

Chapter - 5 Morphology of Flowering Plants

Question-1

Give any two external features on the basis of which rhizomes are classified as modified underground stems.

Solution:

The two external features on the basis of which rhizomes are classified as modified underground stems are as follows

- (i) It is a prostrate and swollen stem growing horizontally under the soil.
- (ii) Nodes and internodes are well-marked.

Question-2

Give any two reasons to justify that onion bulb is a modified stem.

Solution:

Onion bulb is a modified stem because,

- (i) It has a large number of fleshy scale leaves.
- (ii) Terminal and axillary buds are present.
- (iii) On the lower posterior side, a cluster of adventitious roots are present.

Question-3

Write the difference between hypogynous and epigynous.

Solution:

Following are the differences between Hypogynous and Epigynous

Hypogynous	Epigynous
(i) The floral parts originate below the ovary.	(i) The floral parts originate above the ovary.
(ii) Ovary is superior.	(ii) Ovary is inferior.

Question-4

What is phyllotaxy?

Solution:

Phyllotaxy is an arrangement of leaves on the stem or branch. It may be alternate or opposite. In the case of alternate arrangement, the single leaf arises at each node. In opposite phyllotaxy, two leaves arise at each node opposite to each other.

Question-5

Mention the four different conditions of stamens.

Solution:

The four different conditions of stamens are,

(i) Monodelphous:

The filaments are all fused to form one bundle.

(ii) Diadelphous:

The filaments are fused to form two bundles.

(iii) Polyadelphous:

The filaments are fused to form many bundles.

(iv) Syngenesious:

The filaments are free but anthers are fused.

Question-6

What is Cymose Inflorescence?

Solution:

Cymose inflorescence is an inflorescence where the floral axis ends in a flower and the remaining flowers are arranged in a basipetal manner.

Question-7

What are Haustoria?

Solution:

Haustoria are the specialized structures of certain parasitic plants and fungi that penetrate the cells of the host plant to absorb nutrients.

Question-8

List the various functions of roots.

Solution:

The important functions of roots are listed below

- (i) The roots fix the plant to the soil.
- (ii) Roots absorb nutrients and water from the soil.
- (iii) Roots conduct absorbed materials from the soil to the aerial parts of the plant.
- (iv) In addition to the above functions, some adventitious roots perform different functions, like, in *Cuscuta*, they absorb food from the host's body, in banyan, the prop roots provide support to the plant, in maize, *Rhizophora*, they support the plant and in *Tinospora*, the green roots perform the function of photosynthesis. Some roots perform the function of storage of food and reproduction.

Question-9

How do leaves get modified? Describe some of the important modifications of the leaf that you have studied giving suitable example.

Solution:

The normal functions of leaves are photosynthesis, respiration and transpiration. Besides these functions, certain leaves have to perform other functions. Hence, they modify themselves in different ways as follows,

(i) Tendril:

In some plants, the entire leaf or parts of it gets modified into a coiled thread-like structure called 'tendril'. Tendrils help the plant to climb up. **E.g.** *Gloriosa*.

(ii) Spine:

In many plants, the leaves or their apices are modified into thin, sharp and pointed structures known as spines. They help in defense. **E.g.** *Opuntia*.

(iii) Scale leaves:

In onion, mostly all the leaves are present in the form of fleshy scale leaves.

(iv) Pitcher:

It is the modification of leaf in insectivorous plants. The lamina takes the form of a pitcher and the apex is in the form of a lid to trap the insects. There are a number of digestive glands in the inner walls of the pitcher. These glands secrete a fluid, which digests insects. **E.g.** *Nepenthes*.

(v) Phyllode:

In this type of modification, the petiole becomes green, flattened and leaf-like and is called phyllode. **E.g.** *Acacia*.

Question-10

Write the difference between the leaflets of a compound leaf and simple leaves on a branch.

Solution:

Leaflets of a compound leaf	Simple leaves on a branch
(i) The lamina is divided into leaflets in a compound leaf.	(i) The lamina of a simple leaf on a branch is entire.
(ii) Leaflets are not arranged in acropetal succession.	(ii) Simple leaves are arranged in acropetal succession.
(iii) Axillary bud is absent.	(iii) Axillary bud is present

Question-11

Pick out the plants with palmate type of compound leaves from the list given below:

Bitter gourd, rose and silk cotton.

Solution:

Silk cotton.

Question-12

Which part of the plant leaf is modified to form spines of *Acacia* and sheath covering the leaf of *Ficus elastica*?

Solution:

Stipules of the plant leaf are modified to form spines of *Acacia* and sheath covering the leaf of *Ficus elastica*.

Question-13

Distinguish between dicot flower and monocot flower.

