photosynthesis is important in releasing oxygen to keep the atmosphere in balance.
Ans : True

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6. Plants lose water when the stomata on leaves are closed.**Ans : False. Correct statement :** Plants lose water when the stomata on leaves are opened.**V. Answer very briefly.****1. What is nastic movement?****Ans :** Nastic movements are non-directional response of a plant or part of a plant to stimulus.**2. Name the plant part****a) Which bends in the direction of gravity but away from the light.****Ans :** Root**b) Which bends towards light but away from the force of gravity.****Ans :** Shoot**3. Differentiate phototropism from photonasty.**

Ans :	S.No.	Phototropism	Photonasty
	1.	Movement of a plant part towards light.	Movement of a part of a plant in response to light.
	2.	Growth dependent movements	Growth independent movements
	3.	Growth of stem towards light	E.g. : Taraxacum officinale, blooms in morning and closes in the evening.

4. Photosynthesis converts energy X into energy Y.**a) What are X and Y ?****Ans :** X - Light energy

Y - Chemical energy

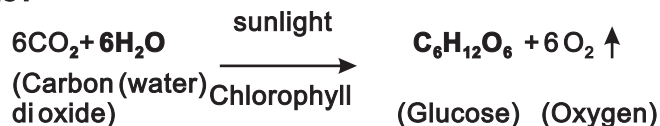
b) Green plants are autotrophic in their mode of nutrition. Why ?**Ans :** Green plants are autotrophic in their mode of nutrition because they prepare their food materials through a process called photosynthesis.**5. Define transpiration.****Ans :** The loss of water in the form of water vapour from the aerial parts of the plant body is called as transpiration.**6. Name the cell that surrounds the stoma.****Ans :** Guard cells.**VI. Answer in briefly.****1. Give the technical terms for the following :****(a) Growth dependent movement in plants.****Ans :** Tropic movements.**(b) Growth independent movement in plants.****Ans :** Nastic movements.**2. Explain the movement seen in Pneumatophores of Avicennia.****Ans :**

- * Negatively geotropic roots.
- * These roots turn 180° upright for respiration

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3. Fill in the blanks :**Ans :****4. What is chlorophyll?****Ans :** Green pigment present in leaves**5. Name the part of plant which shows positive geotropism. Why?****Ans :**

- * The part of plant which shows positive geotropism is **Root**,
- * Because the roots grow downwards towards gravity to provide stability for the plant.

6. What is the difference between movement of flower in sunflower plant and closing of the leaves in the *Mimosa pudica*?**Ans :**

S.No.	Movement in Sunflower	Movement in Mimosa pudica
1.	Photonasty	Thigmonasty
2.	Movement of a part of plant in response to light	Movement of a part of plant in response to touch.

7. Suppose you have a rose plant growing in a pot, how will you demonstrate transpiration in it?**Ans : To demonstrate transpiration in a rose plant :**

- ★ Take a plastic bag and tie it over a leaf and place the plant in light.
- ★ You can see water condensing inside the plastic bag.

8. Mention the differences between stomatal and lenticular transpiration.**Ans :**

S.No.	Stomatal Transpiration	Lenticular Transpiration
1.	Loss of water from plants through stomata.	Loss of water from plants as vapour through the lenticels.
2.	It accounts for 90 - 95% of the water transpired from leaves.	A very small percentage of water is lost by through plants lenticular transpiration.

9. To which directional stimuli do**(a) roots respond****Ans :** Roots respond - Gravity**(b) Shoots respond****Ans :** Shoots respond - Light

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VII. Answer in Detail.**1. Differentiate between tropic and nastic movements.****Ans :**

S.No	Tropic movements	Nastic movements
1.	Unidirectional response to the stimulus.	Non-directional response to the stimulus.
2.	Growth dependent movements.	Growth independent movements.
3.	More or less permanent and irreversible.	Temporary and reversible.
4.	Found in all plants.	Found only in a few specialized plants.
5.	Slow action.	Immediate action.

2. How will you differentiate the different types of transpiration?**Ans : There are three types of transpiration:****(i) Stomatal transpiration:**

★ Loss of water from plants through stomata. It accounts for 90- 95% of the water transpired from leaves.

(ii) Cuticular transpiration:

★ Loss of water in plants through the cuticle.

(iii) Lenticular transpiration:

★ Loss of water from plants as vapour through the lenticels. The lenticels are tiny openings that protrude from the barks in woody stems and twigs as well as in other plant organs.

VIII. Higher Order Thinking Skills.

1. There are 3 plants A, B and C. The flowers of A open their petals in bright light during the day but closes them when it gets dark at night. On the other hand, the flowers of plant B open their petals at night but closes during the day when there is bright light. The leaves of plant C fold up and droop when touched with fingers or any other solid object.

a) Name the Phenomenon shown by the flowers of plant A and B.

