

# QB365 Question Bank Software Study Materials

## Plant Physiology Important 2,3 & 5 Marks Questions With Answers (Book Back and Creative)

9th Standard

Science

Total Marks : 75

### 2 Marks

10 x 2 = 20

1) What is Geotropism?

**Answer :** The plant may respond to gravity and it is termed. Geotropism or Gravitropism.

2) Why guard cells can't photosynthesize?

**Answer :** Because RUBISO and NADP - dehydrogenase are absent in guard cells.

3) Which flowering plant shows photonasty just opposite to that of Dandelion?

**Answer :** Moon flower (or) Ipomoea alba shows photonasty just opposite to that of Dandelion.

4) What is chemotropism? Give example.

**Answer :** Growth or movement of a plant in response to chemical stimuli is called chemotropism.

Ex: During fertilization pollen tube grows.

5) Write the types of transpiration.

**Answer :** i) Stomataltranspiration

ii) Cuticular transpiration

iii) Lenticular transpiration.

6) Define micronutrients.

**Answer :** Plants require nutrients like iron, manganese, copper, boron, chlorine, silicon cobalt are minute quantities hence they are called as macro nutrients.

7) Give an example for a plant whose leaf shows a mesmerizing movement.

**Answer :** Non-directional response of a plants part to stimulus is known as nastic movement.

8) Name the minute openings seen on the lower surface of the leaf.

**Answer :** Stomata

9) Which gas is evolved during photosynthesis?

**Answer :** Oxygen

10) Give an example for micronutrients.

**Answer :** Copper, Boron, Silicon, Zinc, Molybdenum, Iron, Mn, Chlorine, and Cobalt

### 3 Marks

10 x 3 = 30

11) Explain the types of tropisms.

**Answer :** Unidirectional movement of plant part to light stimulus is called Phototropism. The plant may also respond to gravity and it is termed Geotropism or Gravitropism. The response to water is called Hydrotropism. Once the shoot touches a suitable support, it grows towards the surface it is touching. This is called Thigmotropism. Growth or movement of a plant in response to chemical stimuli is called Chemotropism.

12) Give an account of phototropism.

**Answer :** Tropism is generally termed "positive" if growth is towards the signal and "negative" if it is away from the signal. While the shoot in a plant-moves towards the light, the roots move away in the opposite direction. Thus the shoots are said to have positive phototropism, while the roots have negative phototropism.

13) Write a brief note on types of nastic movements.

**Answer :** The flower of *Taraxacum officinale* (common Dandelion) blooms in the morning and evening it closes (Photonasty). *Ipomoea alba* (Moonflower) does exactly the opposite. They open in the night and hence the name moon flower and closes in the day time. Just a casual touch is enough to make the *Mimosa pudica* (Touch-me-not) leaves fold up and droop (Seismonasty or thigmonasty).

14) Briefly, explain nastic movements

**Answer :** The root and shoot move towards the direction of the stimuli, whereas the movement of the opening and closing of the flowers are not directed towards stimuli. Such movements in plants are called as Nastic movements. Unlike tropic movement, nastic movements are independent of the stimuli direction and may or may not be growth movement.

15) How will you prove that shoots bent towards light? (OR) Experiment to demonstrate phototropism.

**Answer :** (i) Take pea seeds soaked in water overnight  
(ii) Wait for the pea seeds to germinate  
(iii) Once the seedling has grown put it in a box with an opening for light on one side.  
(iv) After sometime, it is observed that the stem has bent and grown towards the light. This proves the phototropism movement of the stem.

16) What are the differences between tropic and nastic movements.

