E. Answer the following questions in brief.

Q1. Write two functions of stems in plants.

Answer: Functions of stem in Plants are:

1. Stem bears leaves, buds, flowers and fruits.
2. Stem conducts water from the roots to the leaves and to the other parts of the plant body.
3. Stem supplies food from leaves to root.

Q2. How can we say that potato is a modified stem with sweet potato is a modified root?

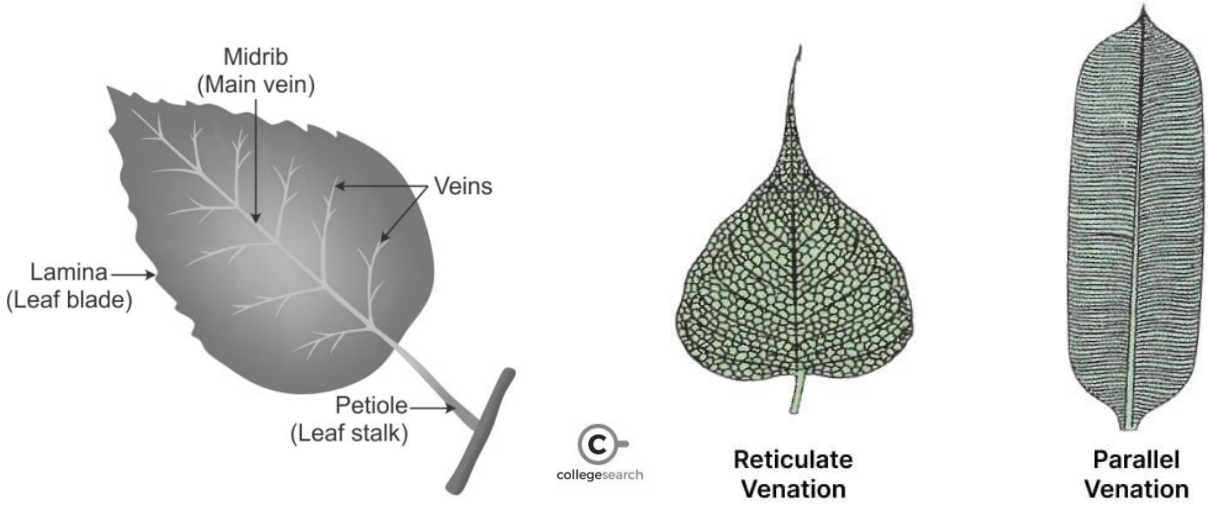
Answer: Sweet potato is a modified food storage root. Potato is indeed a stem that grew from stolons, the underground stems. *(Potato grows on the underground stem. This stem is known as stolon)* Potato tubers contain buds that produce leaves and stems, whereas roots lack these characteristics. On the other hand, sweet potato is indeed a root that is rich in vitamins and nutrients.

Q3. How is a cactus plants benefited by spines present on it? Which part of cactus plant gets modified to form these spines?

Answer: Cactus grows in desert environment, where there is scarcity of water. The leaves of cactus are modified into spines, to prevent water loss from the surface of leaves. The green stem of the cactus plant contains chlorophyll. Thus, the stem is the centre of photosynthesis in the cactus plants instead of the leaves.

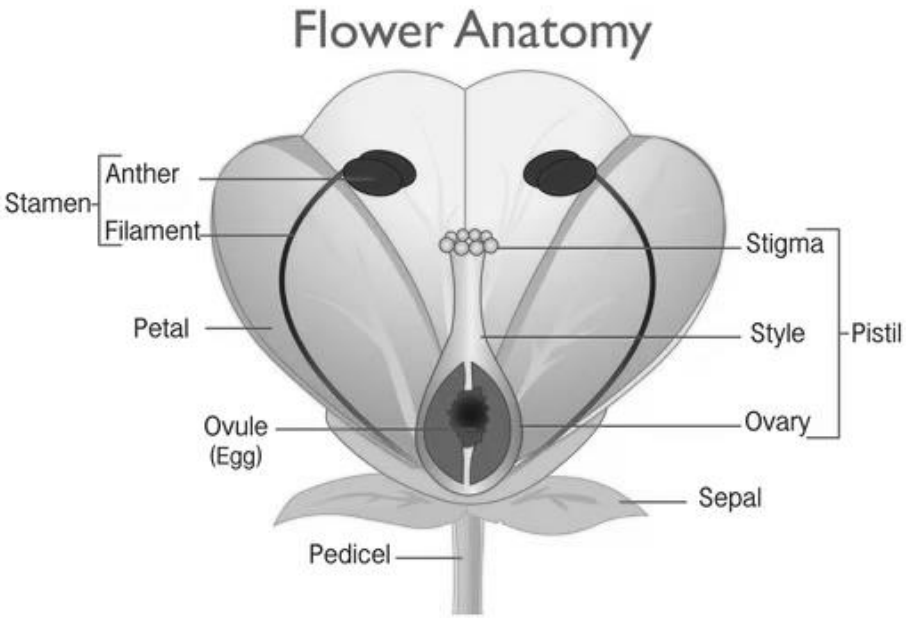
Q4. What is venation? Discuss the two types of venations in leaves of plants?

