Chapter 5

Morphology of Flowering Plants

Solutions (Set-1)

SECTION - A

School/Board Exam. Type Questions

Very Short Answer Type Questions :

1. Which parts in ginger and potato are edible?

Sol. Ginger - Rhizome (stem)

Potato - Tuber (stem)

2. What type of venation occurs in banana?

Sol. Parallel venation

3. What type of aestivation is found in *Calotropis*?

Sol. Valvate

4. Name the phyllotaxy in *Alstonia*.

Sol. Whorled phyllotaxy

5. What is the nature of ovary in an epigynous flower?

Sol. Inferior ovary

6. What is the unit of gynoecium?

Sol. Carpel/pistil

7. Write down the name of plant in which leaflets are modified into tendrils.

Sol. Garden pea

8. Which family is commonly called potato family?

Sol. Solanaceae

9. Add the missing floral organs of the given floral formula of fabaceae.

$\% \, ♀ \, K_{(5)} \_\_\_\_ A_{(9)+1} \, \underline{G}_1$

Sol. $C_{1+2+(2)}$

10. Define internodes and nodes.

Sol. The region of the stem where leaves are borne are called nodes while internodes are the portions between two nodes.

Short Answer Type Questions :

11. What are trimerous flowers? Give one example.

Sol. When all the floral appendages (whorls) of a flower are in the multiples of three, then the flower is said to be trimerous.

Examples - Liliaceae family

12. What do the following terms stand for in a floral formula?

φ, %, P, Br

Sol. φ – Bisexual flower

% – Zygomorphic flower

P – Perianth

Br – Bracteate

13. Define aleurone layer. Give one example.

Sol. The proteinaceous outer covering surrounding the endosperm is called aleurone layer. It separates the embryo from the endosperm *e.g.,* monocotyledonous seeds.

14. Differentiate between hypogynous and epigynous flower.

Sol.

Hypogynous flower	Epigynous flower
It is a condition where sepals, petals and stamens all are inserted below the ovary. The ovary is said to be superior. *e.g.*, Mustard	A condition in which the thalamus is enclosed within the ovary and all the other floral parts arise on the top of the ovary. The ovary in this case is said to be inferior. *e.g.*, Guava

15. What are pitcher plants? Give example.

Sol. The plants in which leaves are modified to form pitcher, to trap insects are called pitcher plants. These pitchers release enzymes to digest the insects and then obtain nutrition from them.

16. Rhizome of ginger is like the roots of other plants that grows underground. Despite this ginger is a stem not a root. Justify.

Sol. Ginger is an underground stem and not root due to the following reasons :

(a) It possesses nodes and internodes.

(b) It bears scaly leaves on the node.

(c) It possesses axillary and apical bud.

17. Name the two plants, belonging to the Solanaceae family, which are used as medicines.

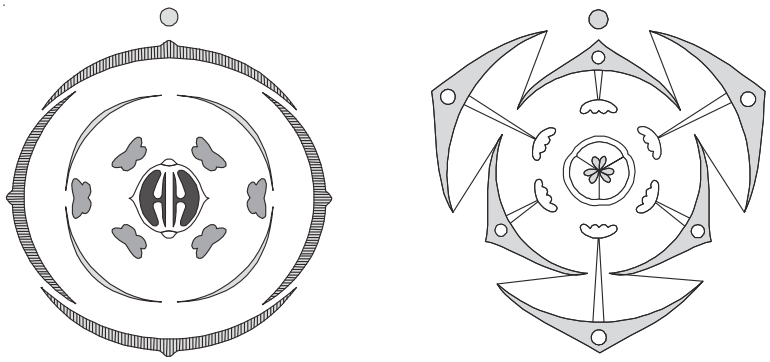
Sol. Belladonna, Ashwagandha.

18. Given below are few floral formulae of some well known plants. Draw floral diagrams from these formulae.

(a) $\oplus \varphi K_{2+2} C_4 A_{2+4} \underline{G}_{(2)}$

(b) $\oplus \varphi \overset{\frown}{P_{3+3}} A_{3+3} \underline{G}_{(3)}$

Sol.



(a) (b)

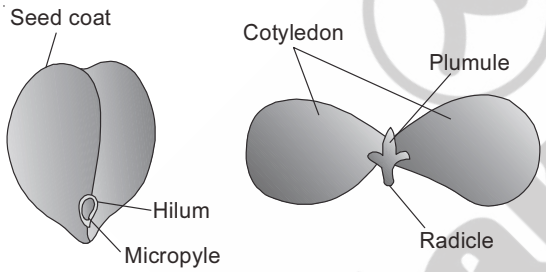
19. Differentiate between stem tendrils and thorns.

Sol.

