KATTAR NEET 2026

Botany By Rupesh Chaudhary Sir

Morphology of Flowering Plants

Q1 In how many of the following plants do roots arise from parts of the plant other than the radicle?

Sugarcane, Mustard, Maize, Banyan, *Monstera*

(A) Five (B) Two
(C) Three (D) Four

Q2 Identify the **incorrect** statements regarding roots:

A. Roots are involved in the synthesis of plant growth regulators.
B. Proximal to the region of elongation is the region of meristematic activity.
C. Fibrous roots arise from the base of the stem.
D. Very fine and delicate, thread-like structures arise from the region of elongation.
E. A thimble-like structure protects the tender apex of the root.

Choose the correct answer from the options given below:
(A) A, B, C, and E only
(B) A, B, and D only
(C) D and E only
(D) B and D only

Q3 From the given list, identify the number of plants with inferior ovary.

A. Plum
B. Brinjal
C. Ray florets of sunflower
D. Mustard
E. Cucumber

Choose the most appropriate answer from the options given below:
(A) A, B and C only
(B) B and D only
(C) C and E only
(D) A and D only

Q4 From the given list, identify the number of plants with imbricate aestivation.

A. Lady's finger
B. Gulmohur
C.Bean
D. *Cassia*
E. China rose

Choose the most appropriate answer from the options given below:
(A) A and B (B) C and E
(C) A and D (D) B and D

Q5 Given below are two statements:

Statement I: In some plants, such as Australian acacia, the petioles expand, become green, and perform photosynthesis like the leaves, while the actual leaves are small, short-lived.

Statement II: In a pinnately compound leaf, a number of leaflets are borne along a common axis, the rachis, which functions like the midrib of the leaf, as seen in China rose.

In the light of the above statements, choose the *most appropriate* answer from the options given below:
(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

Q6 Given below are two statements:

Statement I: The cells of elongation in root are relatively small, thin-walled, and contain dense protoplasm, enabling them to elongate rapidly during growth.

Statement II: Members of the Gramineae family exhibit parallel venation, and their mature seeds possess endosperm, which is not completely used up during development.

In the light of the above statements, choose the *most appropriate* answer from the options given below:

(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

Q7 Which of the following examples show a monocarpellary, unilocular ovary with many ovules?

A. *Sesbania*
B. Mustard
C. *Indigofera*
D. China rose
E. Tomato

Choose the **correct** answer from the options given below:

(A) B and E only
(B) C, D and E only
(C) A, B and D only
(D) A and C only

Q8 Identify the **incorrect** statements regarding monocot seeds from the following:

A. In the seed of cereals, the seed coat is membranous and generally fused with the fruit wall.
B. One large, shield-shaped structure in some monocot seeds helps in transferring nutrition to the developing embryo.
C. Aleurone layer is a part of the endosperm.
D. Radicle and plumule are enclosed in sheaths known as coleoptile and coleorhiza respectively.

Choose the **correct** answer from the options given below:

(A) B and D only
(B) A, B and C only
(C) A only
(D) D only

Q9 Which of the following pairs regarding types of placentation and their examples are correctly matched?

A. Axile – Lemon
B. Basal – Marigold
C. Marginal – Mustard
D. Free central – *Primrose*
E. Parietal – *Argemone*

Choose the **correct** answer from the options given below:

(A) A, C and D only
(B) B, C, D and E only
(C) A, B, D and E only
(D) A, B, C, D and E

Q10 Which of the following plants exhibit variation in the length of stamen filaments in their flowers?

A. Potato
B. China rose
C. *Salvia*
D. Mustard
E. Pea

Choose the **correct** answer from the options given below:

(A) B and E only
(B) A and C only
(C) C and D only
(D) B and D only

Q11 Which of the following are **incorrect** regarding papilionaceous aestivation?

A. Keels are fused
B. Also called vexillary aestivation
C. Found in family Cruciferae
D. Possess one standard, two keels and two wings
E. The standard overlaps the two lateral wings

Choose the correct answer from the options given below:

(A) C and D only
(B) B and E only
(C) A and E only
(D) C only

Q12 Leaf tendrils are found in:

A. Pea

B. Watermelon

C. Cucumber

D. Grapevines

E. Pumpkins

Choose the **correct** answer from the options given below:

(A) B and E only (B) A and D only

(C) C and D only (D) A only

Q13 Match **List-I** with **List-II**:

	List-I		**List-II**
(A)	Grass family	(I)	False septum in locule of ovary
(B)	Compositae	(II)	Leaf base expands into a sheath covering the stem partially or wholly
(C)	Some leguminous plants	(III)	Pulvinus
(D)	Mustard family	(IV)	Basal placentation

Choose the **correct** answer from the options given below:

(A) A-II, B-IV, C-III, D-I

(B) A-III, B-II, C-I, D-IV

(C) A-IV, B-I, C-II, D-III

(D) A-I, B-III, C-IV, D-II

Q14 Identify the **incorrect** statement(s).