Answer: The arrangement or system of veins and veinlets in the leaf lamina is known as venation. There are two types of venation in leaf: Reticulate venation and Parallel venation.



Q5. Name the reproductive organ of a plant. What are the specialized reproductive part in it?

Answer: The reproductive part of a plant is the flower. A flower is the main reproductive part of an angiospermic plant. It has structures in four whorls, i.e. sepals, petals, stamens, and carpels. Stamens and carpels form the essential whorls as these constitute the fertile parts of a flower.



Q6. Write short notes on the following?

a. Pollination b. Stem tendril c. Climbing roots d. Photosynthesis

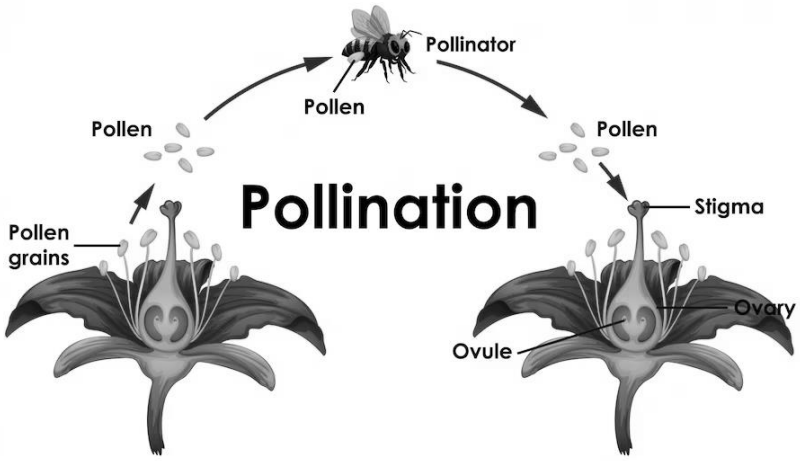
Answer:

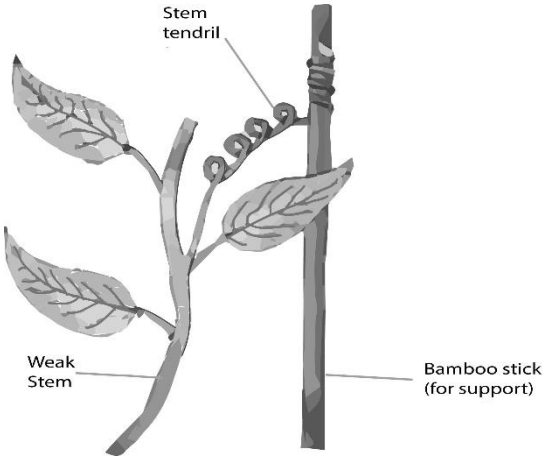
Pollination: Pollination is the act of transferring pollen grains from the male anther of a flower to the female stigma. The goal of every living organism, including plants, is to create offspring for the next generation. One of the ways that plants can produce offspring is by making seeds.

Stem tendril: Tendrils are thread-like thin growths on climbing portions' stems or leaves. Tendrils help in the climbing plants. Tendrils are touch-sensitive. They are positively thigmotropism, meaning they grow towards anything they come into contact with.

