

**MULTIPLE CHOICE QUESTIONS**

**1. Rearrange the following zones as seen in the root in vertical section and choose the correct option.**

- A. Root hair zone**
- B. Zone of meristems**
- C. Rootcap zone**
- D. Zone of maturation**
- E. Zone of elongation**

**Options:**

- a. C, B, E, A, D**
- b. A, B, C, D, E**
- c. D, E, A, C, B**
- d. E, D, C, B, A**

**Solution;**

Option (a) is the answer.

**2. In an inflorescence where flowers are borne laterally in acropetal succession, the position of the youngest floral bud in the floral axis shall be**

- a. Proximal**
- b. Distal**
- c. Intercalary**
- d. Anywhere**

**Solution:**

Option (b) is the answer.

**3. The mature seeds of plants such as gram and peas possess no endosperm, because of**

- a. These plants are not angiosperms**
- b. There is no double fertilization in them**
- c. The endosperm is not formed in the**
- d. Endosperm gets used up by the developing embryo during seed development**

**Solution:**

Option (d) is the answer.

**4. Roots developed from parts of the plant other than radicle are called**

- a. Taproots**
- b. Fibrous roots**
- c. Adventitious roots**
- d. Nodular roots**

**Solution:**

Option (c) is the answer.

**5. Venation is a term used to describe the pattern of arrangement of**

- a. Floral organs
- b. Flower in inflorescence
- c. Veins and veinlets in a lamina
- d. All of them

**Solution:**

Option (c) is the answer.

**6. The endosperm, a product of double fertilization in angiosperms is absent in the seeds of**

- a. Coconut
- b. Orchids
- c. Maize
- d. Castor

**Solution:**

Option (b) is the answer.

**7. Many pulses of daily use belong to one of the families below (tick the correct answer)**

- a. Solanaceae
- b. Fabaceae
- c. Liliaceae
- d. Poaceae

**Solution:**

Option (b) is the answer.

**8. The placenta is attached to the developing seed near the**

- a. Testa
- b. Hilum
- c. Micropyle
- d. Chalaza

**Solution:**

Option (b) is the answer.

**9. Which of the following plants is used to extract the blue dye?**

- a. Trifolium
- b. Indigofera
- c. Lupin
- d. Cassia

**Solution:**

Option (b) is the answer.

**10. Match the following and choose the correct option**

Column I	Column II
A. Aleurone layer	i. without fertilization
B. Parthenocarpic fruit	ii. Nutrition
C. Ovule	iii. Double fertilization

**D. Endosperm**

**iv. Seed**

**Options:**

- a. A-i, B-ii, C-iii, D-iv
- b. A-ii, B-i, C-iv, D-iii
- c. A-iv, B-ii, C-i, D-iii
- d. A-ii, B-iv, C-i, D-iii

**Solution:**

Option (b) is the answer.

**VERY SHORT ANSWER TYPE QUESTIONS**

**1. Roots obtain oxygen from the air in the soil for respiration. In the absence or deficiency of O<sub>2</sub>, root growth is restricted or completely stopped. How do the plants growing in marshlands or swamps obtain their O<sub>2</sub> required for root respiration?**

**Solution:**

In some plants such as Rhizophora growing in swampy areas, many roots come out of the ground and grow vertically upwards. Such roots, called pneumatophores, help to get oxygen for respiration.

**2. Write the floral formula for a flower which, is bisexual; actinomorphic; pentamerous sepal, petal, stamens free with the ovary, syncarpous, superior, trilocular with axile placentation.**

**Solution:**



**3. In Opuntia, the stem is modified into a flattened green structure to perform the function of leaves (i.e., photosynthesis). Cite two other examples of modifications of plant parts for photosynthesis.**

**Solution:**

In Australian Acacia the petiole takes the shape of the leaf and turns green to perform the function of photosynthesis.

The stem, i.e., about one internode long modifies into a leaf-like structure to carry out photosynthesis, as in Asparagus.

**4. In swampy areas like the Sunderbans in West Bengal, plants bear special kind of roots called \_\_\_\_\_.**

**Solution:**

In swampy areas like the Sunderbans in West Bengal, plants bear special kind of roots called pneumatophores.

**5. In aquatic plants like Pistia and Eichhornia, leaves and roots are found near \_\_\_\_\_.**

**Solution:**

In aquatic plants like Pistia and Eichhornia, leaves and roots are found near Node.

