Unit No. 2
Structural orgnization in Plant & Animals.
Chapter No: 5
Morphology OF Flowering Plants.

Q.1 Describe Modification of Stem?

→ = Stem are modified to perform different function.
- underground stem potato, ginger, turmeric, are s modified to store food in them.
- They also act as organs of perennation to tide over condition unfavorable for growth.
- Stem tendrils which develops from axillary buds. are slender & spirally coiled & helps plants to climb such as in ground. & grapevines.

Axillary buds of stem may also get modified into woody, straight & pointed thorns.
- Thorns are found in many plant such as citrus, Bougainvillea.
- They protect plant from brocosing animals.
- plant of arid regions modify their stem to flattened, fleshy & cylindrical having chloroplyll for photosynthesis.
- underground stem of some plants such as grass and strawberry etc. spread to new niches & when older parts die new plants are formed.
- In banana, pineapple & chrysanthemum the lateral branches originate from basal & underground portion of the main stem, grow Horizontally beneath the soil & then come out obliquely upward giving rise to leafy shoots.

Q.No2. What is flower & describe various parts of flower?

- Flower is the reproductive part of angiospermic plants for sexual means of reproduction.
- Atypical flower has four whorls arranged on a swollen end of stalk of pedicel called thalamus.
- They are calyx, corolla, androecium & gynocoelium.
- calyx & carolla are accessory organs.
- while androcoelium & gynocoelium are reproductive organ.
- when a flower has both androcoelium & gynocoelium it is bisexual & A flower having either only stamens or only carpels is unisexual.
- Based on the position of calyx, carolla & androecium & ~~gynoecium~~ in respect of the ovary on thalamus the flowers are described as Hypogynous, perigynous & epigynous.

1. Hypogynous flower :- ovary occupies the highest position. The ovary in such case is called superior.
   Eg. mustard, brinjal.
2. Perigynous flower :- IF gynoecium is situated in the center & other parts of the flower are located on the rim of the thalamus almost at the same level. called perigynous.
3. Epigynous flowers :- The margin of thalamus grows to completly covers the ovary. ovary is said to be inferior.

Calyx :-

The calyx is the outermost ~~whorl~~ whorl of the flower & members are called Sepals. Generally Sepals are green leaf like & protect the flower in the bud stage. The calyx may be gamosepalous & polysepalous.

Corolla :-

Corolla is composed of petals. petals are usually brightly coloured to attract insects for pollination.

Aestivation :- The mode of arrengement of sepals & petals in floral bud with respect to the other members of the same whorl is known as Aestivation

- In valvet. the whorls of sepals or petals touch each other as in calotropis.
- In Twisted aestivation, the whorls overlap each other as in china rose.

Androecium :-

- Androecium represent the male reproductive parts of flower, consist of Stamens.
- Each Stamen consist of filament & anther.
- Pollen grains are produced in pollen sac.
- Sterile Stamen is called Staminode.
- when Stamens are attached to the petals they are epipetalous as in brinjal or epiphyllous when attached to the perianth as in the flowers of lily.

Gynoecium :-

- Gynoecium is the female reproductive part of the flower & is made up of one or more carpel.

- A carpel consist of three parts namely stigma, style, ovary.
- Ovary is the enlarged basal part on which lies the elongated tube, the style.
- The style connects the ovary to the stigma.
- The stigma is usually at the tip of the style & is the receptive surface for pollen grain.
- When more the one carpel is present it may be free as in lotus & rose or fused together as in mustard & tomato.
- After fertilization, ovules change into seed & ovary mature in fruits.

Q.3- Write down semi-technical description & also draw their floral diagram of families Fabaceae & Solanaceae.

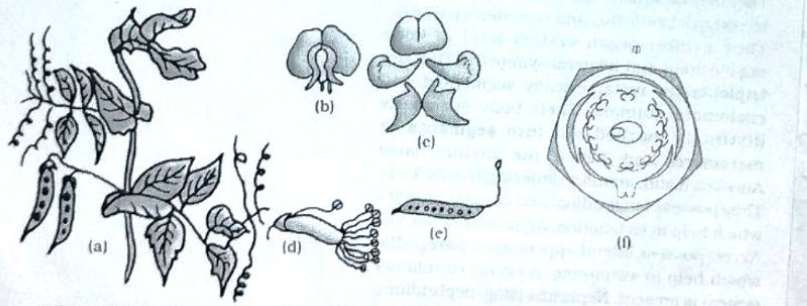


Figure 5.21 *Pisum sativum* (pea) plant : (a) Flowering twig (b) Flower (c) Petals (d) Reproductive parts (e) L.S.carpel (f) Floral diagram

Fabaceae :- This family was earlier called Papilionoidae, a subfamily of family Leguminosae.