Tendrils	Thorns
(i) Axillary buds are modified into long, thin thread-like spiral structures called tendrils.	(i) Axillary buds are modified into hard, straight, pointed structures called thorns.
(ii) It provides support to the weak plants.	(ii) It protects the plants from grazing animals.

20. Draw a labelled diagram of a dicot seed.

Sol.



21. What do you understand by the term venation? Explain its types.

Sol. The arrangement of veins or veinlets in the lamina or leaf blade is known as venation. It occurs in two ways:

(i) Reticulate venation : The venation where veins and veinlets are irregularly arranged or distributed to form a network is called reticulate venation. It generally occurs in dicot such as peepal, *Hibiscus* etc.

(ii) Parallel venation : The venation where the veins run parallel to each other and do not form a network is called parallel venation. It generally occurs in monocots.

Example - Banana.

22. Explain briefly the modification of stem found in *Pistia* and *Eichhornia*.

Sol. *Pistia* and *Eichhornia*, contain a lateral branch which bear short internodes. In these lateral branches distance between the nodes decreases and a rosette of leaves and a tuft of roots is found at each node. This is known as offsets.

23. Explain the vexillary and imbricate aestivation.

Sol. **Vexillary aestivation :** In vexillary aestivation, the largest petal overlaps the two smaller lateral petals (wings) which in turn overlap the two smallest anterior petals (keel).

Example - Pea and Bean.

Imbricate aestivation : In imbricate aestivation, margins of petals or sepals overlap each other but not in a particular fashion or direction.

Example - *Cassia*, Gulmohur.

24. Describe the axile placentation with the help of an example.

Sol. **Axile placentation :** In axile placentation, the placenta is present in the axial position and the ovules are attached to it in a multilocular ovary.

Example - Lemon

25. Describe calyx, corolla and fruit of Solanaceae.

Sol. **Calyx :** Sepals five, united, persistent, valvate aestivation.

Corolla : Petals five, united, valvate aestivation.

Fruit : Berry or capsule.

26. Write two differences and two similarities in the ovaries of Solanaceae and Liliaceae.

Sol. The ovaries of both Solanaceae and Liliaceae are syncarpous, superior and have axile placentation. The ovary of Solanaceae is bicarpellary and bilocular whereas the ovary of Liliaceae is tricarpellary and trilocular.

27. What are respiratory roots? How do they help the plant? Give an example.

Sol. The plants growing in mangroves or saline swamps, respire through modified respiratory roots called pneumatophores. They come out of the ground and grow vertically upwards to get oxygen for respiration. *e.g.*, *Rhizophora.*

28. 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

Sol. (a) Cucumber - Stem tendril

(b) Peas - Leaf tendril

(c) Pumpkin - Stem tendril

(d) Grapevine - Stem tendril

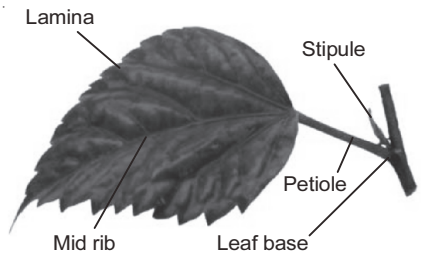
(e) Watermelon - Stem tendril

29. Define root hair. From which region of the root do they arise? What is their function?

Sol. In root, some epidermal cells from the region of maturation form very fine and delicate thread-like structures called root hair. The root hair increases the surface area for absorption of water and minerals.

30. Draw a well-labelled diagram of a typical leaf and label any five parts.

Sol.



Long Answer Type Questions :

31. Describe various root modifications associated with food storage, mechanical support and respiration.

Sol. (i) **Modification of root for storage**

Tap roots of carrot, turnips and adventitious roots of sweet potato, get swollen and store food.

(ii) **Modification of root to provide support**

Prop roots : They arise from the branches of stem for providing mechanical support to heavy branches as pillars *e.g.*, banyan tree.

Stilt roots : They arise from lower nodes of stem to support main axis and enter the soil obliquely *e.g.*, sugarcane.

(iii) **Modification of root for respiration**

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

32. Describe briefly the various regions of root.

Sol. Regions of the root

(i) **Root cap :** At the apex of root a smooth cap-shaped structure is present which is called as root cap. It is protective.

(ii) **Region of meristematic activity :** This zone is located a few millimetres above the root cap. The cells of this region are very small, thin-walled and with dense cytoplasm. They divide repeatedly.

(iii) **Region of elongation :** The cells of this zone undergo rapid elongation and enlargement and are responsible the growth of root in length.

(iv) **Region of maturation :** The cells in this region are differentiated into permanent tissue depending upon the function they have to perform. Root hairs are also present in this zone which help in absorption of water.