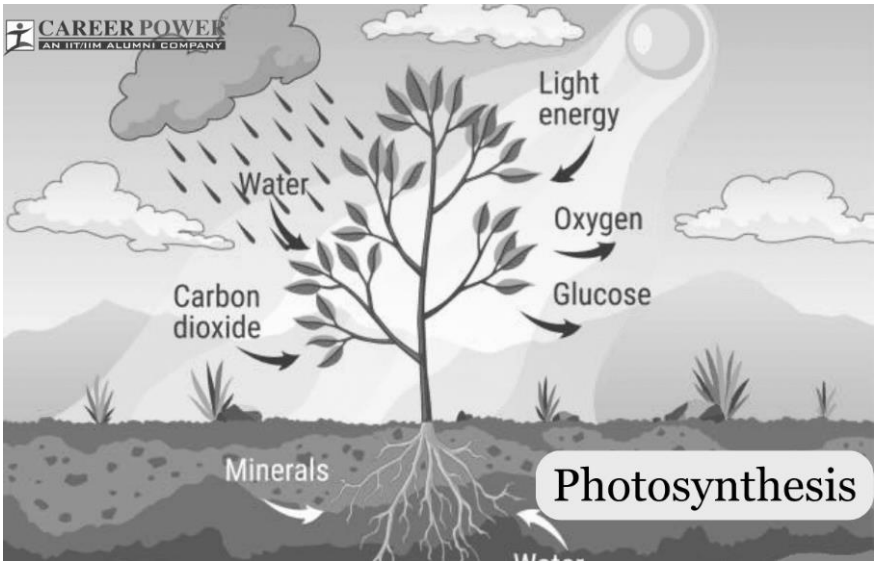
Climbing roots: Climbing roots are the adventitious roots that arise from the nodes or internodes in plants having weak stems. These roots help the plants in climbing by penetrating the cracks of the support, as in Pothos (money plant) or they may stick firmly to a support by secreting a cementing gummy substance, as in Ficus pumila.

Photosynthesis: Photosynthesis is the process in which solar energy is trapped by chlorophyll to convert carbon dioxide and water to produce food in the form of glucose. It is produced in plants where chlorophyll is present inside the chloroplast as trapping the solar energy initiates the process.





(Climbing roots)

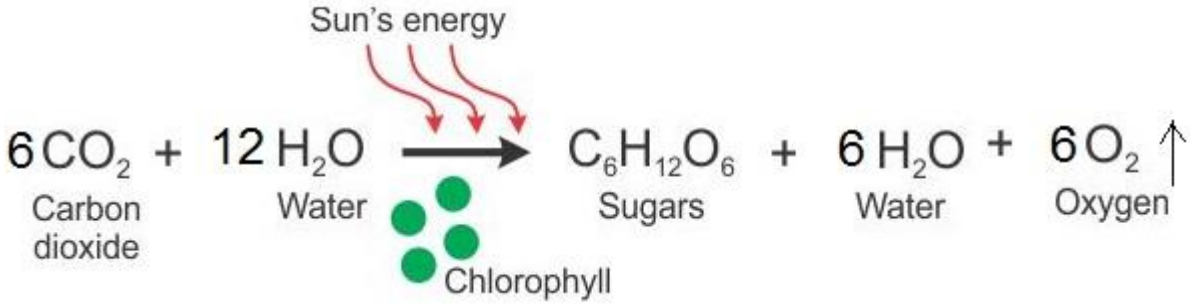


Q7. Write complete equation of photosynthesis.

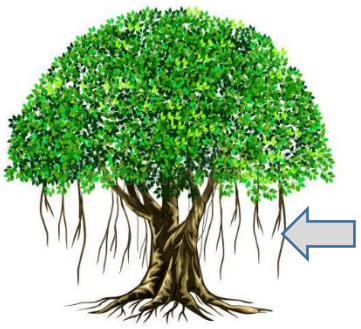
Answer: The process of photosynthesis is commonly written as:

$6CO2 + 12H_2O \rightarrow C_6H_{12}O_6 + 6O_2 + 6H_20$

This means that the reactants, six carbon dioxide molecules and six water molecules, are converted by light energy captured by chlorophyll (implied by the arrow) into a sugar molecule and six oxygen molecules, the products.