**6. Reticulate and parallel venation are characteristic of \_\_\_\_\_ and \_\_\_\_\_ respectively.**

**Solution:**

Reticulate and parallel venation is characteristic of dicotyledons and monocotyledons respectively.

**7. Which parts in ginger and onion are edible?**

**Solution:**

In ginger, the edible part is a rhizome which is modified shoot that stores food materials. The edible part of the onion is fleshy scale leaves.

**8. In epigynous flower, ovary is situated below the \_\_\_\_\_.**

**Solution:**

In epigynous flower, the ovary is situated below the sepals, petals and androecium.

**9. Add the missing floral organs of the given floral formula of Fabaceae.**

$$\phi \bar{\square} K_{(5)} \rightarrow A_{(g+1)} \underline{G}_1$$

**Solution:**

The given floral formula lacks Corolla. The floral formula of the family Fabaceae is

$$Br \oplus \bar{\square} K_5 C_{1+2+(2)} A_{1+(9)} \underline{G}_1$$

**10. Name the body part modified for food storage in the following**

- a. Carrot \_\_\_\_\_
- b. Colocasia \_\_\_\_\_
- c. Sweet potato \_\_\_\_\_
- d. Asparagus \_\_\_\_\_
- e. Radish \_\_\_\_\_
- f. Potato \_\_\_\_\_
- g. Dahlia \_\_\_\_\_
- h. Turmeric \_\_\_\_\_
- i. Gladiolus \_\_\_\_\_
- j. Ginger \_\_\_\_\_
- k. Portulaca \_\_\_\_\_

**Solution:**

- a. Carrot – Root

- b. Colocasia – Stem
- c. Sweet potato – Root
- d. Asparagus – Root
- e. Radish – Root
- f. Potato – Stem
- g. Dahlia – Root
- h. Turmeric – Stem
- i. Gladiolus – Stem
- j. Ginger – Stem
- k. Portulaca – Root

### SHORT ANSWER TYPE QUESTIONS

**1. Give two examples of roots that develop from different parts of the angiosperms plant other than the radicle.**

**Solution:**

Banyan tree – roots develop from the lower nodes of the stem. They are prop roots which grow downwards and touch the soil. They meant for support.

Sugarcane – roots arise from the lower nodes of stem and enter the soil. They are stilt roots which are meant to provide strength to the plant.

**2. The essential functions of roots are anchorage and absorption of water and minerals in the terrestrial plant. What functions are associated with the roots of aquatic plants? How are the roots of aquatic plants and terrestrial plants different?**

**Solution:**

The aquatic plants don't have to face problem in obtaining the water. Therefore the main function of the roots of the aquatic plants is anchorage.

Aquatic plants	Terrestrial plants
Roots are either absent or underdeveloped Vascular bundles are not well developed Modifies to carryout photosynthesis food storage and exchange of gases	Roots are well developed Vascular bundles are well developed Provide anchorage and help in the absorption of nutrients from the soil

**3. Draw diagrams of a typical monocot and dicot leave to show their venation pattern.**

**Solution:**



**Parallel  
venation**



**Reticulate  
venation**

**4. A typical angiosperm flower consists of four floral parts. Give the names of the floral parts and their arrangements sequentially.**

**Solution:**

**Calyx** – It is the outermost whorl of the flower and the members are called sepals which are green, leaf-like and protects the flower in the bud stage.

**Corolla** – It is composed of petals. Petals are usually brightly coloured to attract insects for pollination.

**Androecium** – It is composed of stamens. Each stamen which represents the male reproductive organ consists of a stalk or a filament and an anther.