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

Sol. Stems are modified to store food in some plants. They are underground stem. Due to storage of food materials, they become thick and fleshy. Different types of underground modified stems are

(i) Rhizome – *e.g.*, Ginger

(ii) Tuber – *e.g.*, Potato

(iii) Corm – *e.g.*, *Colocasia*

Stem tendril : Stem tendrils are slender and spirally coiled structures which develop from axillary buds and help to climb.

e.g., Grapevines

Modification of stem for protection

In some plants, axillary buds of stems may get modified into woody, straight and pointed **thorns**. They protect plants from browsing animals.

e.g., *Citrus*

34. What is a leaf? Where does it arise from? How is it borne on a stem? What is its function?

Sol. A leaf is a green, flat, thin expanded lateral outgrowth of the stem. It originates from the shoot apical meristem. It is borne on the node of the stem in an acropetal order (*i.e.*, youngest leaves towards the growing point and the oldest towards the base of the parent stem). Leaf bears a bud which later develops into a branch. The bud is present at the axil of the leaf.

Leaves are green in colour due to the presence of photosynthetic pigment, chlorophyll. Chlorophyll is essential for absorbing sunlight needed for the process of photosynthesis by which the leaves prepare their own food. Leaves are the most important vegetative organ for photosynthesis.

35. What is a compound leaf? Explain its two types with the help of example and diagram.

Sol. **Compound leaf :** The leaf in which the lamina or leaf blade of the leaf is completely broken into distinct leaflets is called compound leaf. The leaf has incision which reaches the midrib. Compound leaf contains a bud at the axil of the petiole but is absent in the axil of leaflets. The compound leaves are of two types :

(i) **Pinnately compound leaf :** In pinnately compound leaf, the midrib forms a common axis called rachis. A number of leaflets are present on common axis.

Example - Neem.

(ii) **Palmately compound leaf :** In palmately compound leaf, the leaflets are attached to a common point *i.e.*, at the tip of the petiole. The tip of the petiole bears all the leaflets in a form of a bunch or cluster.

Example - Silk cotton.

36. Explain the different types of floral symmetry.

Sol. The floral symmetry can be of three types :

(i) **Radial symmetry :** In radial symmetry any radial vertical plane, passing through the centre divides the flower into two equal radial (vertical) halves. The two vertical halves are mirror images of each other. The flowers having radial symmetry are called **actinomorphic flowers**.

Example - Mustard flowers.

(ii) Asymmetric : In asymmetric condition, flower can not be divided into two equal halves by any plane. The flower is irregular.

Example - *Canna*

(iii) Bilateral symmetry : In bilateral symmetry, only one, single vertical plane passing through the centre divides the flower into two equal halves, which are mirror images of each other. In bilateral symmetry only one plane divides the flower into two equal halves. The flowers having bilateral symmetry are said to be zygomorphic.

Example - Pea, gulmohar, bean, *Cassia*.

37. Write a short note on fourth whorl of a flower.

Sol. Gynoecium is the fourth and last whorl of the flower. It is the female reproductive part of a flower which is composed of one or more carpels. A carpel has three parts namely :

(i) Ovary : Ovary is the lower part of the carpel which bears one or several ovules. These ovules later matures into seeds after fertilisation. The ovules are attached to a flattened and cushion-like structure called placenta. The ovary has one or more chambers or loculi. The wall of the ovary after fertilisation forms the pericarp (fruit wall). Ovules develop in to seed after fertilization.

(ii) Style : The tube-like structure which connects the stigma and the ovary is called style. It lie above the ovary in a carpel.

(iii) Stigma : Stigma is generally situated at the tip of the style. During pollination the pollens are transferred from the anther to the stigma. The stigma acts as the receptive organ for pollen grains.

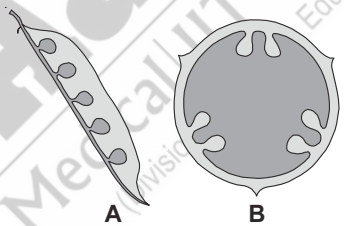
38. Explain with diagram the placentation found in pea and mustard.

Sol. (i) Marginal placentation : The placenta forms a ridge along the ventral suture of the ovary. The ovules are borne in two alternate rows along the ridge.

Example - Pea

(ii) Parietal placentation : The ovary is one-chambered (unilocular) but become two-chambered due to the formation of the false septum. The ovules develop on the inner wall of the ovary or on the peripheral part.

Example - Mustard



39. Tabulate the essential differences in the structure of a dicotyledonous and monocotyledonous seed.

Sol.

Dicotyledonous seed	Monocotyledonous seed
(i) It contains two cotyledons.	(i) It contains only one cotyledon.
(ii) It is generally non-endospermic with few exception.	(ii) It is generally endospermic.
(iii) Aleurone layer is absent.	(iii) Aleurone layer may present.
(iv) The seed coat are separated from the fruit wall.	(iv) The seed coat is generally fused with the fruit wall.

40. Write the floral characters of fabaceae.

Sol. Floral Characters of Fabaceae family

Inflorescence : Racemose.