Q8. Observe the picture given below and answer the questions that follow:



A. Identify the structure

B. Write its function

C. Given example of plant having this structure.

Answer:

A. The aerial prop is a type of root are present in a banyan tree.

B. It grows and spreads branches to a large area. In order to provide additional support to huge branches it produces prop or pillar roots which are the type adventitious roots. These roots arise from aerial branches and grow vertically downwards. They ultimately enter the soil and bear underground adventitious roots again. After this these roots look like tree trunks only.

C. Example of plant with prop roots is rubber plants and the banyan tree.

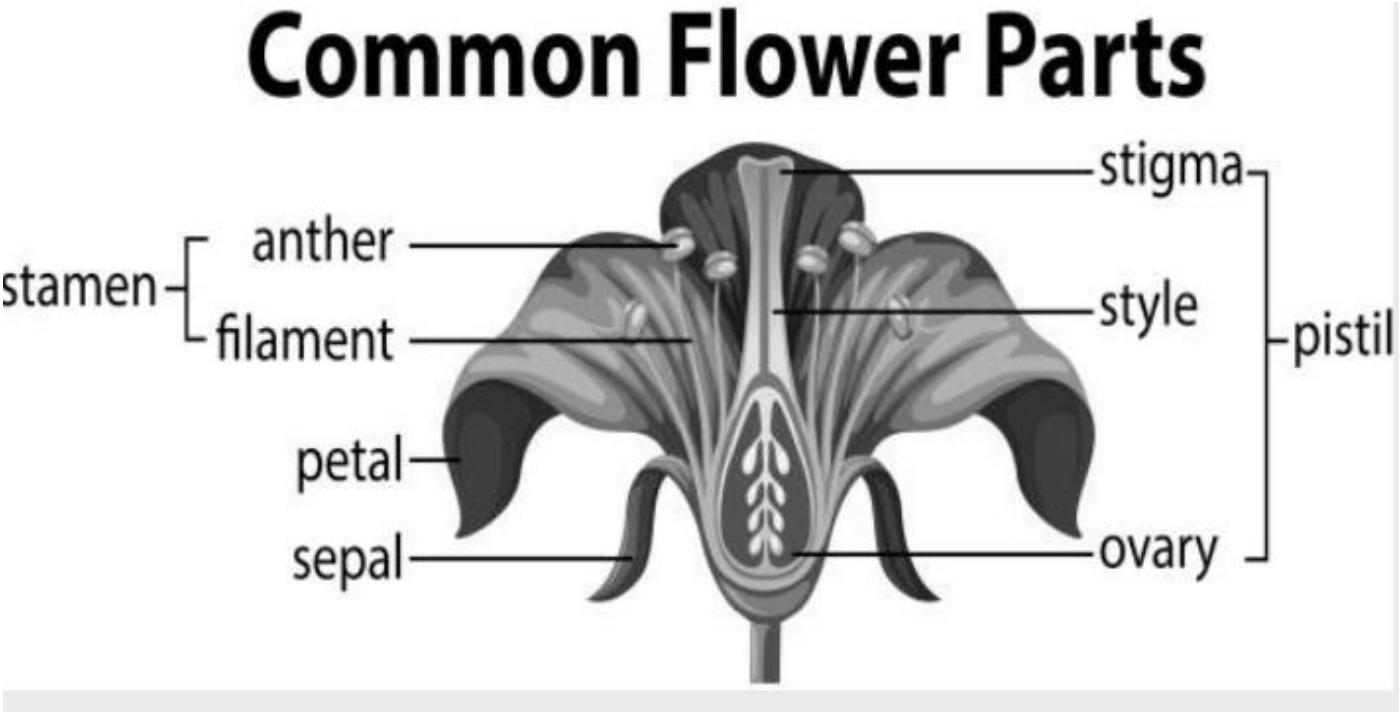
F. Answer the following question in detail.

Q1. Draw a neat labelled diagram of flowers. Name and label the part that.

A. attach the flower to the branch or stem.

B. Protect the flower in the bud stage

C. Are generally coloured.



Answer:

Petals: This is a bright-coloured part that attracts bees, insects, and birds. The colour of petals varies from plant to plant; some are bright while some are pale coloured. Thus, petals help us to differentiate one flower from another.

Sepals: Sepal is the green-coloured part beneath the petals to protect rising buds. Some flowers have fused petals-sepals while a few have separated petals-sepals.

The reproductive parts of a flower consist of the following:

Stamen: This is the male reproductive organ and is also known as Androecium. It consists of two parts namely: anther and filaments.

