6. Differentiate between
(a) Racemose and cymose inflorescence
(b) Fibrous root and adventitious root
(c) Apocarpous and syncarpous ovary
Solution:
(a) Differences between racemose and cymose inflorescence are as follows:

	Racemose inflorescence	**Cymose inflorescence**
(i)	The main axis continues to grow.	The main axis terminates in a flower.
(ii)	Growth is unlimited.	Growth is limited.
(iii)	The flowers are borne in an acropetal succession.	Flowers are borne in a basipetal succession.
(iv)	The grouping of flowers is less common and arrangement of flowers in a group is centripetal.	The grouping of flower is more common and arrangement of flowers in a group is centrifugal.

(b) Differences between fibrous and adventitious roots are as follows :

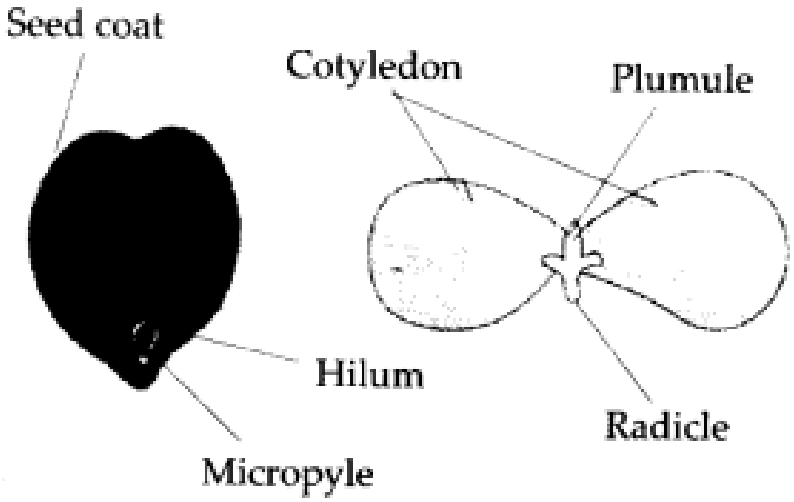
	Fibrous root	Adventitious root
(i)	It occurs in place of tap root system at the base of main stem.	Roots arise from various parts of the plant other than the radicle.
(ii)	The roots are thin and fibrous.	The roots can be thin, thick or variously modified.
(iii)	The root system is underground.	It can be underground or above ground.
(iv)	Fibrous root system takes part in fixation of plant, absorption of water and mineral salts etc.	It performs several functions like clinging, support, storage, reproduction, fixation, absorption, etc.

(c) Differences between apocarpous and syncarpous ovary are as follows :

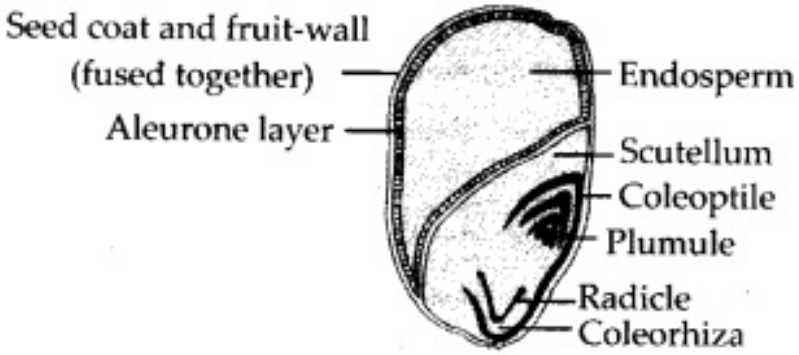
	Apocarpous ovary	Syncarpous ovary
(i)	The flower has several free ovaries.	There is a single ovary.
(ii)	It is always unilocular.	It can be unilocular or multilocular.
(iii)	On maturity it forms fruitlet of aggregate type.	On maturity it forms a simple fruit.

7. Draw the labelled diagram of the following:
(i) Gram seed
(ii) V.S of maize seed.
Solution:

(i) Gram seed.



(ii) V.S of maize seed.



8. Describe modifications of stem with suitable examples.
Solution: Stems are modified to perform different functions. Underground stems of some plants are modified to store food in them. They also act as organs of perennation to tide over conditions unfavourable for growth. Different modifications of stem are:
(i) Underground modifications
(ii) Sub-aerial modifications
(iii) Aerial modifications

(i) Underground modifications of stem are discussed as follows:

- Tuber: It is the branch of main stem which accumulates or stores food in it and swells up, e.g., Solarium tuberosum (potato).
- Rhizome: It is a branched, prostrate horizontally growing stem having nodes and internodes. On the nodes sessile scale leaves are formed, e.g., Carina, Zingiber officinale (ginger), Curcuma domestica (turmeric) etc.
- Corm: This is a spherical, branched, vertically growing thick underground stem with more diameter than length, e.g., Crocus sativus (saffron), Gladiolus, Colocasia esculenta (arvi) etc.
- Bulb: In bulb the stem is highly reduced and can be seen only as a disc-like structure bearing numerous fleshy scaly leaves, e.g., Allium cepa (onion), Allium sativum (garlic) etc.

(ii) Subaerial modifications: Subaerial part of stem grows horizontally on the ground while some part remains underground. Vegetative propagation takes place by means of these. They may be of following kinds.

- Runner: It grows prostrate on the surface of soil. It develops at the base of erect shoot called crown. A number of runners arise from one erect shoot which spread in different directions. Each runner has one or more nodes which bear scale leaves and axillary buds, e.g., Cynodon (doob grass).
- Stolon: The nodes of horizontally growing underground stem give rise to branches which come out of the soil, e.g., Fragaria (strawberry).
- Sucker: Suckers are formed from the node of underground stem. Sucker comes up obliquely in the form of leafy shoot, e.g., Mentha (mint).
- Offset: Stem consists of thick and short intemodes. The branches are formed from the main stem and upper portion of each branch bears a group of leaves while the lower portion bears the roots. Each branch is capable of growing as an independent plant after separating from the parent plant, e.g., Eichhornia (water hyacinth), Pistia, etc.

(iii) Aerial modifications: The aerial portion of stem is modified to perform different functions, e.g., climbing, protection, food manufacturing, etc. It may show following types of modifications:

- Twinners : The stem is long, flexible and sensitive which can coil around an upright support like a rope, e.g., Ipomoea, Convolvulus.
- Climbers : The stem is weak and flexible but is unable to coil around an upright support by itself. It requires the help of clasping or clinging structures. Accordingly, climbers are of four types : root climbers, e.g., Betel; tendril climber, e.g., Passiflora; scramblers, e.g., Bougainvillea and lianas, e.g., Bauhinia.
- Phylloclade: The stem performs the function of photosynthesis. The stem modifies into green fleshy leaf-like structure having distinct nodes and intemodes. Leaves of such plants are reduced into spines in order to prevent loss of water, e.g., Opantia (prickly pear), Euphorbia.
- Cladode: It is similar to phylloclade with only one internode, e.g., Asparagus.
- Thorn: Stem is modified into stiff, pointed unbranched or branched structures which have lost their growing point and become hard, called as thorns, e.g., Bougainvillea,Pomegranate, Citrus, etc. They perform defensive function.
- Tendrils : These are thread like sensitive structures which can coil around a support and help the plant in climbing, e.g., Cucurbita.
- Bulbils: In some plants vegetative buds or floral buds modify into a swollen structure called bulbil. It separates from the parent plant and on approach of favourable condition gives rise to a new plant, i.e., it is an organ of vegetative reproduction, e.g., Agave, Oxalis.

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