**Answer :**

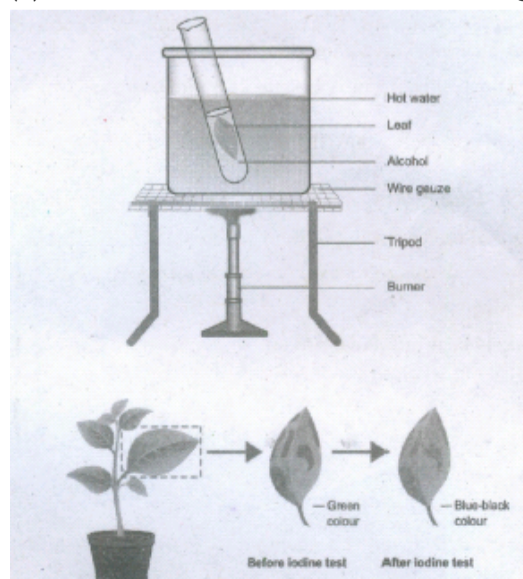
Tropic movements	Nastic movements
Unidirectional response to the stimulus	Non-directional response to the stimulus movements
Growth-dependent movements More or less permanent and irreversible Found in all plants	Growth independent movements Temporary and reversible few specialized plants immediate action.
Found in a plants Slow action	

17) Explain the experiment to prove that chlorophyll is essential for photosynthesis.

**Answer : Aim:** To show that chlorophyll is essential for photosynthesis.  
**Materials Needed:** Croton plant, boiling water, alcohol and iodine solution.

**Procedure:**

- (i) A potted croton plant is kept in dark room for 24 hours to de-starch the plant.
- (ii) Then keep the plant in sunlight for 4-5 hours.
- (iii) Variegated leaf is plucked from the plant.
- (iv) On a plain sheet draw the outline of a plucked leaf showing green area and non-green area.
- (v) The leaf is immersed in the boiling water then in alcohol it is tested for starch with iodine solution



**Observation:** It is observed that the patches of leaf with chlorophyll turn blue - black the other portion remain colourless.

**Conclusion:** This proves that chlorophyll is essential for photosynthesis.

18) Experiment to prove that sunlight is necessary for photosynthesis.

**Answer : Aim:** To show that sunlight is necessary for photosynthesis.

Materials Needed: Potted plant, black paper, boiling water, alcohol and iodine solution.

**Procedure:**

- (i) Potted plant is placed in a dark room for 2 days to de-starch its leaves.
- (ii) One of its leaves is covered with the thin strip of black paper on both sides.
- (iii) The potted plant is kept in bright sunlight for 4 or 6 hours.
- (iv) The selected covered leaf is plucked and the black paper is removed.
- (v) This leaf is immersed in boiling water and then in alcohol to remove chlorophyll.
- (vi) The leaf is now tested with iodine solution
- (vii) The covered part of the leaf does not change blue-black colour because it did not receive sunlight.
- (viii) The uncovered part of the leaf which received sunlight has able to synthesise starch and so it turns blue-black in colour.

**Conclusion:** This proves that light is essential for photosynthesis.

- 19) While conducting experiments to study the effects of various stimuli on the plants, it was observed that the roots of a plant X grow and bend towards two stimuli A and B but bend away from a third stimulus C. The stem of the plant X however bends away from stimulus A and B but bends towards the stimulus C. The stimulus B is known to act on the roots due to factors related with Earth. Keeping these points in mind, answer the following questions:
- (a) What could be stimulus A?
  - (b) Name the stimulus seen in B.
  - (c) What could be stimulus C?

**Answer :** a) Gravity (b) Water (c) Light.

- 20) An organism A which cannot move from one place to another makes a simple food B from the substances C and D available in the environment. This food is made in the presence of green coloured substance E present in organs F in the presence of light energy in a process called G Some of the simple food B also gets converted into a complex food H for storage purposes. This food gives blue-black colour with iodine solution?
- (a) What is (i) organism A (ii) food B and food H?
  - (b) What are C and D?
  - (c) Name (i) green coloured substance E and organ F.
  - (d) What is the process G?

**Answer :** (i) Green Plants, (ii) B - Glucose, H - Starch  
C = CO<sub>2</sub> ; D = H<sub>2</sub>O  
E = Chlorophyll ; F - Green leaf Photosynthesis.

**5 Marks**

5 x 5 = 25

- 21) Differentiate tropic and nastic movements.

**Answer :**

S.No	Tropic movements	Nastic movements
1.	Unidirectional response to the stimulus	Non - directional response to the stimulus
2.	Growth dependent movement	Growth independent movement.
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

- 22) Design an experiment to demonstrate hydrotropism.