The **anther** is a yellowish, sac-like structure, involved in producing and storing the pollens.

The **filament** is a slender, threadlike object, which functions by supporting the anther.

Pistil: This is the innermost part and the female reproductive organ of a flower which comprises three parts -stigma, style and ovary. This is collectively known as the pistil.

Ovary: It is the ductless reproductive gland that holds a lot of ovules. It is the part of the plant where the seed formation takes place.

Q2. Transpiration amounts the loss of water in plants. Yet it is useful process both the plants and the environment. Justify.

Answer: transpiration in plant helps to protect Leaf of plants to become dry in summer by cooling its surface. And it is useful for environment because when plant transpirate in large amount it helps to maintain temperature of our surrounding.

(in detail)

Transpiration is very useful to plants-

1. Transpiratory pull will draw water from roots to the leaves of the tall trees for photosynthesis.

2. Transpiration also brings a cooling effect to the plants.

3. Minerals and other nutrients are also transported along with water to all parts of the plant.

4. Brings strength and rigidity in soft parts of the plant because the absorption of water makes plant cells rigid(stiff).

(Transpiration is the loss of water by the stomatal openings of the aerial parts of the plant. This helps in the upward movement of water and minerals from the roots to the leaves by a cohesion-adhesion mechanism.)

Q3. Roots may not always perform the function of anchorage and absorption. Give examples to justify.

Answer: Roots may not always perform the function of anchorage and absorption as some of the roots get modified to store food, provide additional support and help in respiration. For example: Roots of plants like carrot, reddish get modified to store food.

(in detail)

1. **Storage roots** are the roots modified to store food in them. E.g. Carrot, turnip, radish, sweet potato, etc.

2. **Respiratory roots** are the roots modified for respiration.

E.g. Roots of mangrove plants.

3. **Parasitic roots** are the roots which arise from the stem and absorb nourishment from the host plant. E.g. Cuscuta.

4. **Climbing roots** are the roots which help the plant to climb and cling onto a support. E.g. Money plant, betel.

5. **Reproductive roots** are the roots which help in the process of producing the offspring. E.g. sweet potato.

6. **Prop roots** are the roots which offer support to the huge structure of the tree. E.g. Banyan tree

Q4. Give the reasons for the following:

A. Pitcher plans can make food, yet has an insectivore's habit.

Answer: The plants like pitcher plants contain chlorophyll and are green in color, so they can carry out photosynthesis to synthesize a part of the required food by themselves. But they don't get the nitrogen from the soil in which they grow. So, insectivorous or carnivorous plants feed on small insects to collect the amount of nitrogen they need for their growth.

B. Stem prepares the food in cactus instead of leaves.

Answer: Cactus makes its food in stem through photosynthesis. The habitat of cactus is hot and dry so, to reduce the amount of water evaporation it lacks leaves. In absence of leaves, stems containing chlorophyll have to prepare food for its survival and spines are there all over the body to protect it from animals

C. Different plant parts may get modified to store food.

Answer: Plants prepare their food and store in the form of starch. They can store their food in different parts like roots, stems and leaves. Plants are modified to store food when they need to protect their food from the climatic conditions. Storing the food helps them to use it in winter and survive because there is very little sunlight available and so they photosynthesize less. For example, carrots store food in their roots and live on it all winter and in summers a new plant grows from these roots.

Roots are modified in some plants for storing reserve food materials. Roots that store food materials are called tuberous roots. Some plants like sweet potatoes, radish, carrot, and beetroot store food materials in their roots.

The plants which store food in their stem are cactus, bamboo, pineapple, potato, ginger, onion, banana, sugarcane etc.

There are many plants that store starch in their leaves. Examples of such plants are Cabbage, Spinach, lettuce, Banana, Onion, etc.

Fleshy layers of an onion are modified stem to store food produced by the leaves.

Underground stem that stores food is called Tuber. The stem tuber grows underground and stores the food in the form of starch. Example: Potato

Extra Questions:

Q1. How many systems does a flowering plant have? Name them.

Answer: A flowering plant has two systems. These are root system and the shoot system. The root system is the part of the plant that remains within the ground. The shoot system, on the other hand, is the part of the plant that grows above the ground.