Flower : Bisexual, zygomorphic.

Calyx : Sepals five, gamosepalous, imbricate aestivation.

Corolla : Petals five, polypetalous, papilionaceous, consisting of a posterior standard, two lateral wings, two anterior ones forming a keel (enclosing stamens and pistil), vexillary aestivation.

Androecium : Ten, diadelphous, anther dithecous.

Gynoecium : Ovary superior, monocarpellary, unilocular with many ovules, style single.

Fruit : Legume, seed : one to many, non-endospermic.

Floral formula : $\oplus\, ♂♀\, K_{(5)}\, C_{1+2+(2)}\, A_{(9)+1}\, \underline{G}_1$

41. Why are the plants of Solanaceae family important to us?

Sol. Economic Importance of Solanaceae family

a. **Source of food :** Potato, tomato

b. **Spices :** Chilli

c. **Fumigatory plant :** Tobacco

d. **Medicine :** Belladonna

42. Write any 10 symbols and what they stand for, used in a floral formula.

Sol.

Symbols	Stand for
Br	Bracteate
K	Calyx
C	Corolla
P	Perianth
A	Androecium
G	Gynoecium
$\underline{G}$	Superior ovary
$\overline{G}$	Inferior ovary
♂	Male
♀	Female
⚥	Bisexual
$\oplus$	Actinomorphic
%	Zygomorphic

43. Why are leaves modified in some plants? Write any two modifications of leaves.

Sol. Leaves are generally responsible for the process of photosynthesis, transpiration, gaseous exchange etc. But some times leaves get modify and perform other functions such as storage, protection, support, defence etc. Different modifications that occur in leaves are :

(i) Leaf tendrils : In some plants, leaves modify into long, slender, thread-like sensitive structures called tendrils. Tendrils coil around a support to which they come in contact and help the plant while climbing. The tendrils are sensitive to touch. Their main function is to provide support to the climbing plants.

Example - Pea

(ii) Spines : In some plants such as cactus, leaves modify into small, sharp-pointed structures which reduce transpiration and protect the plants from browsing animals. The sharp pointed structures are called spines.

Example – *Opuntia*, *Aloe*

44. (a) Give the reproductive unit in angiosperms.

(b) What is perianth? Give two examples.

(c) Differentiate between radial and bilateral symmetry.

Sol. (a) Flower

(b) When calyx and corolla are not distinct, the undifferentiated structure is called perianth.

(c)

Radial	Bilateral
When a flower can be divided into two equal radial halves in any radial plane passing through the centre, it is said to be actinomorphic or radial. *e.g.*, Mustard	When a flower can be divided into two similar halves only in one particular vertical plane, it is zygomorphic or bilateral. *e.g.*, Pea

45. Write a short note on endosperm, embryo and seed coat found in seed of maize plant.

Sol. Endosperm

In a monocot seed the endosperm is bulky. It is covered by a protein layer. The proteinaceous outer covering surrounding the endosperm is called the **aleurone layer**. Layer separates the embryo from the endosperm. The endosperm stores food material which provides nourishment and nutrition to the growing embryo.

Embryo

The embryo is present in the seed coat. It contains a cotyledon and a small axis called the embryonal axis. This axis contains plumule at one end and radicle at the other. The plumule which gives rise to the shoot system and is enclosed in a protective sheath called **coleoptile**. The radicle which gives rise to the root system and is enclosed in a sheath called **coleorhiza**.

Seed coat

The protective membrane present over the seed is called the seed coat. It surrounds the seed and enclose the embryo and the endosperm. Seed coat is membranous and is generally fused with the fruit wall. The outer wall of the fruit (pericarp) is fused with the seed coat.

SECTION - B

Model Test Paper

Very Short Answer Type Questions :

1. There may be a variation in the length of filaments of stamens within a flower. Give two examples.

Sol. *Salvia*, mustard

2. Write the floral formula for family Liliaceae.

Sol. $Br \oplus \varnothing \overset{\frown}{P_{(3+3)}} A_{3+3} \underline{G}_{(3)}$

3. Name the fumigatory plant belonging to the family Solanaceae.

Sol. Tobacco

4. What is the ploidy level of aleurone layer?

Sol. Triploid

5. Name the inflorescence in which the flowers are arranged in a basipetal manner.

Sol. Cymose inflorescence

6. What is mesocarp?

Sol. It is the middle layer of the pericarp. It is present between the epicarp and endocarp.

7. What is the fate of ovule and ovary after fertilisation?

Sol. After fertilisation, the ovules develop into seeds and ovary develops into a fruit.

8. Which drupe has a fibrous mesocarp?

Sol. Coconut

Short Answer Type Questions :

9. What is the family of *Aloe*? Why is it important?

Sol. *Aloe* is a source of medicine. It is a member of Liliaceae.