Vegetative characters :

Tree, Shrubs, herbs root, with root nodules.
Stem - erect or climber

Leaves :- alternate, pinnately compound or simple ; leaf base, pulvinate, stipulate, venation reticulate.

Floral characters :-

Inflorescence - racemose.

Flower - bisexual, zygomorphic.

Calyx - Sepals five, gamosepalous ; valvet/imbricate aestivation.

Corolla - petals five, polypetalous, papilionaceous consist of posterior Standard, two lateral wings, two anterior ones forming a keel vexillary aestivation.

Androecium :- ten, ~~diap~~ diadelphous

Gynoecium :- ovary superior, mono carpellary.

Fruits :- legume Seed.

Floral formula :- $\% \; ♀ \; K_{(5)} \; C_{1+2(2)} \; A_{(9)+1} \; G_1$

Economic Importance :-

Plants belonging to this family are source of pulse like gram, Arhar, Bean, Pea etc. and edible oils like groundnut, soyabean etc.

(2) Solanaceae :

It is a large family commonly called as the 'potato family'. It is widely distributed in tropics, sub-tropics & even temp. zones.

Vegetative characters :-

Stem - Herbaceous rarely woody, aerial, erect cylindrical, branched, solid & hollow.

Leaves - alternate, simple, rarely pinnately compound.

Floral characters :-

Inflorescence - solitary, axillary or cymose

Flower - bisexual, actinomorphic

Calyx - sepals five, united.

Corolla - petals five, united

Androecium - stamens five

Gynoecium - bicarpellary obligately placed.

Fruits - berry or capsule.

Seed - many.

Floral formula - $\oplus\ \delta\ K_{(5)}\ C_{(5)}\ A_5\ \underline{G}_{(2)}$

Economic Importance :-

many plants belonging to this family are source of food, spice, medicine.

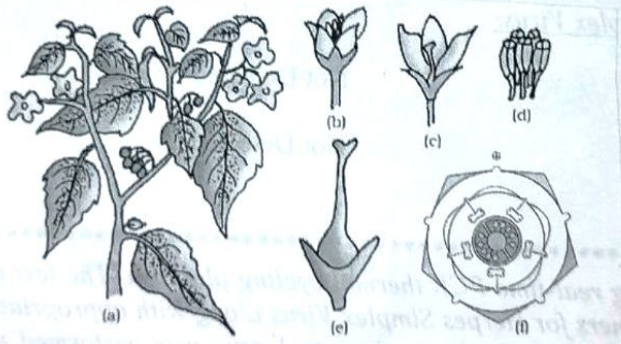


Figure 5.22 *Solanum nigrum* (makoi) plant : (a) Flowering twig (b) Flower (c) L.S. of flower (d) Stamens (e) Carpel (f) Floral diagram

Q. No-4 - Define the term inflorescence & Explain the basis for the different types of inflorescence in the flowering plant?

→ - A flower is modified shoot wherein the shoot apical meristem changes to floral meristem.
- When a shoot tip transforms into a flower it always solitary.
- The arrangment of flowers on the floral axis is termed as inflorescence.
- Depending on the whether the apex gets developed into a flower or continues to grow
- two major types of inflorescence.
- 1. racemose & 2. cymose.
- 1. Racemose :- It is indefinite inflorescene
- main axis continue to grow & flowers borne in acropetal succession.
- eg radish, mustard, Amaranthus.
- 2. Cymose :- It is definite Inflorescence
- In cymose type of inflorescence the main axis terminates in a flower hence is limited in growth. The flowers are borne in a basipetal orde.