A. Veins provide rigidity to the leaf blade.

B. Leaves develop at the node and bear a bud in its axil.

C. Leaf base may bear two lateral small leaf-like structures called bracts.

D. Petiole helps in cooling the leaf and bringing fresh air to the leaf surface.

E. Leaves originate from shoot apical meristems and are arranged in a basipetal order.

Choose the correct answer from the options given below:

(A) A, B, C, D and E

(B) A, B and E only

(C) C and E only

(D) A, B, D and E only

Q15 Identify the **incorrect** statement w.r.t flower.

A. Four different kinds of whorls are arranged successively on the swollen end of the stalk or pedicel, called receptacle.

B. When a shoot tip transforms into a flower, it is always solitary.

C. Unisexual male flowers are called staminode.

D. Calyx and corolla are accessory organs.

E. In a flower, whorls arise from nodes, internodes are condensed.

Choose the correct answer from the options given below:

(A) C only

(B) D and E only

(C) A and D only

(D) D, C and B only

Q16 How many of the following plants possess flowers that can be divided into two similar halves by only one vertical plane passing through the centre?

Mustard, Gulmohur, *Cassia*, Canna, *Datura*, Bean, Chilli, Pea

(A) Three (B) Five

(C) One (D) Four

Q17 Read the following statements and identify the **correct** one(s):

A. Mustard shows opposite phyllotaxy and possesses a hypogynous flower, syncarpous carpel.

B. Lotus and rose have syncarpous carpels, while mustard and tomato have apocarpous carpels.

C. China rose shows alternate phyllotaxy and possesses a flower with superior ovary, imbricate aestivation, axile placentation.

D. Guava plant shows opposite phyllotaxy and possesses a flower with half-inferior ovary.

E. Plum, rose, and peach have perigynous flowers.

Choose the correct answer from the options given below:

(A) A, B, C, D and E
(B) C, A and B only
(C) D, C, A and E only
(D) E only

Q18 Match **List-I** with **List-II**:

	List-I (Plant)		**List-II (Type of Aestivation / Description)**
(A)	*Calotropis*	(I)	Margins of appendages overlap one another but not in a specific direction
(B)	Bean	(II)	Appendages just touch one another at the margins, no overlapping
(C)	Lady's finger	(III)	One margin of the appendage overlaps that of the next one and so on
(D)	Gulmohur	(IV)	Standard overlaps the two lateral wings, which in turn overlap the two keels

Choose the **correct** answer from the options given below:
(A) A-II, B-IV, C-III, D-I
(B) A-I, B-III, C-IV, D-II
(C) A-III, B-I, C-II, D-IV
(D) A-II, B-IV, C-I, D-III

Q19 Given below are two statements:
Statement I: In China rose, stamens are monoadelphous, whereas in citrus they are polyadelphous.
Statement II: In flowers of brinjal, stamens are epiphyllous, while in lily, stamens are epipetalous.
In the light of the above statements, choose the *most appropriate* answer from the options given below:
(A) Statement I is correct but Statement II is incorrect.
(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

Q20 Match **List-I** with **List-II**:

	List-I (Placentation)		**List-II (Example)**
(A)	Free central	(I)	Tomato
(B)	Basal	(II)	Bean
(C)	Axile	(III)	*Dianthus*
(D)	Marginal	(IV)	Sunflower

Choose the **correct** answer from the options given below:
(A) A-IV, B-II, C-I, D-III
(B) A-III, B-IV, C-I, D-II
(C) A-III, B-IV, C-II, D-I
(D) A-III, B-II, C-I, D-IV

Q21 Which set of seeds are non-endospermic?
(A) Groundnut, maize and wheat
(B) Castor, barley and wheat
(C) Coconut, gram and pea
(D) Gram, bean and pea

Q22 Select the **correct** floral formula of Cruciferae family.
(A) $\mathrm{Br}\ \% \male\!\!\female\ \mathrm{P}_2\mathrm{A}_3\underline{\mathrm{G}}_1$
(B) $\% \male\!\!\female\ \mathrm{K}_{(5)}\ \mathrm{C}_{1+2+(2)}\ \mathrm{A}_{(9)+1}\ \underline{\mathrm{G}}_1$
(C) $\oplus \male\!\!\female\ \mathrm{K}_{2+2}\ \mathrm{C}_4\ \mathrm{A}_{2+4}\ \underline{\mathrm{G}}_{(2)}$
(D) $\mathrm{Br}\ \oplus \female\ \mathrm{K}_p\ \overset{\frown}{\mathrm{C}_{(5)}\ \mathrm{A}_{(5)}}\ \overline{\mathrm{G}}_{(2)}$

Q23 Identify the **incorrect** feature regarding the mustard family.
(A) Ovules are developed on the inner wall of the ovary or on peripheral part.
(B) Flowers are actinomorphic, tetramerous, and bisexual.