10. Explain valvate aestivation.

Sol. In valvate aestivation, margin of the sepals or petals present in a whorl just touch each other. There is no overlapping between the two sepals or petals.

Example - *Calotropis*

11. Explain alternate phyllotaxy with the help of an example.

Sol. The phyllotaxy in which single leaf is present at each node in an alternate fashion is called alternate phyllotaxy.

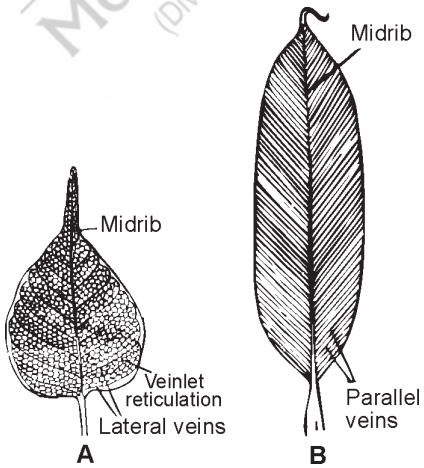
Example - China rose, mustard, sunflower.

12. Describe the type of leaf present in neem.

Sol. Neem has pinnately compound leaf. Midrib forms a common axis called rachis.

13. Diagrammatically explain the difference between parallel and reticulate venation.

Sol.



14. What do you understand by asymmetric symmetry?

Sol. In asymmetric symmetry, a radial vertical plane passing through the centre cannot divide the flower into two equal halves. The flower is irregular and asymmetric.

Example - *Canna*.

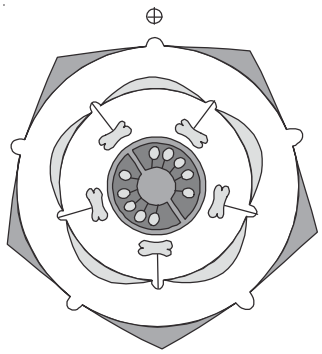
15. What is stigma? Why is it important?

Sol. Stigma is a part of carpel. It is situated at the tip of the style. It receives pollen grains providing male gametes for fertilisation. During pollination, pollen grains are transferred from the anther to the stigma.

Short Answer Type Questions :

16. Draw the floral diagram for the family Solanaceae.

Sol.



17. Which symbols are used to represent the following in a floral formula?

(a) Inferior ovary
(b) Calyx
(c) Male
(d) Zygomorphic flower
(e) Perianth
(f) Gynoecium

Sol. (a) Inferior ovary – $\underline{\overline{G}}$
(b) Calyx – K
(c) Male – δ
(d) Zygomorphic – %
(e) Perianth – P
(f) Gynoecium – G

18. Describe the function of a stem.

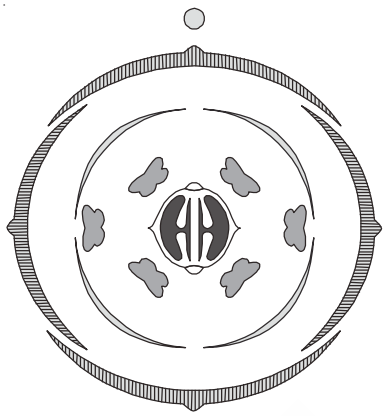
Sol. (i) Stem bears and support leaves, flowers and fruits.
(ii) It conducts water and mineral salts from roots to the leaves, fruits and different parts of a plant.
(iii) The food manufactured in the leaves is transported to the roots, fruits and organs of storage through the stem.

19. Explain the modified stem – stolon, in brief.

Sol. **Stolon :** It is subterranean long lateral branch arising from base of the stem. It first grows obliquely upward and then bends down to the ground surface. *e.g.*, Jasmine.

20. What is a floral diagram? Explain with a diagram.

Sol. A floral diagram provides information about the number of parts of a flower, their arrangement and the relation they have with one another. The position of the mother axis with respect to the flower is represented by a dot on the floral diagram in the centre.



21. Give two examples that develop from different part of the angiospermic plant other than radicle. Name the roots which are modified for respiration.

Sol. **Stilt roots :** They arise from lower nodes to stem *e.g.*, Maize.

Prop roots : They arise from the branches of stem *e.g.*, Banyan.

Pneumatophores help in respiration *e.g.*, *Rhizophora*.

Long Answer Type Questions :

22. (a) What is fruit?

(b) Define parthenocarpic fruit.

(c) Describe various zones of fruit by taking any fleshy fruit.

Sol. (a) Fruit is a ripened ovary, developed after fertilisation.

(b) If fruit is formed without fertilisation of the ovary, it is called a **parthenocarpic fruit** *e.g.,* Banana.

(c) A fruit consists of a wall or **pericarp** and seeds. The pericarp may be dry or fleshy.