Ans : Photonasty

b) Name one plant each which behaves like the flowers of plant A and B

Ans : Plant A - Taraxacum officinale (Common Dandelion)

Plant B - Ipomoea alba (Moon flower)

c) Name the phenomenon exhibited by the leaves of plant C

Ans : Thigmonasty

d) Name the plant which behaves like the leaves plant C.

Ans : Mimosa pudica

2. Imagine that student A studied the importance of certain factors in photosynthesis. He took a potted plant and kept it in dark for 24 hours. In the early hours of the next morning, he covered one of the leaves with dark paper in the centre only. Then he placed the plant in sunlight for a few hours and tested the leaf which was covered with black paper for starch.

a) What aspect of photosynthesis was being investigated?

Ans : To show that sunlight is essential for photosynthesis.

b) Why was the plant kept in the dark before the experiment?

Ans : The plant was kept in the dark before the experiment for destarching

c) How will you prove that starch is present in the leaves?

Ans : The presence of starch in the leaves is proved by the Iodine test

d) Name the raw materials needed for photosynthesis ?

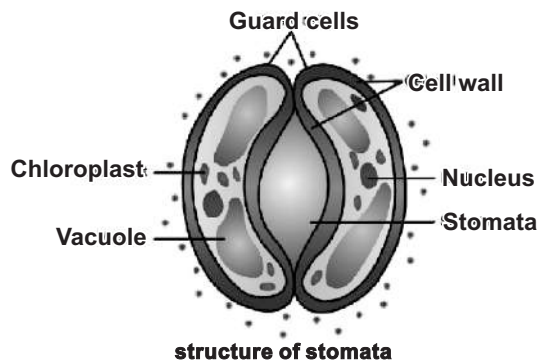
Ans : Chlorophyll, Water, Carbon di oxide (from air), Sunlight.

Additional questions & answers**Fill in the blanks.**

1. transpiration accounts for 90-95% of the water transpired from leaves.

Ans : Stomata

2. of stomata are green but cannot photosynthesize.

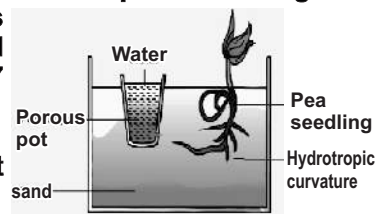
Ans : Guard cells**Draw the structure of stomata and mark its parts.****Ans :**

Activity 1 Take a glass trough and fill it with sand. Keep a flower pot containing water, plugged at the bottom at the centre of the glass trough. Place some soaked pea or bean seeds around the pot in the sand. What do you observe after 6 or 7 days? Record your observation.

Ans :

Hydrotropism : Movement of a plant or part of a plant towards water.

E.g. : root of a plant.

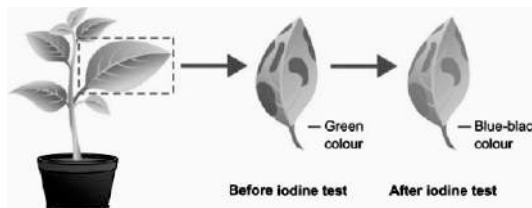
**Activity 2:**

Take pea seeds soaked in water overnight. Wait for the pea seeds to germinate. Once the seedling has grown put it in a box with an opening for light on one side. After few hours, you can clearly see how the stem has bent and grown towards the light.

Ans : Movement of a part of a plant in response to light. E.g: Taraxacum

Activity 3:

Pluck a variegated leaf from *Coleus* plant kept in sunlight. De-starch it by keeping in dark room for 24 hours. Draw the picture of this leaf and mark the patches of chlorophyll on the leaf. Immerse the leaf in boiling water followed by alcohol and test it for starch using iodine solution. Record your observation.



Activity 4 :

Place a potted plant in a dark room for about 2 days to de-starch its leaves.

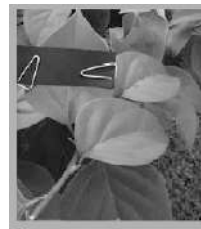
Cover one of its leaves with the thin strip of black paper as shown in the picture. make sure that the leaf is covered on both sides.

Keep the potted plant in bright sunlight for 4 to 6 hours. Pluck the selected covered leaf and remove the black paper.

Immerse the leaf in boiling water for a few minutes and then in alcohol to remove chlorophyll.

Test the leaf now with iodine solution for the presence of starch.

The covered part of the leaf does not turn blue-black whereas the uncovered part of the leaf turns blue-black colour.



Why are the changes in colour noted in the covered and uncovered part of the leaf?

Ans : These activities show that certain things are necessary for photosynthesis.

They are :

1. Chlorophyll - Green pigment in leaves
2. Water
3. Carbon dioxide (from air)
4. Sun light.

Activity 5 :

Take a plastic bag and tie it over a leaf and place the plant in light. You can see water condensing inside the plastic bag. The water is let out by the leaves. Why does this occur?

Ans : Transpiration