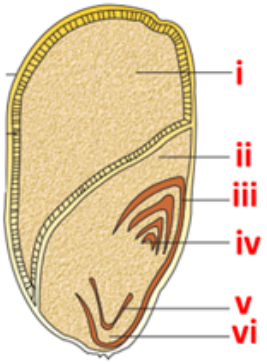
(C) Stamens are attached to petals.
(D) Carpels are bicarpellary and syncarpous with superior ovary.

Q24 Match **List-I** with **List-II**:

	List-I		**List-II**
(A)	Coleorhiza	(I)	Scar on the seed coat
(B)	Micropyle	(II)	Inner layer of seed coat
(C)	Tegmen	(III)	Sheath enclosing the radicle
(D)	Hilum	(IV)	Small pore above the scar on seed coat

Choose the **correct** answer from the options given below:
(A) A-I, B-IV, C-II, D-III
(B) A-III, B-I, C-IV, D-II
(C) A-III, B-IV, C-II, D-I
(D) A-IV, B-II, C-I, D-III

Q25 Identify the correct option regarding the features of the parts of the given structures that are labeled as i, ii, iii, iv, v and vi.



(A) (i) is the single cotyledon of monocots and (iv) gives rise to the root cap.
(B) (ii) is the protective sheath that encloses (iii), which is the plumule.
(C) (v) gives rise to the root and (vi) is the protective sheath that encloses the scutellum.
(D) (iv) gives rise to the shoot and (i) provides nutrition to the developing embryo.

Q26

Which of the following are **not** a stem modification?
(A) Pitcher of venus-fly trap
(B) Thorns of *Bougainvillea*
(C) Tendrils of grapevines
(D) Cylindrical structures of *Euphorbia*
(E) Swollen structure of sweet potato
Choose the correct answer from the options given below:
(A) (A), (C), and (E) only
(B) (A) and (E) only
(C) (B), (D), and (E) only
(D) (A), (B), and (E) only

Q27 Modification of stem that act as organs of perennation is found in:
(A) *zaminkand*
(B) *Colocasia*
(C) Turnip
(D) Ginger
(E) Sweet potato
Choose the **correct** answer from the options given below:
(A) (C), (D), and (E)
(B) (A), (B), and (D)
(C) (A), (C), and (E)
(D) (B), (D), and (E)

Q28 Underground stems of some plants spread to new niches and when older parts die new plants are formed. This is observed in plants such as:
(A) grass and strawberry.
(B) mint and jasmine.
(C) *Pistia* and *Eichhornia*.
(D) pineapple and *Chrysanthemum.*

Q29 How many plants in the list given below have marginal placentation?

Mustard, Gram, China rose, Wheat, Arhar, Sunhemp, Rice, Cotton, Radish, Sunflower, Pea, Marigold, Lupin

(A) Six (B) Three
(C) Four (D) Five

Q30

Which of the following features are common between members of the Leguminosae and Cruciferae families?
(A) Position of ovary in the flower
(B) Venation in leaves
(C) Type of inflorescence
(D) Polysepalous condition
(E) Symmetry of flower
Choose the correct answer from the options given below:
(A) A, B, and D only
(B) A, D, and E only
(C) A, B and C only
(D) C, D, and E only

Q31 Which of the following is not a true modification of the stem, based on site of origin and structural identity?
(A) Structures that are meant for climbing arising from axillary buds in gourds
(B) Hanging supportive structures arising from branches in banyan tree
(C) Protective structures developed from axillary buds in *Citrus*
(D) Structures that store food in *Colocasia*

Q32 Only a single seed will be produced in the fruit developed from;
(A) syncarpous ovary with axile placentation.
(B) apocarpous ovary with marginal placentation.
(C) unilocular ovary with basal placentation.
(D) multilocular ovary with free central placentation.

Q33 Which of the following characteristics are true for *Solanum*?
A. Cymose inflorescence
B. Food stored in tubers
C. Twisted aestivation
D. 2 petals free and 4 are united
E. Epipetalous androecium
Choose the **correct** option:
(A) A, B and E (B) B, C and D
(C) C, D and E (D) A, C and D

Q34 Which of the following **correctly** describes the origin of adventitious roots?
(A) They develop from the radicle of the embryo, as seen in the sweet potato.
(B) They emerge in tufts from the apex of the stem, as in wheat.
(C) They arise from plant parts other than the radicle, as observed in *Monstera*.
(D) They originate from the radicle of the embryo, as in grasses.

Q35 Which of the following modifications aids vegetative propagation and is identifiable by roots arising from nodes and leafy rosettes?
(A) Phylloclade of *Opuntia*
(B) Sucker of *Chrysanthemum*
(C) Offset of *Pistia*
(D) Rhizome of *Zaminkand*

Q36 Choose the correct set of plants having more than one carpel which are fused.
(A) Rose, Lotus, Mustard, Tomato
(B) Rose, Tomato, Cotton, Sunflower
(C) Lotus, Mustard, Tomato, Sunflower
(D) Mustard, Tomato, Cotton, Sunflower

Q37 Phyllotaxy plays a crucial role in:
(A) Controlling flower number and size
(B) Regulating stomatal activity on leaf surfaces
(C) Exposing each and every leaf to light
(D) Maintaining floral symmetry during development

Q38 Given below are two statements:
Statement I: In mature seeds of orchids, the food storing tissue formed as a result of double fetilisation is not present.
Statement II: The position of the mother axis with respect to the flower is represented by a dot on the top of the floral diagram.
In the light of the above statements, choose the **most appropriate** answer from the options given below:
(A) Statement I is correct but Statement II is incorrect.