Q. 5 - Draw & labelled the diagram of monocotyledonous seed & dicotyledonous seed.

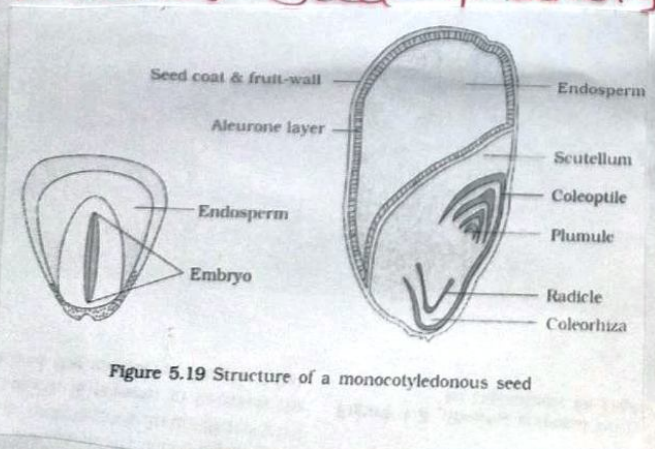


Figure 5.19 Structure of a monocotyledonous seed

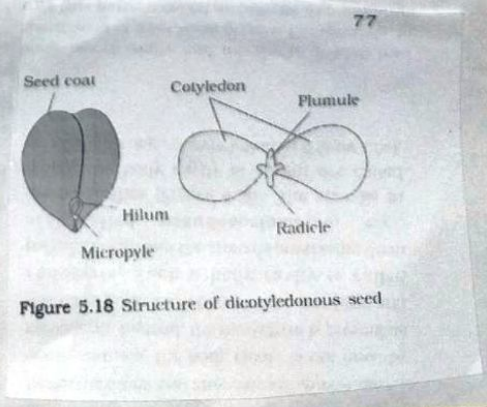
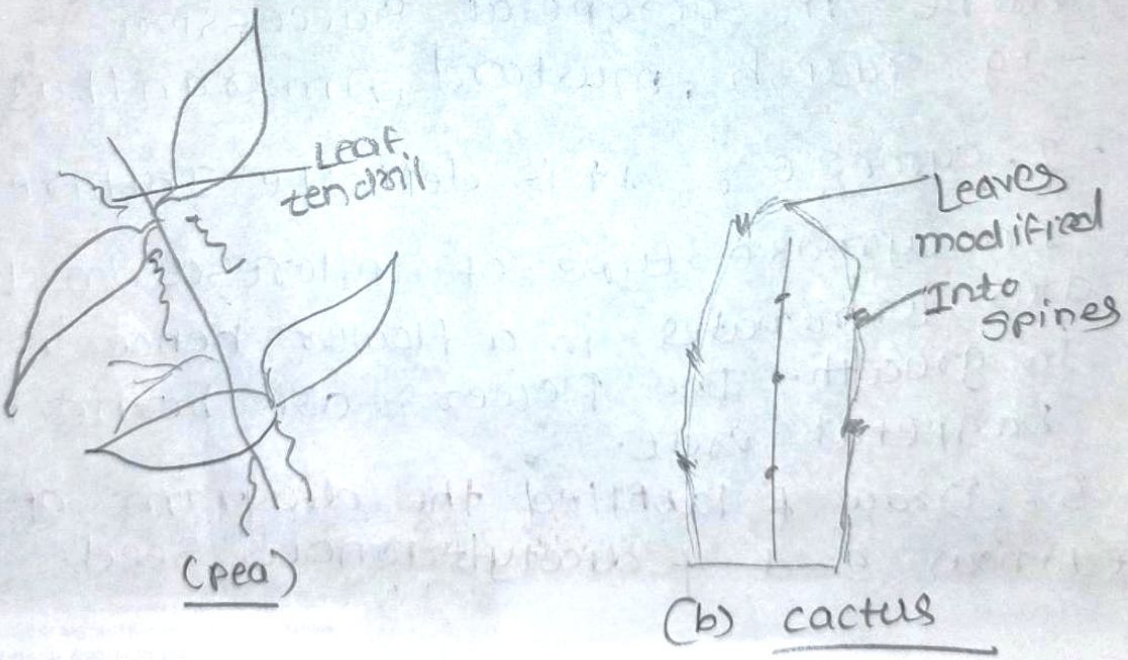


Figure 5.18 Structure of dicotyledonous seed

Q.6 Describe modification of Leaves?

- leaves are often modified to perform function other than photosynthesis.
- they are converted into tendrils for climbing as in peas or into spines for defence as in cacti.
- The fleshy leaves of onion & garlic store food.
- In some plants such as Australian acacia.
- the leaves are small & short lived.
- The petioles in these plants expand, become green & synthesise food.
- Leaves of certain insectivorous plants such as pitcher plant, Venus fly trap are also modified leaves.



Modification of Leaf