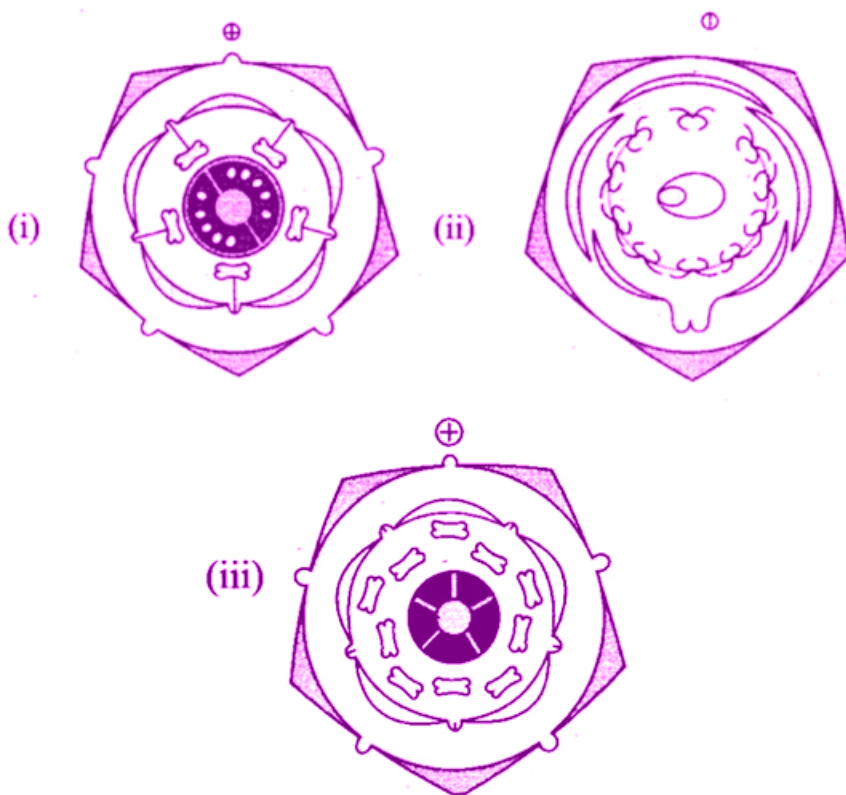
**Gynoecium** – It is the female reproductive part of the flower and is made up of one or more carpels. A carpel consists of three parts namely stigma, style and ovary.

**5. Given below are floral formulae of some plants. Draw floral diagrams from these formulae.**



**Solution:**





**6. Reticulate venation is found in dicot leaves while in monocot leaves venation is of parallel type. Mention one exception to this generalization.**

**Solution:**

Similar and Dioscorea are monocots having reticulate venation. Calophyllum and Eryngium are dicots parallel venation.

**7. You have heard about several insectivorous plants that feed on insects. Nepenthes or the pitcher plant is one such example, which usually grows in shallow water or marshlands. What part of the plant is modified into a 'pitcher'? How does this modification help the plant for food even though it can photosynthesize like any other green plant?**

**Solution:**

The pitcher plant can't photosynthesize like other green plants so it gets its food from the insects as these insects are a good source of Nitrogen for the insectivorous plants.

**8. Mango and coconut are 'drupe' type of fruits. In mango fleshy mesocarp is edible. What is the edible part of coconut? What does milk of tender coconut represent?**

**Solution:**

The edible part of the coconut is the endosperm. The milk of tender coconut represents the oily endosperm in liquid form. Later it gets deposited along the walls of endocarp and forms edible flesh.

**9. How can you differentiate between free central and axile placentation?**

**Solution:**

When the placenta is axial and the ovules are attached to it in a multilocular ovary, the placentation is said to be axile. Examples - china rose, tomato and lemon.

When the ovules are borne on the central axis and septa are absent, the placentation is called free central. Examples - Dianthus and Primrose.

**10. Tendrils are found in the following plants. Identify whether they are stem tendrils or leaf tendrils. a. Cucumber**

**b. Peas**

**c. Pumpkins**

**d. Grapevine**

**e. Watermelons**

**Solution:**

a. Cucumber – Stem tendrils

b. Peas – Leaf tendrils

c. Pumpkins – stem tendrils

d. Grapevines – stem tendrils

e. Watermelons – stem tendrils

**11. Why is maize grain usually called as a fruit and not a seed?**

**Solution:**

The maize grain is usually called fruit because it is a ripened ovary which contains a ripened ovule.

**12. Tendrils of grapevines are homologous to the tendril of pumpkins but are analogous to that of a pea. Justify the above statement.**

**Solution:**

The tendrils of grapevines are homologous to the tendril of pumpkins as both are originated from the same part of the plant i.e. stem but have different functions. In grapevines, the function of tendrils is to climb while in pumpkin is creeping.

**13. The rhizome of ginger is like the roots of other plants that grow underground. Despite this fact, ginger is a stem and not a root. Justify.**

**Solution:**

Ginger is a stem, not a root because it possesses nodes and internodes which are not possessed by the roots.