(B) Statement I is incorrect but Statement II is correct.
(C) Both Statement I and Statement II are correct.
(D) Both Statement I and Statement II are incorrect.

Q39 Identify the **correct** sequential arrangement of regions observed from base to apex in a typical root.
(A) Root cap → Region of maturation → Region of elongation → Region of meristematic activity
(B) Root cap → Region of meristematic activity → Region of elongation → Region of maturation
(C) Region of maturation → Region of elongation → Region of meristematic activity → Root cap
(D) Region of meristematic activity → Root cap → Region of elongation → Region of maturation

Q40 An actinomorphic flower;
(A) is said to have bilateral symmetry.
(B) is present in canna and gulmohur.
(C) has no symmetry hence said to be irregular.
(D) can be divided into two equal radial halves in any radial plane passing through the centre.

Q41 Match **List I** with **List II** w.r.t floral formula of plant families.

List-I		**List-II**	
(A)	$\oplus\ ♀♂\ K_{(5)}\ \overbrace{C_{(5)}\ A_5}\ \underline{G}_{(2)}$	(I)	Leguminosae
(B)	$Br \oplus ♀♂\ Epik_{3-9}\ \overset{\curvearrowleft}{K_{(5)}},\ C_5\ A_{(\infty)}\ G_{(5-\infty)}$	(II)	Solanaceae
(C)	$Br\ (Lemma)\ Brl\ (Palea)\ ♀♂\ \phi\ P_{2-3}\ lodicules\ A_{3\ or\ 3+3}\ \underline{G}_{(3)}$	(III)	Malvaceae
(D)	$\%\ ♀♂\ K_{(5)}\ C_{1+2+(2)}\ A_{(9)+1}\ \underline{G}_1$	(IV)	Graminae

Choose the **correct** answer from the options given below:
(A) A-IV, B-I, C-II, D-III
(B) A-II, B-III, C-IV, D-I
(C) A-III, B-IV, C-I, D-II
(D) A-I, B-III, C-II, D-IV

Q42 Identify the **correct** statement.
(A) In cymose type of inflorescence the main axis terminates in a flower.
(B) Racemose inflorescence is limited in growth.
(C) In cymose inflorescence, young flowers are at the apex and older ones near the base.
(D) In racemose inflorescence, the flowers are borne apically in an acropetal succession.

Q43 In the members of family Poaceae;
(A) two cotyledons are present in the embryo within the seed.
(B) the fruit is called caryopsis.
(C) flowers possess pedicels.
(D) the outer covering of endosperm in a seed separates the embryo by a proteinous layer called scutellum.

Q44 Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R):**
Assertion (A): In Australian acacia, the leaf is modified for trapping insects.
Reason (R): In such plants, the leaves are small and short-lived.
In the light of the above statements, choose the **correct** answer from the options given below:
(A) A is true but R is false
(B) A is false but R is true
(C) Both A and R are true and R is the correct explanation of A
(D) Both A and R are true but R is NOT the correct explanation of A

Q45 Read the following statements.
A. The ovary in a hypogynous flower is said to be inferior.
B. If gynoecium is situated in the centre and other parts of the flower are located on the rim of the thalamus almost at the same level, the flower is called perigynous.
C. The ovary is said to be superior in flowers of guava.
D. Based on the position of calyx, corolla and androecium in respect of the ovary on thalamus, flowers can be of 3 types.
E. In a bisexual flower, only reproductive whorls are present but accessory whorls are absent.

In the light of above statements, choose the **correct** answer from the options given below:

(A) A, C and E are incorrect

(B) B, C and D are correct

(C) C, D and E are correct

(D) A, C and D are incorrect

Q46 Match **List I** with **List II**.

List-I		**List-II**	
(A)	Difference in length of filaments in stamens within a flower	(I)	Lily
(B)	Calyx and corolla are not distinct	(II)	China rose
(C)	Stamens united into one bundle	(III)	Brinjal
(D)	Stamens attached to petals	(IV)	*Salvia*

Choose the **most appropriate** answer from the options given below:

(A) A-IV, B-I, C-II, D-III

(B) A-II, B-III, C-IV, D-I

(C) A-III, B-IV, C-I, D-II

(D) A-I, B-III, C-II, D-IV

Q47 Generally, dicotyledonous plants have 'A' while monocotyledonous plants have 'B'. Choose the **correct** option for A and B, respectively.