Q2. In which kind of root system is there no thick main root? Give two examples of plants that have such a root system.

Answer: Thick main root is not found in fibrous root system. In this type of root system, roots generally arise from the stem base. Some examples of plants that have fibrous root system are barley and maize.

Q3. Plants need sunshine, air, water and mineral salts. Which of these are supplied by the root?

Answer: Roots provide water and mineral salts to the plants. Mineral salts and water are present in the soil and these substances are absorbed by the roots. These substances are then supplied to different parts of the plant.

Q4. Give one example each of the following

a. a small plant that will never grow up to be a big plant

b. a root that we eat

c. a plant that has additional roots emerging from its branches

Answer:

a. An example of a small plant that will never grow up to be a big plant is **tomato** plant.

b. One of the examples of root that we eat is **turnip**.

c. An example of a plant having additional roots that emerge from its branches is **sugarcane** plant.

Q5. Which substances does the stem help in transporting? Name the starting points and destinations of each substance.

Answer: A stem helps in the transportation of food, water and minerals to every part of the plant. The starting point for the absorption of minerals and water is the roots and these are destined for buds, fruits, flowers, fruits and leaves. The food is produced in the leaves and it is then transported to all parts of the plants.

Q6. Other than the main functions that almost all stems perform, there are other specialised functions performed by stems of some plants. Name two such plants and the specialised function performed by their stems.

Answer: In addition to the main functions such as conduction of water, food and minerals, stems can perform following specialised functions:

1. Provide support: In case of **grapewine**, the stem is modified into minute thread-like structures called **stem tendrils**. These stem tendrils have the ability to coil around any rough surface and provide support to the plant.

2. Store food: In case of **ginger**, the stem is modified to store food. The stem in this case lies underground and functions to store additional food material.

Q7. During photosynthesis, leaves convert water and carbon dioxide to a kind of sugar called glucose. If that is so, all food stored by the plant should be sweet. But this is not so. Why?

Answer: The glucose produced by the plants is further converted into a complex sugar called starch, which does not have a sweet taste. This is reason that all food stored by the plant is not sweet.

Q8. A plant is found to have fibrous roots. Can you say what kind of venation its leaves have?

Answer: Plants that have fibrous roots generally have **parallel venation**. In this type of venation, the veins of the leaves are aligned parallel to each other.

Q9. Leaves in some plants are modified to also perform functions other than making food. Name two such modifications and give one example of each.

Answer: In addition to making food for the plants, leaves can be modified to following structures in some plants:

1. Tendrils: In plants such as *Gloriosa,* leaves are modified into tendrils. These tendrils have the ability to coil across objects and provide support to the plants.

2. Spines: In certain desert plants such as **cactus**, the leaves are modified into spines. This modification allows cactus to minimise water loss and it also protects the plant from grazing animals.

Q10. Both stem and leaf can get modified into tendrils. True or false? If true, give one example of each. If false, give the correct statement.

Answer: It is true that both leaves and stems can be modified to form tendrils. The basic function of stem and leaf tendril is to provide support to the plant. Stem tendrils can be found in **passion flower plants**, whereas leaf tendrils are found in *Gloriosa* plant.

Q10. Unlike humans many flowers have the male and female organs in the same flower. Name these organs.

Answer: The male organ of a flower is called **stamen** and the female organ of a flower is called **carpel**. Stamens are formed by anther and filaments, whereas carpels are formed by ovary, style and stigma.

Q12.The relationship between a honeybee and a flower benefits both. How?

Answer: The relationship between flower and honeybee is beneficial for both because the flowers get pollinated with the help of honeybee and the honeybee obtains nectar from the flower. Thus, both flower and honeybee are mutually benefited.

Q13. What changes occur in a flower after pollination?

Answer: After pollination, following changes occur in a flower:

1. The ovary becomes swollen and is converted into a fruit.

2. The ovules develop into seeds after pollination.

Q14. What is the difference between creepers and climbers?

Answer:

Creepers	**Climbers**
These plants cannot stand upright and spread out in the ground.	These plants climb up with the help of a support.
Example: strawberry plant.	Example: Grapevine plant.

Q5. Name two plants in which food is stored in the stem.

Answer: Potatoes and onions are underground stems that are modified to store food.

Q6. What are the functions of the network of veins in a leaf?