**14. Differentiate between**

**a. Bract and Bracteole**

**b. Pulvinus and petiole**

**c. Pedicel and peduncle**

**d. Spike and spadix**

**e. Stamen and staminoid**

**f. Pollen and pollenium**

**Solution:**

a. A bract is present at the base of the pedicle whereas bracteolate is present between bract and flower.

b. Pulvinus is swollen leaf base present in the leguminous plants whereas petiole is a subcylindrical stalk



which connects the leaf base with the lamina.

c. The pedicle is a stalk of flower and peduncle is a stalk of whole inflorescence

d. Spike is that the flowers are sessile that develop on an elongated peduncle in acropetal succession whereas spadix is covered by one of the few large bracts called spates

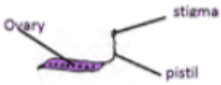





e. Stamen represents a male reproductive organ whereas sterile stamen is called stamina.

f. Pollen is a male gametophyte of angiosperms whereas polonium is the group of pollen grains.

## LONG ANSWER TYPE QUESTIONS

**1. Distinguish between families Fabaceae, Solanaceae, Liliaceae based on gynoecium characteristics (with figures). Also, write economic importance of any one of the above family.**

**Solution:**

Fabaceae	Solanaceae	Liliaceae
Ovary superior, monocarpellary, unilocular with many ovules, style single	Bicarpellary, obligately placed, syncarpous; ovary superior, bilocular, placenta swollen with many ovules, axile	Tricarpellary, ayncarpous, ovary superior, trilocular with many ovules; axile placentation
		
		

**2. Describe various stem modifications associated with food storage, climbing and protection.**

**Solution:**

i) Food storage – Underground stems of potato, ginger, turmeric, Samarkand, Colocasia are modified to store food in them.

ii) Climbing – Stem tendrils which develop from axillary buds, are slender and spirally coiled and help plants to climb such as in gourds (cucumber, pumpkins, watermelon) and grapevines.

iii) Protection – Axillary buds of stems may also get modified into woody, straight and pointed thorns. Thorns are found in many plants such as Citrus, Bougainvillea.

**3. Stolon, offset and rhizome are different forms of stem modifications. How can these modified forms of stem be distinguished from each other?**

**Solution:**

Stolon is underground stems which spread to new niches and when old plants die, new are formed. It is a creeper.

Offset is a lateral branch with short internodes and each node bearing a rosette of leaves and tuft of roots is found in aquatic plants.

The rhizome is an underground stem growing parallel to soil surface which is differentiated from roots in having scale leaves and auxiliary buds and helps in vegetative propagation.

**4. The mode of arrangements of sepals or petals in a floral bud is known as aestivation. Draw the various types of aestivation possible for a typical pentamerous flower.**

**Solution;**

There are 4 types of aestivation.

i. Valvate

When sepals or petals in a whorl just touch one another at the margin, without overlapping, as in Calotropis, it is said to be valvate.

ii. Twisted

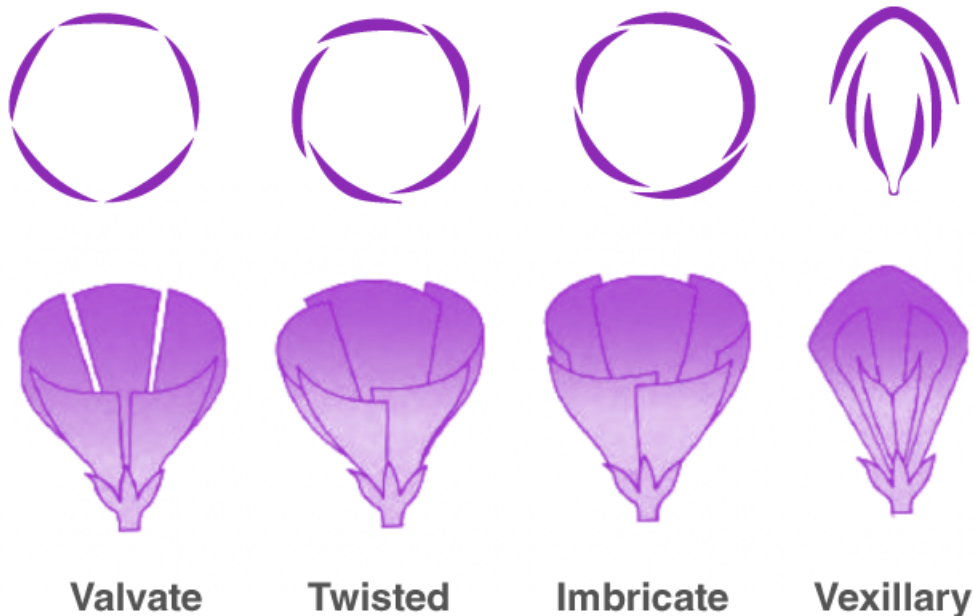
If one margin of the appendage overlaps that of the next one and so on as in china rose, lady's finger and cotton, it is called twisted.