(A) fibrous root system and tap root system

(B) reticulate venation and parallel venation in leaves

(C) pinnately compound and palmately compound leaves

(D) coleoptile and coleorhiza as root covering in the seed

Q48 Given below are two statements:

Statement I: In members of family Leguminosae, flowers show twisted aestivation in the corolla.

Statement II: In bean flower, the standard petal overlaps the two lateral wings, which overlap the keel petals.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

(A) Statement I is correct but Statement II is incorrect.

(B) Statement I is incorrect but Statement II is correct.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

Q49 A student observes a longitudinal section of a root under a microscope and identifies fine, thread-like structures emerging from certain cells. These structures played a role in absorbing water and minerals from soil. Based on this observation, identify the cells and the specific root region involved in their formation.

(A) Cortical cells in the region of elongation

(B) Epidermal cells in the region of maturation

(C) Cortical cells in the region of maturation

(D) Epidermal cells in the region of elongation

Q50 Identify the **correct** statement.

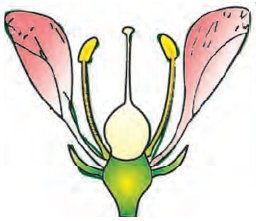
(A) Stamens consist of a filament and anther.

(B) Pollen grains are formed in the stalk of anthers.

(C) A fertile stamen is referred to as staminode.

(D) Each anther has a single pollen sac per lobe.

Q51 Which of the following **correctly** represent the arrangement of calyx, corolla and androecium on the thalamus of cucumber flower?

(A) 

(B) 

(C)

(D)

Q52 Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R):**

Assertion (A): In parietal placentation, although the ovary is one-chambered, yet it appears two chambered.

Reason (R): In case of parietal placentation, false septum is formed.

In the light of the above statements, choose the **correct** answer from the options given below:

(A) A is true but R is false.

(B) A is false but R is true.

(C) Both A and R are true and R is the correct explanation of A.

(D) Both A and R are true but R is NOT the correct explanation of A.

Q53 Identify the **incorrectly** matched pair.

(A)	Part of leaf by which it is attached to the stem	-	Leaf base
(B)	Present at the leaf base, generally two in number	-	Stipules
(C)	Leaf base become swollen in some leguminous plants	-	Bract
(D)	Green expanded part of the leaf with veins and veinlets	-	Leaf blade

Q54 A bud is present in the axil of

A. petiole in simple leaves.

B. petiole in compound leaves.

C. leaflets of the compound leaves.

Select the **correct** option.

(A) Only A and B (B) Only B and C

(C) Only C (D) All A, B and C

Q55 Given below are two statements:

Statement I: Thorns and spines are meant for defense when present in plants.

Statement II: Thorns are modified leaves and spines are modified axillary buds.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

(A) Statement I is correct but Statement II is incorrect.

(B) Statement I is incorrect but Statement II is correct.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

Q56 Select the **correct** statement w.r.t fruit in both mango and coconut.

(A) It develops from bicarpellary ovary.

(B) The seed is edible.

(C) The mesocarp is fibrous.

(D) The endocarp is not edible.

Q57 Which of the following economic uses are **correctly** matched with their respective Malvaceae plant sources?

A. Gossypium hirsutum – Provide fibre

B. *Abelmoschus esculentus* – Medicinal plant

C. *Hibiscus rosasinensis* – Ornamental

D. *Abelmoschus moschatus* – Seed oil used as flowering agent

E. *Bombax ceiba* – Wood used to make toys

In the light of the above statements, choose the **most appropriate** answer from the options given below:

(A) A, B, C and D (B) B, C, D and E

(C) A, B, D and E (D) A, C, D and E

Q58

Choose the **incorrect** statement from the following.

(A) The stem bears nodes and internodes.

(B) The region of the stem where leaves are born are called internodes.

(C) The stem bears buds, which may be terminal or axillary.

(D) Stem is generally green when young and later often becomes woody and dark brown.

Q59 Given below are two statements:

Statement I: A floral diagram provides information about the number of parts of a flower, their arrangement and the relation they have with one another.

Statement II: In a floral formula, adhesion is indicated by enclosing the figure within bracket and fusion by a line drawn above the symbols of the floral parts.

In the light of the above statements, choose the **most appropriate** answer from the options given below:

(A) Statement I is correct but Statement II is incorrect.

(B) Statement I is incorrect but Statement II is correct.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect.

Q60 Given below are two statements: One is labelled as **Assertion (A)** and the other is labelled as **Reason (R):**

Assertion (A): The coconut fruit is one-seeded.

Reason (R): The drupe fruit develops from superior ovary.