Answer: The function of the network of veins in a leaf is to transport water, minerals and food. Also, it provides support to the leaf.

Q7. What is pollination?

Answer: Pollination is the transfer of the pollen grains from the anther to the stigma of same flower, or on to another flower, via wind, water or by insects.

Q8. How do prop roots help the plant?

Answer: Prop roots grow down from the branches and on reaching the ground fix themselves to the soil. They provide additional support to the large branches of some plants such as banyan tree.

Q9. The leaf is called the food factory of the plant. Why?

Answer: Leaf is called the food factory of the plants because it makes food for the plant through the process of photosynthesis.

Q10. Give the main functions of each of the following:

(a) root

(b) stem

(c) leaf

(d) flower

Answer:

(a) Root: They absorb water and minerals from the soil, thereby providing the important nutrients to the plant.

(b) Stem: They keep the plant upright. They transport water, minerals and food to all parts of plant.

(c) Leaf: The most important function of leaf is to prepare food via photosynthesis.

(d) Flower: The main function of a flower is to provide a platform for reproduction. It contains stamen as male and pistil as female reproductive parts.

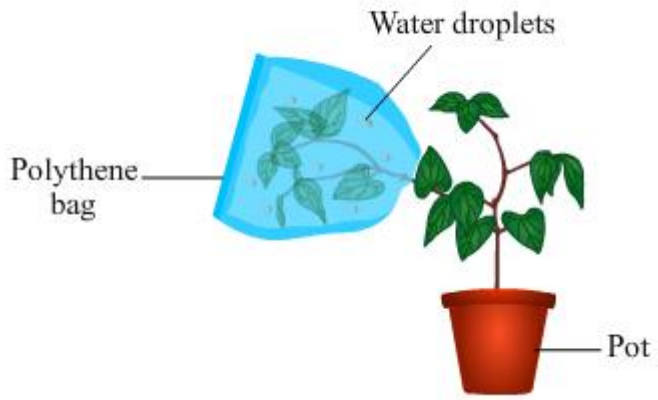
Q11. Explain the difference between tap roots and fibrous roots.

Answer:

Tap roots	Fibrous roots
It is the main root from which several branch roots arise.	It is formed by thin fibre like roots growing from the bottom of the stem.
Examples of plants with tap roots are pea, turnip, radish carrots.	Examples of plants with fibrous roots include wheat, maize, barley.

Q12. Draw a labelled diagram to show that transpiration occurs from leaves. How does transpiration help the plant?

Answer:



Leaves release water from the plant through the stomata through transpiration. When water vapour is removed from the leaves through the process of transpiration, more water is draw in from the roots. The water coming in from the roots also brings in more nutrients and minerals.

Q13. Is a small mango plant a herb? Give reasons.

Answer: A small mango plant cannot be categorised as a herb because the stem of even a small mango plant will be brown and hard which usually show a characteristic of the stem of a tree. This characteristic also indicates that the plant is still in the stages of growth, and has not attained the complete growth

Q14. Some flowers are not pollinated by insects but by wind. Do you think such flowers are as attractive as insect-pollinated ones?

Answer: The wind pollinating flowers are usually small, dull coloured and are scentless. Thus the insects are not attracted towards such type of flowers. The pollen grains in such type of flowers will be large in number and are dusty, so that they can be easily carried away by the winds. When both types of flowers are compared, the wind pollinated flowers are less attractive than the insect pollinated flowers.

(Extra Questions - 2)

Q1.What are the important parts of a flower?

The important parts of a flower include:

Sepals

Petals

Stamens

Pistil

Q2. How do flowers reproduce?

Flowers reproduce by a process called pollination. In this process, the male gametes are transferred to the female ovules where fertilization occurs and ovules grow into seeds within a fruit.

Q3.Give 10 uses of flowers.

History demonstrates that people have been using flowers for various reasons for thousands of years. Ten uses of flowers include:

Production of food

Origin of honey

Origin of medicine

Promote crop production and pollination

Enhance the neighbouring area

Provide fragrances and colognes

Decoration

Preparation of dyes

Pest deterrents

Promote breeding

Q4. What are the reproductive parts of a flower?

Stamen is the male reproductive part of a flower, while pistil is the female reproductive part of a flower. The stamen is surrounded by anther and filament. The anthers produce pollen grains.