iii. Imbricate

If the margins of sepals or petals overlap one another but not in any particular direction as in Cassia and Gulmohar, the aestivation is called imbricate.

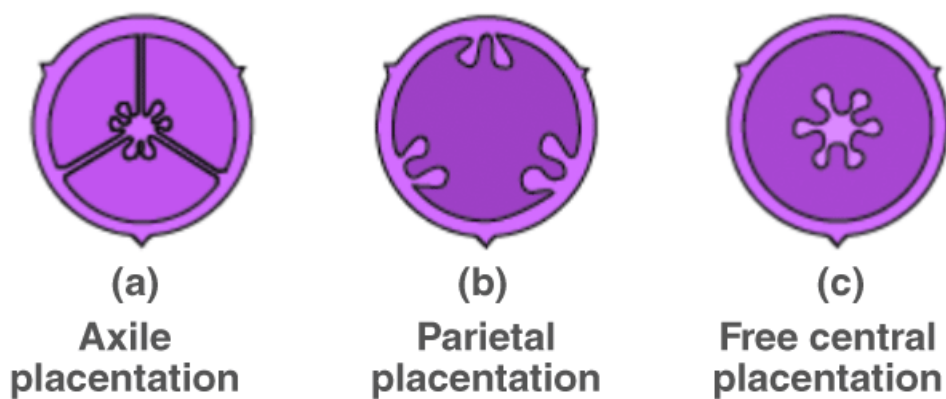
iv. Vexillary

In pea and bean flowers, there are five petals, the largest (standard) overlaps the two lateral petals (wings) which in turn overlap the two smallest anterior petals (keel); this type of aestivation is known as vexillary.



5. The arrangements of ovules within the ovary are known as **placentation**. What does the term **placenta** refer to? Name and draw various types of placentation's in the flower as seen in T.S. or V.S.

**Solution:**



The mode of attachment of ovule to the placenta is known as **placentation** which is of the following types: Parental, Marginal, Axile, Free central and Basal.

6. **Sunflower is not a flower. Explain.**

**Solution:**

Sunflower is not a flower but a type of inflorescence called **capitulum** in which the receptacle is

flattened. The whole cluster of florets gets surrounded by bracts, known as an involucre. Two kinds of florets are recognised in sunflower:

- (i) Ray Florets - Arranged on the rim of a receptacle having distinct yellow and strap-shaped petals. These florets are female, sterile and are always zygomorphic and may be arranged in one or more whorls.
- (ii) Disc florets - Grouped in the centre, bisexual and actinomorphic.

**7. How do you distinguish between hypogeal germination and epigeal germination? What is the role of the cotyledon (s) and the endosperm in the germination of seeds?**

**Solution:**

Role of Cotyledons and Endosperm in the germination of seeds –

They contain reserved food materials. When seed imbibes water, enzymes get activated, hydrolyze reserve food material and make it available for the germinating seed.

Hypogeal germination is that epicotyl grows first and the only plumule is pushed out of the soil. The cotyledons remain non-green and non-photosynthetic.

In Epigeal germination, hypocotyl grows first. It pushes cotyledons and other parts of the seed out of the soil. Cotyledons become green and photosynthetic.

**8. Seeds of some plants germinate immediately after shedding from the plants while in other plants they require a period of rest before germination. The latter phenomenon is called dormancy. Give the reasons for seed dormancy and some methods to break it.**

**Solution:**

Reasons for seed dormancy –

- Impermeable and hard seed coat
- Presence of chemical inhibitors like abscisic acid
- Immature embryo

Methods to break seed dormancy are –

- Washing away of inhibitors due to rain
- Maturation of embryo
- Inactivation of growth inhibitors due to heat or cold treatment.
- Weakening and decomposition of seed coat by microorganisms.