Mango is a fleshy fruit. In mango pericarp is thick and fleshy. It is differentiated into outer **epicarp**, the middle **mesocarp** and the inner **endocarp**. The mesocarp is edible in mango.

23. Distinguish between families Solanaceae, Liliaceae and Fabaceae on the basis of gynoecium characteristics. Also write economic importance of any one of the above family.

Sol.

Criteria	Solanaceae	Liliaceae	Fabaceae
Gynoecium	Bicarpellary, syncarpous, ovary superior, bilocular, placenta swollen with many ovules.	Tricarpellary, syncarpous, ovary superior, trilocular with many ovules.	Monocarpellary, ovary superior, unilocular with many ovules, style single.

Economic importance of family fabaceae :

(i) Sources of pulses – *e.g.*, Gram, arhar

(ii) Edible oil – *e.g.*, Soyabean, groundnut

(iii) Dye – *e.g.*, *Indigofera*

(iv) Fibres – *e.g.*, Sunhemp

(v) Fodder – *e.g.*, *Sesbania*, *Trifolium*

(vi) Ornamental plants – *e.g.*, Lupin, sweet pea

(vii) Medicine – *e.g.*, Muliathi

❑ ❑ ❑

Solutions (Set-2)

Objective Type Questions

(The Root)

1. Primary root is the direct elongation of the

(1) Pedicel (2) Radicle

(3) Plumule (4) Stamen

Sol. Answer (2)

Primary root is the direct elongation of the radicle.

2. The type of roots present in mustard plant is

(1) Fibrous roots (2) Adventitious roots

(3) Tap roots (4) Nodulated roots

Sol. Answer (3)

The type of roots present in mustard plant is tap roots.

3. Which of the following is not the lateral branches of the roots?

(1) Tertiary roots (2) Secondary roots

(3) Primary root (4) More than one option is correct

Sol. Answer (3)

Primary root is not the lateral branches of the roots.

4. In wheat plant _____ root system is present.

(1) Nodulated (2) Tap

(3) Fibrous (4) Prop

Sol. Answer (3)

In wheat plant fibrous root system is present.

5. Which of the following is not the main function of the root system?

(1) Provide anchorage to the plant parts (2) Synthesis of PGRs

(3) Absorption of water and minerals from soil (4) Photosynthesis

Sol. Answer (4)

Photosynthesis is not the main function of the root system.

6. A root grows in length, which region of the root is responsible for this growth?

(1) Root cap (2) Region of meristematic activity

(3) Region of elongation (4) Region of maturation

Sol. Answer (3)

Region of elongation of the root is responsible for the root growth.

7. Root hairs are present in/on

(1) Region of elongation (2) Region of maturation

(3) Region of meristematic activity (4) Root cap

Sol. Answer (2)

Root hairs are present in region of maturation

8. The region or part of root that increases the surface area for water absorption is

(1) Root cap (2) Zone of elongation

(3) Meristematic zone (4) Root hair

Sol. Answer (4)

Root hair increases the surface area of water absorption.

9. The tap roots of _____ gets modified to store food.

(1) Carrot (2) Onion (3) Ginger (4) Sweet potato

Sol. Answer (1)

The tap roots of carrot get modified to store food.

10. Adventitious roots of _____ get swollen and store food.

(1) Carrot (2) Turnip

(3) Radish (4) Sweet potato

Sol. Answer (4)

Adventitious roots of sweet potato get swollen.

11. Supporting roots coming out of the lower nodes of the sugarcane stem are called

(1) Prop roots (2) Stilt roots

(3) Pneumatophores (4) Fusiform roots

Sol. Answer (2)

Supporting roots coming out of the lower nodes of sugarcane stem is called stilt roots.

12. In *Rhizophora*, roots are modified to form

(1) Tuberous roots (2) Pneumatophores

(3) Stilt roots (4) Storage roots

Sol. Answer (2)

In *Rhizophora*, roots are modified to form pneumatophores.

13. The hanging structures that support banyan tree are called

(1) Prop roots (2) Stilt roots

(3) Pneumatophores (4) Root hair

Sol. Answer (1)

The hanging structures that support banyan tree are called prop roots.

(The Stem)

14. Stem develops from _____ of the embryo of a germinating seed.
(1) Radicle (2) Plumule (3) Pedicel (4) Pneumatophore

Sol. Answer (2)

Stem develops from plumule of the embryo of a germinating seed.

15. _____ are the regions of the stem that bear leaves.
(1) Internode (2) Nodes (3) Foliar bud (4) Radical bud

Sol. Answer (2)

Nodes are the regions of the stem that bear leaves.

16. Stems of potato, ginger and turmeric are modified to
(1) Respiration (2) Perform photosynthesis
(3) Store food (4) Provide support

Sol. Answer (3)

Stems of potato, ginger and turmeric are modified to store food.

