FREE NOTES · NCERT + NEET LEVEL

Morphology of Flowering Plants

Root, stem aur leaf aur unke modifications, inflorescence, flower ke parts aur floral formula, fruit aur seed, aur Fabaceae, Solanaceae, Liliaceae families.

01 Root aur modifications
02 Stem aur leaf
03 Inflorescence aur flower
04 Aestivation, stamens, placentation
05 Fruit aur seed
06 Semi-technical description & floral formula
07 Extra: aur families (NEET syllabus) + tricks
08 Important Q&A
09 Common mistakes
10 Practice (NEET style)
11 Quick revision

01 Root aur modifications

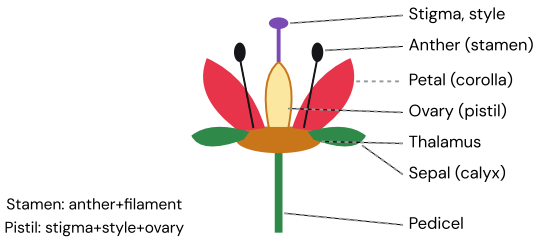
- **Tap root** (dicots, radicle se; sarson) · **fibrous** (monocots; gehun) · **adventitious** (radicle ke alawa kisi part se; *Monstera*, bargad, ghaas).
- Regions: root cap → meristematic zone → elongation → maturation (root hairs).
- **Storage**: gajar, shalgam (tap), shakarkand (adventitious). **Prop roots**: bargad. **Stilt roots**: makka, ganna. **Pneumatophores** (saans ke liye, upar ugti): *Rhizophora* (mangroves).

02 Stem aur leaf

- Stem: nodes, internodes, buds; plumule se banta. **Storage**: aloo (tuber), adrak, haldi (rhizome), *Colocasia* (corm), pyaaz (bulb). **Tendrils** (axillary bud): kheera, angoor. **Thorns**: *Citrus*, *Bougainvillea*. **Phylloclade** (chapta hara stem): *Opuntia*, *Euphorbia*. Runner (ghaas), stolon (pudina, chameli), offset (*Pistia*, *Eichhornia*), sucker (kela, ananas, *Chrysanthemum*).
- Leaf: leaf base, petiole, lamina; legumes me **pulvinus**. Venation: reticulate (dicots), parallel (monocots). Simple vs compound (pinnate: neem; palmate: silk cotton).
- Phyllotaxy: alternate (gudhal), opposite (*Calotropis*, amrood), whorled (*Alstonia*).
- Leaf modifications: tendrils (matar), spines (cactus), storage (pyaaz, lahsun), phyllode (Australian *Acacia*), keede khane wale (pitcher plant, Venus fly trap).

03 Inflorescence aur flower

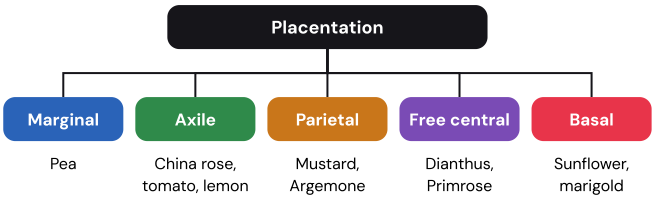
- **Racemose**: main axis badhta rehta, flowers acropetal (purane neeche).
- **Cymose**: main axis flower pe khatam, basipetal.
- Flower: modified shoot; thalamus pe 4 whorls: calyx, corolla, androecium, gynoecium.
- Symmetry: actinomorphic (sarson, datura, mirch), zygomorphic (matar, gulmohur, sem, *Cassia*), asymmetric (canna).
- Ovary position: hypogynous (superior: sarson, gudhal, baingan), perigynous (half-inferior: plum, gulab, aadu), epigynous (inferior: amrood, kheera, sunflower ray florets).



Flower ke parts

04 Aestivation, stamens, placentation

- Aestivation: **valvate** (*Calotropis*), **twisted** (gudhal, bhindi, kapas), **imbricate** (*Cassia*, gulmohur), **vexillary**/papilionaceous (matar, sem: standard, 2 wings, 2 keel).
- Stamens: epipetalous (baingan), epiphyllous (lily); monoadelphous (gudhal), diadelphous (matar), polyadelphous (citrus).
- Gynoecium: apocarpous (alag carpels: kamal, gulab), syncarpous (jude: sarson, tamatar).



Placentation ke types

05 Fruit aur seed

- Fruit = fertilisation ke baad paki ovary; **parthenocarpic** fruit bina fertilisation. Pericarp: epicarp, mesocarp, endocarp.
- **Drupe** (ek beej, sakht endocarp): aam, nariyal (fibrous mesocarp).
- Dicot seed (matar, sem): seed coat (testa + tegmen), hilum, micropyle, embryo (axis + 2 cotyledons), non-endospermic (khana cotyledons me; arandi endospermic).
- Monocot seed (makka): endospermic; aleurone layer; scutellum (ek cotyledon); coleoptile plumule ko dhakta, coleorhiza radicle ko.