In the light of the above statements, choose the **correct** answer from the options given below:

(A) A is true but R is false

(B) A is false but R is true

(C) Both A and R are true and R is the correct explanation of A

(D) Both A and R are true but R is NOT the correct explanation of A

Answer Key

Q1	(D)	Q31	(B)
Q2	(D)	Q32	(C)
Q3	(C)	Q33	(A)
Q4	(D)	Q34	(C)
Q5	(A)	Q35	(C)
Q6	(B)	Q36	(D)
Q7	(D)	Q37	(C)
Q8	(D)	Q38	(C)
Q9	(C)	Q39	(C)
Q10	(C)	Q40	(D)
Q11	(D)	Q41	(B)
Q12	(D)	Q42	(A)
Q13	(A)	Q43	(B)
Q14	(C)	Q44	(B)
Q15	(A)	Q45	(A)
Q16	(D)	Q46	(A)
Q17	(D)	Q47	(B)
Q18	(A)	Q48	(B)
Q19	(A)	Q49	(B)
Q20	(B)	Q50	(A)
Q21	(D)	Q51	(C)
Q22	(C)	Q52	(C)
Q23	(C)	Q53	(C)
Q24	(C)	Q54	(A)
Q25	(D)	Q55	(A)
Q26	(B)	Q56	(D)
Q27	(B)	Q57	(D)
Q28	(A)	Q58	(B)
Q29	(D)	Q59	(A)
Q30	(C)	Q60	(D)

Hints & Solutions

Q1 Text Solution:
In some plants like grass, *Monstera*, wheat (with fibrous roots arising from the base of the stem), and the banyan tree (with prop roots), as well as sugarcane and maize (with stilt roots), roots arise from parts of the plant other than the radicle; such roots are called adventitious roots. In mustard, a tap root system is found and adventitious roots are not formed.

Q2 Text Solution:
Proximal to the region of elongation is the region of maturation, while the region of meristematic activity lies distal to the region of elongation. From the region of maturation, some of the epidermal cells develop into very fine and delicate, thread-like structures called root hairs.

Q3 Text Solution:
Plum- half inferior ovary
Mustard and brinjal- superior ovary
Ray floret of sunflower and cucumber- inferior ovary

Q4 Text Solution:
Cassia and gulmohur – imbricate aestivation
China rose, lady's finger – twisted aestivation
Bean – vexillary aestivation

Q5 Text Solution:
In some plants such as Australian acacia, the leaves are small and short-lived. The petioles in these plants expand, become green and synthesise food. In china rose leaves are simple. In a pinnately compound leaf a number of leaflets are present on a common axis, the rachis, which represents the midrib of the leaf as in neem. China rose has simple leaves.

Q6 Text Solution:
A few millimetres above the root cap is the region of meristematic activity. The cells of this region are very small, thin-walled and with dense protoplasm. They divide repeatedly. The cells proximal to this region undergo rapid elongation and enlargement and are responsible for the growth of the root in length. This region is called the region of elongation. In monocotyledonous plants such as those belonging to the Gramineae (Poaceae) family, the leaves show parallel venation, where the veins run parallel to each other. This is a characteristic feature of monocots. Mature seeds in most of monocots are endospermic.

Q7 Text Solution:
Sesbania and *Indigofera* belong to the family Leguminoceae, where the flower typically has a single carpel (monocarpellary, unilocular ovary).
In contrast, Mustard, China rose and Tomato have more than one carpel.

Q8 Text Solution:
The plumule and radicle are enclosed in sheaths which are called coleoptile and coleorhiza respectively.

Q9 Text Solution:
Mustard has parietal placentation

Q10 Text Solution:
There may be a variation in the length of filaments within a flower, as in *Salvia* and mustard.

Q11 Text Solution:
Papilionaceous aestivation is found in family Leguminosae. Members of cruciferae have valvate aestivation.

Q12 Text Solution:
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. Pea possesses leaf tendril.

Q13 Text Solution:
Leaf base expands into a sheath covering the stem partially or wholly (as in wheat- Grass

family). Ovary is one-chambered but it becomes two-chambered due to the formation of the false septum, e.g., mustard and *Argemone*. In basal placentation, the placenta develops at the base of ovary and a single ovule is attached to it, as in sunflower, marigold (Compositae family). In some leguminous plants the leafbase may become swollen, which is called the pulvinus.

Q14 Text Solution:

Leaf base may bear two lateral small leaf-like structures called stipules. Leaves originate from shoot apical meristems and are arranged in acropetal order.

Q15 Text Solution:

A flower having either only stamens or only carpels is unisexual. A sterile stamen is called staminode.

Q16 Text Solution:

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, e.g., mustard, *Datura*, chilli. When it can be divided into two similar halves only in one particular vertical plane, it is zygomorphic, e.g., pea, gulmohur, bean, *Cassia*. A flower is asymmetric (irregular) if it cannot be divided into two similar halves by any vertical plane passing through the centre, as in canna.

Q17 Text Solution:

Mustard shows alternate phyllotaxy and possesses a hypogynous flower, syncarpous carpel.

Lotus and rose have apocarpous carpels, while mustard and tomato have syncarpous carpels.

China rose shows alternate phyllotaxy and possesses a flower with superior ovary, twisted aestivation, axile placentation.

Guava plant shows opposite phyllotaxy and possesses a flower with inferior ovary.

Q18 Text Solution:

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

Q19 Text Solution:

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. The stamens may be united into one bunch or one bundle (monoadelphous) as in china rose, or two bundles (diadelphous) as in pea, or into more than two bundles (polyadelphous) as in citrus.