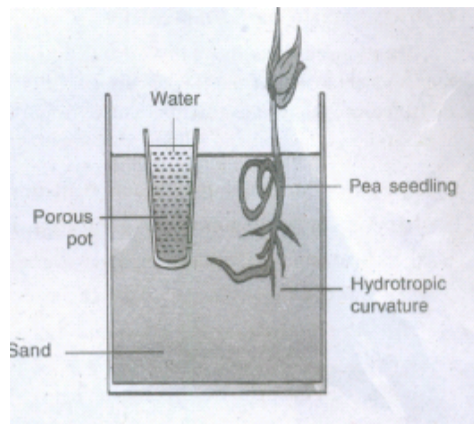
**Answer : Materials required:** Glass trough, sand, flower pot, plugged at the bottom, pea or bean seeds and water.

**Procedure:**

1. A glass trough is taken and is filled with sand. A flower pot containing water, plugged at the bottom is kept at the centre of the glass trough.
2. Soaked pea or bean seeds are placed around the pot in the sand, what do we observe after 6 or 7 days?

**Observation:** It will be observed that radicle has grown towards the pot and moisture instead of growing vertically downward.

**Inference:** It proves that primary root is positively hydrotropic.



- 23) Demonstrate geotropism with experiment.

**Answer :** 1. Two clinostates are taken and a potted plant on each is fixed on a horizontal position.

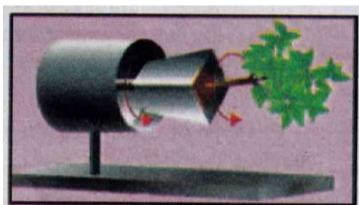
2. One clinostat is rotated and the other is kept stationary.

3. Observation made after some days.

4. It will show that the shoot of the plant fixed on the stationary clinostat bends upwards showing negative geotropism and the root bends downwards showing positive geotropism.

5. But there is no bending in the root and shoot of the plant fixed on the rotating clinostat.

6. This is due to the fact that gravitational stimulus is not unilateral and as it affects the sides of the rotating organ equally.



- 24) Prove chlorophyll is essential for photosynthesis.

**Answer : Aim:**

To show that chlorophyll is essential for photosynthesis.

**Instruments need:**

Coleus plant with variegated leaves, boiling water alcohol and Iodine solution.

**Procedure:**

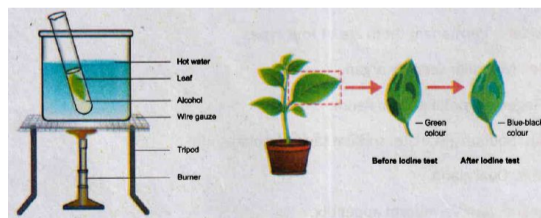
Variegated leaf is plucked from coleus plant keep in sunlight after destarching by keeping it in dark room for 24 hours. The picture of the leaf is drawn and the patches of chlorophyll as the leaf are marked. After immersing the leaf in boiling water then in alcohol it is tested for starch with Iodine solution

**Observation:**

The patches of the leaf with chlorophyll turn blue black. The other position remain colourless.

**Conclusion:**

The chlorophyll is essential for photosynthesis.



- 25) Prove sunlight is necessary for photosynthesis.

**Answer : Aim:**

To show that sunlight necessary for photosynthesis.

**Instruments need:**

Potted plants, black paper, boiling water, alcohol and Iodine solution.

**Procedure:**

A potted plant is placed in a dark room for about 2 days to destarching its leaves. One of its leaf is covered with the thin strip of black paper as shown the picture make sure that the leaf is covered on both sides. The potted plant is kept in bright sunlight for 4 to 6 hours. The selected covered leaf is plucked and the black paper removed. The leaf is immersed in boiling water for a few minutes and then in alcohol to remove chlorophyll. The leaf is now tested with Iodine solution for the presence of starch. The covered part of the leaf does not form blue black where as the uncovered part of the leaf turns blue-black colour. The covered part of the leaf which did not receive the sunlight was unable to synthesise starch hence it does not form blue black colour. But the uncovered part of the leaf which received sunlight was able to synthesise starch and so it turns blue black in colour.

**Conclusion:**

Sunlight is necessary for photosynthesis.