06 Semi-technical description & floral formula

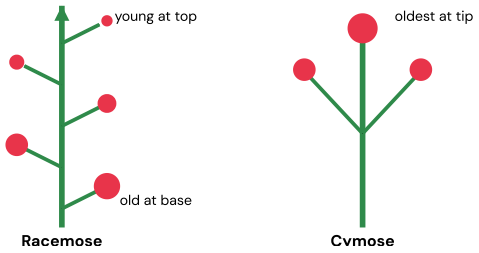
Symbols: Br bracteate, ⊕ actinomorphic, % zygomorphic, ⚥ bisexual, K calyx, C corolla, P perianth, A androecium, G gynoecium; G ke neeche line = superior, upar line = inferior; bracket = jude hue; C aur A ko arc se jodna = epipetalous.

Family	Floral formula	Features	Examples / use
Fabaceae (matar)	% ⚥ $K_{(5)}$ $C_{1+2+(2)}$ $A_{(9)+1}$ G_{1}	Root nodules, pulvinus, vexillary aestivation, diadelphous stamens, marginal placentation, legume pod	Chana, arhar, soybean, moongphali; neel, sunn hemp, *Sesbania*, lupin
Solanaceae (aloo)	⊕ ⚥ $K_{(5)}$ $C_{(5)}$ A_{5} $G_{(2)}$	Epipetalous stamens, phooli axile placenta, ovary tirchhi, berry/capsule	Tamatar, baingan, aloo; belladonna, ashwagandha; tambaku; petunia
Liliaceae (lily)	⊕ ⚥ $P_{(3+3)}$ A_{3+3} $G_{(3)}$	Monocot, tepals, epitepalous stamens, axile placentation, capsule/berry	Tulip, *Gloriosa*; aloe, asparagus, colchicine (*Colchicum*)

07 Extra: aur families (NEET syllabus) + tricks

Family	Floral formula	Mukhya baatein	Examples
Malvaceae (gudhal)	Epk ⊕ ⚥ $K_{(5)}$ C_{5} $A_{(\infty)}$ $G_{(5)}$	Epicalyx; twisted aestivation; monadelphous stamens (staminal tube); axile placentation	Kapas, bhindi, gudhal
Brassicaceae / Cruciferae (sarson)	⊕ ⚥ K_{2+2} C_{4} A_{2+4} $G_{(2)}$	Cruciform corolla; **tetradynamous** stamens (4 lambe + 2 chhote); replum ke saath parietal placenta; fruit siliqua	Sarson, mooli, patta gobhi
Asteraceae / Compositae (sunflower)	Disc floret: ⊕ ⚥ K_{pappus} $C_{(5)}$ $A_{(5)}$ $G_{(2)}$ inferior	Head (capitulum); **syngenesious** stamens (anthers jude); basal placenta; fruit cypsela	Sunflower, genda, *Parthenium*
Poaceae / Gramineae (ghaas)	$P_{2\ \text{lodicules}}$ A_{3} G_{1}	Spikelets; versatile anthers; fruit **caryopsis** (pericarp aur seed coat jude)	Gehun, chawal, makka, baans

- Root shapes (storage): **fusiform** (mooli), **conical** (gajar), **napiform** (shalgam, chukandar), **fasciculated** (*Dahlia*, *Asparagus*).
- Chadhne wali roots: money plant (*Pothos*); velamen wali epiphytic roots: orchids.
- Ovary trick: **HPE** → Hypogynous (superior), Perigynous (aadha), Epigynous (inferior).



Racemose vs cymose

08 Important Q&A

Q1. Aloo stem aur shakarkand root kyun?

Aloo me nodes aur buds (aankhen) hote, stem se banta; shakarkand phooli adventitious root hai, nodes/buds nahi.

Q2. Pneumatophores ka kaam?

Daldal mitti se seedhe upar ugkar saans ke liye oxygen lete (jaise *Rhizophora*).

Q3. Racemose aur cymose me antar?

Racemose: axis lagatar badhta, flowers acropetal. Cymose: axis flower pe khatam, basipetal.

09 Common mistakes

- Adrak ko root kehna (rhizome = stem hai).
- Axile (tamatar) aur parietal (sarson) placentation mix karna.
- Solanaceae ovary ko inferior likhna (superior hai).
- Bhoolna ki nariyal drupe hai.

10 Practice (NEET style)

1. Matar ke phool ka aestivation?
2. Sunflower me placentation?
3. Phylloclade ka example?
4. Nariyal ka khane wala part?
5. Fabaceae me stamens?

ANSWERS

1) Vexillary · 2) Basal · 3) *Opuntia* · 4) Endosperm · 5) Diadelphous (9)+1

11 Quick revision: exam se 5 minute pehle

ROOT/STEM

- Prop: bargad; stilt: makka
- Pneumatophore: Rhizophora
- Aloo tuber, adrak rhizome

FLOWER

- Hypogynous = superior ovary
- Twisted: gudhal
- Vexillary: matar

PLACENTATION

- Marginal matar · axile tamatar
- Parietal sarson · basal sunflower
- Free central Dianthus

FAMILIES

- Fabaceae: diadelphous, pod
- Solanaceae: epipetalous
- Liliaceae: P(3+3)

Koi doubt? padhaiadda.netlify.app pe AI Doubt Solver se poocho, ya is chapter ka mock test do.