Q20 Text Solution:

Basal placentation → Sunflower

Marginal placentation → Bean (Legume family)

Axile placentation → Tomato

Free central placentation → *Dianthus*

Q21 Text Solution:

Non-endospermic seeds (seed stores food in cotyledons, endosperm is absent in mature seed): Gram, Bean, Pea, Groundnut.

Endospermic seeds (endosperm persists in mature seed): Wheat, Maize, Barley, Coconut, Castor

Q22 Text Solution:

Floral formula of family Cruciferae (Brassicaceae) is

$$\oplus \male\female \; K_{2+2}\, C_4\, A_{2+4}\, \underline{G}_{(2)}$$

Q23 Text Solution:

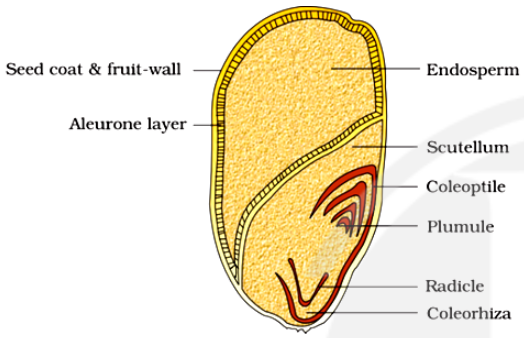
$$\oplus \male\female \; K_{2+2}\, C_4\, A_{2+4}\, \underline{G}_{(2)}$$

Stamens are free with 2+4 arrangement.

Q24 Text Solution:

The plumule and radicle are enclosed in sheaths which are called coleoptile and coleorhiza respectively. The hilum is a scar on the seed coat through which the developing seeds were attached to the fruit. Above the hilum is a small pore called the micropyle. The outermost covering of a seed is the seed coat. The seed coat has two layers, the outer testa and the inner tegmen.

Q25 Text Solution:



The outer covering of endosperm separates the embryo by a proteinous layer called aleurone layer. The embryo is small and situated in a groove at one end of the endosperm. It consists of one large and shield shaped cotyledon known as scutellum and a short axis with a plumule and a radicle. The plumule and radicle are enclosed in sheaths which are called coleoptile and coleorhiza respectively.

Q26 Text Solution:

The pitcher of venus-fly trap is a modification of the leaf, not the stem. The swollen structure of sweet potato is a modification of the adventitious root. The thorns of *Bougainvillea* are modified axillary stems. The tendrils of grapevines arise from axillary buds, making them a stem modification. The cylindrical green structures of *Euphorbia* are modified stems that are photosynthetic and biomes.

Q27 Text Solution:

Underground stems of potato, ginger, turmeric, *zaminkand, Colocasia* are modified to store food in them. They also act as organs of perennation to tide over conditions unfavourable for growth. Tap roots of turnip and adventitious roots of sweet potato, get swollen and store food.

Q28 Text Solution:

Underground stems of some plants such as grass and strawberry, etc., spread to new niches and when older parts die new plants are formed.

Q29 Text Solution:

Marginal placentation is found in members of the leguminoceae family. The following plants from the list belong to this family and exhibit marginal placentation: gram, arhar, sunhemp, pea, and lupin. Mustard and radish show parietal placentation. China rose and cotton show axile placentation. Wheat, rice, sunflower, and marigold show basal placentation.

Q30 Text Solution:

Common features between Leguminosae and Cruciferae: Reticulate venation in leaves (both are dicots), racemose inflorescence, superior ovary.

Not common features:

Leguminosae: Usually has 5 fused sepals (gamosepalous).

Cruciferae: Has 4 free sepals arranged as 2 + 2 (polysepalous).

Flower symmetry:

Cruciferae: Actinomorphic (radial symmetry).

Leguminosae: Zygomorphic (bilateral symmetry).

Q31 Text Solution:

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

Q32 Text Solution:

In basal placentation, the placenta develops at the base of ovary and a single ovule is attached to it, as in sunflower, marigold. Ovule develops into seed after fertilization, hence only one seed will be present in such fruit.

Q33 Text Solution:

In *Solanum*, the aestivation is valvate and corolla has five united petals.

Q34 Text Solution:

In majority of the dicotyledonous plants, the direct elongation of the radicle leads to the formation of primary root which grows inside the soil. In some plants, like grass, *Monstera* and the banyan tree, roots arise from parts of the plant other than the radicle and are called adventitious roots.

Q35 Text Solution:

A lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of roots is found in aquatic plants like *Pistia* and *Eichhornia*. This is called an offset.

Q36 Text Solution:

When more than one carpel is present, they may be free (as in lotus and rose) and are called apocarpous. They are termed syncarpous when carpels are fused, as in mustard, tomato, cotton and sunflower.