17. In gourds, axillary buds develop spirally coiled structures called
(1) Thorns (2) Tendril (3) Offsets (4) Suckers

Sol. Answer (2)

In gourds, axillary buds develop spirally coiled structures called tendril.

18. _____ protect *Bougainvillea* from grazing animals.
(1) Tendrils (2) Suckers (3) Offsets (4) Thorns

Sol. Answer (4)

Thorns protect *Bougainvillea* from grazing animals.

19. Stems are modified into flattened structures, which carryout photosynthesis in
(1) *Euphorbia* (2) *Opuntia* (3) *Bougainvillea* (4) *Colocasia*

Sol. Answer (2)

In *Opuntia*, stems are modified into flattened structures which carryout photosynthesis.

20. Chlorophyll containing fleshy cylindrical structures found in *Euphorbia* are modified
(1) Roots (2) Fruit (3) Leaves (4) Stem

Sol. Answer (4)

Phylloclade is stem modification in *Euphorbia*.

21. In *Pistia* and *Eichhornia*, stems are modified to form
(1) Offsets (2) Tendrils (3) Stolons (4) Suckers

Sol. Answer (1)

In *Pistia* and *Eichhornia*, stems are modified to form offsets.

(The Leaf)

22. Leaves originate from _____ and are arranged in an _____ order.
    (1) Root apical meristem, acropetal
    (2) Floral meristem, basipetal
    (3) Shoot apical meristem, acropetal
    (4) Internodes, basipetal

Sol. Answer (3)

Leaves originate from shoot apical meristem and are arranged in an acropetal order.

23. Which of the following is not a part of a leaf?
    (1) Pedicel
    (2) Leaf base
    (3) Petiole
    (4) Lamina

Sol. Answer (1)

Pedicel is not a part of leaf.

24. Leaf base may bear two lateral small leaf like structures called
    (1) Lamina
    (2) Pulvinus
    (3) Stipules
    (4) Sepals

Sol. Answer (3)

Leaf base may bear two lateral small stipules.

25. Swollen leaf base found in leguminous plants is called
    (1) Leaf blade
    (2) Petiole
    (3) Stipules
    (4) Pulvinus

Sol. Answer (4)

Swollen leaf base found in leguminous plants is called pulvinus.

26. Which one of the following plants shows alternate phyllotaxy?
    (1) Sunflower (2) Guava (3) *Nerium* (4) *Calotropis*

Sol. Answer (1)

Sunflower shows alternate phyllotaxy.

27. The petiole expand and become green to synthesize food in
    (1) *Solanum* (2) *Pisum sativum* (3) Venus-fly trap (4) Australian *Acacia*

Sol. Answer (4)

Petiole expand and become green, structure called phyllode to synthesize food.

(The Inflorescence and The Flower)

28. Mark the incorrect statement
    (1) Flower is a modified shoot
    (2) In cymose inflorescence, the main axis terminates in a flower
    (3) Flowers are borne on successive internodes on the stems and roots
    (4) When a shoot tip transforms into a flower, the flower is always solitary

Sol. Answer (3)

Flowers are borne on successive nodes on the stems.

29. The four whorls of a flower are arranged on the

(1) Thalamus (2) Petiole (3) Corolla (4) Stamens

Sol. Answer (1)

Four whorls of a flower are arranged on the thalamus.

30. Radial symmetry is found in flowers of

(1) *Cassia* (2) Chilli (3) Gulmohur (4) *Canna*

Sol. Answer (2)

Radial symmetry is found in flowers of chilli.

31. The flower of which of the following plant is zygomorphic?

(1) Bean (2) *Datura* (3) Mustard (4) *Canna*

Sol. Answer (1)

The flower of bean is zygomorphic.

32. Which of the following plant has a superior ovary?

(1) Peach (2) Guava (3) China rose (4) Rose

Sol. Answer (3)

Guava - Inferior ovary

Peach & Rose - Perigynous

China rose - Superior ovary

33. Which of the following plant has epigynous flower?

(1) Cucumber (2) Brinjal (3) Mustard (4) Peach

Sol. Answer (1)

Cucumber has epigynous flower

34. The ray florets of sunflower has

(1) Superior ovary (2) Half inferior ovary

(3) Half superior ovary (4) Inferior ovary

Sol. Answer (4)

The ray florets of sunflower have inferior ovary.

35. Mark the incorrect match

(1) *Calotropis* – Valvate

(2) Lady's finger – Twisted

(3) *Cassia* – Valvate

(4) Gulmohur – Imbricate

Sol. Answer (3)

Cassia shows imbricate aestivation

36. Match the column-I with column-II w.r.t. aestivation.

Column-I		Column-II
a.		(i) Valvate
b.		(ii) Vexillary
c.		(iii) Twisted
d.		(iv) Imbricate

(1) a(ii), b(i), c(iv), d(iii) (2) a(iii), b(ii), c(iv), d(i) (3) a(iv), b(ii), c(iii), d(i) (4) a(i), b(iii), c(iv), d(ii)

Sol. Answer (4)

Correct match.