Solution:

Dicot flower	Monocot flower
Dicots may be herbaceous (for example, a tomato plant) or woody (for example, a hickory tree). Their leaves vary in shape but usually are broader than monocot leaves, with netted veins (branched veins resembling a net).	Monocots are mostly herbaceous plants with long, narrow leaves that have parallel veins (the main leaf veins run parallel to one another).
Flower parts usually occur in fours or fives or multiples thereof.	The flower parts of monocot flowers usually occur in threes or multiples of three. For example, a flower might have three sepals, three petals, six stamens, and a compound pistil consisting of three fused carpels.
Two cotyledons are present in dicot seeds, and endosperm is usually absent in the mature seed, having been absorbed by the two cotyledons.	Monocot seeds have a single cotyledon, or embryonic seed leaf, and endosperm, nutritive tissue is usually present in the mature seed.
The vascular bundles in the stem cross-section of dicots are arranged in a circle, or ring.	In monocots, the vascular bundles in the stem cross-section are usually scattered or more complex of an arrangement as compared to dicots.
The roots are a taproot system.	The roots are a fibrous root system.

Question-14

Pick out the plant with whorled arrangement of leaves from the list given below:

Neem, Nerium and Nepenthes.

Solution:

The leaves of Nerium show whorled arrangement. This arrangement is not found in Neem or Nepenthes.

Question-15

Which part of the plant is modified into:

(i) Pitcher in pitcher plant

(ii) Tendrils in pumpkin

(iii) Haustoria in cuscuta

(iv) Tendrils in pea.

Solution:

Part of the plant	Modification
(i) Pitcher in pitcher plant.	Lamina of the leaf of the pitcher plant is modified into pitcher.
(ii) Tendrils in pumpkin.	Auxiliary bud.
(iii) Haustoria's in cuscuta.	Root.
(iv) Tendrils in pea.	The upper leaflets of the pinnate compound leaf are modified into tendrils in pea (Pisum sativum).

Question-16

Write the floral structure of the family liliaceae E.g Tulbaghia violacea –
Common name (Society Garlic).

Solution:

Floral structure of family Liliaceous:

Calyx: 3 sepals.

Corolla: 3 petals (sepals 'petaloid' - 6 'tepals' with calyx evident by relative position only).

Androecium: 6 stamens.

Gynoecium: 3 carpel's (ovary septa) fused. It is a typical Monocot.

Question-17

How will you differentiate a dichlamydeous flower from a monochlamydeous one?

Solution:

A flower is said to be dichlamydeous, when the perianth is double, both calyx and corolla being present and distinct. A flower is said to be monochlamydeous, when the perianth is single, whether by the union of the calyx or corolla.

Question-18

Why is a flower considered to be a modified shoot?

Solution:

Evolutionarily speaking a flower is a modified shoot. Just as a shoot is comprised of leaves and stem, flowers originate from vegetative leaves and stem. The "leafy" origin of a flower is readily apparent in the sterile outer parts (petals, sepals). Except for some of the more primitive angiosperms, it is difficult to observe the "leafy" origin of the fertile, inner parts (androecium and gynoecium). The flowers of primitive plants exhibit their foliar nature to a greater degree. The flower stalk (pedicel) and axis (receptacle) supporting the floral parts evolved from a shortened stem axis. The flower is the key feature of angiosperms. Flowers are complex organs that produce the male and female gametophytes. Hence, a flower is considered to be a modified shoot.

Question-19

Write about the success, importance and the features of angiosperm.

Solution:

Success

Angiosperms are the most evolutionary successful group of plants (supported by their predominance in most landscapes). There are about 300 families of angiosperms with about 300,000 species.

Importance

Flowering plants are important to humans in many ways like (a) food; (b) medicine; (c) shelter; (d) paper; (f) perfumes and spices; (g) rubber (h) sweeteners; (i) beverages; (j) energy (i.e., coal, oil gas are really just partially decomposed, metamorphosed plants; (k) oils, paints; (l) and lots more.

Features

Angiosperms are characterized by (1) Vessels in wood; (2) Flowers (modified microsporophyll and megasporophylls); (3) Fruits - ovules surrounded by capillary sporophylls ovary.

Question-20

How are seeds formed?

Solution:

Flowers are brightly colored or patterned and contain a fragrance or nectar when they must attract pollinators, such as insects, animals or birds. In the process of searching for nectar, these pollinators will transfer pollen from flower to flower. The stigma contains a chemical that excites the pollen, causing it to grow a long tube down the inside of the style to the ovules inside the ovary. The sperm is released by the pollen grain and fertilization occurs. Fertilization is the union of the male sperm nucleus from the pollen grain and the female egg found in the ovary. If fertilization is successful, the ovule will develop into a seed.