(a) Valvate (b) Twisted (c) Imbricate (d) Vexillary

37. Carpels are fused in the flowers of

(1) Lotus (2) Tomato (3) Rose (4) Both (1) & (3)

Sol. Answer (2)

Carpels are fused in the flowers of tomato.

38. Ovary containing the false septum occurs in

(1) *Primrose* (2) *Dianthus* (3) *Argemone* (4) *Pisum sativum*

Sol. Answer (3)

Ovary containing the false septum occurs in *Argemone* .

39. In _____ placentation, the placenta forms a ridge along the ventral suture of the ovary.

(1) Axile (2) Basal (3) Free central (4) Marginal

Sol. Answer (4)

In marginal placentation, the placenta forms a ridge along the ventral suture of the ovary.

(The Fruit and The Seed)

40. The stony hard part of the mango represents

(1) Mesocarp (2) Epicarp (3) Endosperm (4) Endocarp

Sol. Answer (4)

The stony hard part of the mango represents endocarp.

41. Select the correct statement w.r.t. Mango and coconut

(1) They develop from monocarpellary superior ovaries (2) They develop from monocarpellary inferior ovaries

(3) They have fibrous epicarp (4) They have fleshy edible mesocarp

Sol. Answer (1)

Mango and coconut develop from monocarpellary superior ovaries.

42. The inner layer of the seed coat is called

(1) Testa (2) Hilum (3) Micropyle (4) Tegmen

Sol. Answer (4)

The inner layer of the seed coat is tegmen.

43. Which of the following parts of the embryo contains radicle and plumule?

(1) Cotyledon (2) Seed coat (3) Embryonal axis (4) Endosperm

Sol. Answer (3)

Embryonal axis contains radicle and plumule.

44. Which of the following plant has endospermic seed?

(1) Bean (2) Gram (3) Pea (4) Castor

Sol. Answer (4)

Castor has endospermic seed.

(Semi-technical description of a typical flowering plant)

45. While representing a floral formula, G stands for

(1) Epigynous flower (2) Superior ovary (3) Inferior ovary (4) Androecium

Sol. Answer (2)

In floral formula, G stands for superior ovary.

46. Select the correct option.

	Column-I		**Column-II**
a.	Br	(i)	Corolla
b.	K	(ii)	Perianth
c.	C	(iii)	Calyx
d.	P	(iv)	Bracteate

(1) a(iv), b(ii), c(iii), d(i) (2) a(iv), b(i), c(iii), d(ii) (3) a(iv), b(iii), c(i), d(ii) (4) a(i), b(ii), c(iii), d(iv)

Sol. Answer (3)

Br - Bracteate

K - Calyx

C - Corolla

P - Perianth

47. Actinomorphic nature of flower is represented by which of the following symbols?

(1) A (2) % (3) ⊕ (4) ♂

Sol. Answer (3)

Actinomorphic symbol – ⊕

(Description of some important families)

48. The floral formula of the plants belonging to the family Fabaceae is

(1) $\oplus \male\female K_{(5)}\, C_{1+2+(2)}\, A_{(9)+1}\, \underline{G}_1$ (2) $\% \male K_{(5)}\, C_{1+2+(2)}\, A_{(9)+1}\, \underline{G}_1$

(3) $\oplus \male\female K_5\, C_{1+2+2}\, A_{9+1}\, \underline{G}_1$ (4) $\% \male\female K_{(5)}\, C_{1+2+(2)}\, A_{(9)+1}\, \underline{G}_1$

Sol. Answer (4)

Floral formula of fabaceae

$\% \male\female K_{(5)}\, C_{1+2+(2)}\, A_{(9)+1}\, \underline{G}_1$

49. The plants belonging to the family Solanaceae is represented by the floral formula

(1) $\oplus \male\female K_5\, C_5\, A_5\, \overline{G}_2$ (2) $\oplus \male\female K_{(5)}\, C_{(5)}\, A_{(5)}\, \underline{G}_{(2)}$ (3) $\oplus \male\female K_{(5)}\, \overset{\frown}{C_{(5)}\, A_5}\, \underline{G}_{(2)}$ (4) $\oplus \female K_5\, \overset{\frown}{C_{(5)}\, A_{(5)}}\, G_{(2)}$

Sol. Answer (3)

Floral formula of Solanaceae

$\oplus \male\female K_{(5)}\, \overset{\frown}{C_5\, A_{(5)}}\, \underline{G}_{(2)}$

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

(1) *Trifolium* (2) Lupin (3) *Indigofera* (4) *Cassia*

Sol. Answer (3)

Indigofera is used to extract the blue dye.

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