Q37 Text Solution:

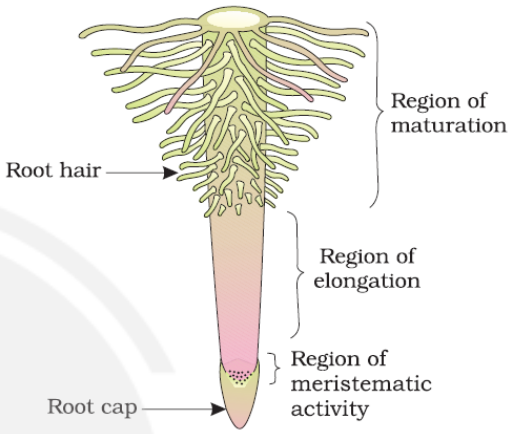
Phyllotaxy is the pattern of arrangement of leaves on the stem or branch. Its object is to expose every leaf in light.

Q38 Text Solution:

In some seeds the endosperm formed as a result of double fertilisation, is a food storing tissue and called endospermic seeds. If the endosperm is not present in mature seeds, they are called non-endospermous. Generally, monocotyledonous seeds are endospermic but some as in orchids are non-endospermic. The position of the mother axis with respect to the flower is represented by a dot on the top of the floral diagram.

Q39 Text Solution:

The root is covered at the apex by a thimble-like structure called the root cap. It protects the tender apex of the root as it makes its way through the soil. A few millimetres above the root cap is the region of meristematic activity. The cells of this region are very small, thin-walled and with dense protoplasm. They divide repeatedly. The cells proximal to this region undergo rapid elongation and enlargement and are responsible for the growth of the root in length. This region is called the region of elongation. The cells of the elongation zone gradually differentiate and mature. Hence, this zone, proximal to region of elongation, is called the region of maturation. From this region some of the epidermal cells form very fine and delicate, thread-like structures called root hairs. These root hairs absorb water and minerals from the soil.



The regions of the root-tip

Q40 Text Solution:

In symmetry, the flower may be actinomorphic (radial symmetry) or zygomorphic (bilateral symmetry). 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, e.g., mustard, *datura*, chilli. When it can be divided into two similar halves only in one particular vertical plane, it is zygomorphic, e.g., pea, gulmohur, bean, *Cassia*. A flower is asymmetric (irregular) if it cannot be divided into two similar halves by any vertical plane passing through the centre, as in canna.

Q41 Text Solution:

F.F of family Solanaceae

$$\oplus\ \female\ K_{(5)}\ \overbrace{C_{(5)}\ A_5}\ \underline{G_{(2)}}$$

F.F of family Malvaceae

$$Br\ \oplus\ \female\ Epik_{3-9}\ \overset{\curvearrowleft}{K_{(5)}, C_5}\ A_{(\infty)}\ G_{(\underline{5-\infty})}$$

F.F of family Graminae

$\text{Br (Lemma) Brl (Palea) } ♂ \phi \text{ } P_{2-3} \text{ lodicules } A_{3 \text{ or } 3+3} \text{ } \underline{G_1} \text{ or } G_{(3)}$

F.F of family Leguminosae

$$\% ♂ K_{(5)} C_{1+2+(2)} A_{(9)+1} \underline{G_1}$$

Q42 Text Solution:

Depending on whether the apex gets developed into a flower or continues to grow, two major types of inflorescences are defined – racemose and cymose. In racemose type of inflorescences the main axis continues to grow, the flowers are borne laterally in an acropetal succession. In cymose type of inflorescence the main axis terminates in a flower, hence is limited in growth. The flowers are borne in a basipetal order.

Q43 Text Solution:

Monocot plants are the members of family Poaceae. Hence they have only one cotyledon present in the embryo within the seed. The flowers are sessile and the fruit is called caryopsis. In monocotyledonous seeds the outer covering of endosperm separates the embryo by a proteinous layer called aleurone layer.

Q44 Text Solution:

In some plants such as Australian acacia, the leaves are small and short-lived. The petioles in these plants expand, become green and synthesise food. Leaves of certain insectivorous plants such as pitcher plant, venus-fly trap are also modified leaves.

Q45 Text Solution:

Each flower normally has four floral whorls, viz., calyx, corolla, androecium and gynoecium. When a flower has both androecium and gynoecium, it is bisexual. A flower having either only stamens or only carpels is unisexual. Based on the position of calyx, corolla and androecium in respect of the ovary on thalamus, the flowers are described as hypogynous, perigynous and epigynous. In the hypogynous flower the gynoecium occupies the highest position while the other parts are situated below it. The ovary in such flowers is said to be superior, e.g., mustard, china rose and brinjal. If gynoecium is situated in the centre and other parts of the flower are located on the rim of the thalamus almost at the same level, it is called perigynous. The ovary here is said to be half inferior, e.g., plum, rose, peach. In epigynous flowers, the margin of thalamus grows upward enclosing the ovary completely and getting fused with it, the other parts of flower arise above the ovary. Hence, the ovary is said to be inferior as in flowers of guava and cucumber, and the ray florets of sunflower.

Q46 Text Solution:

Stamens of flower may be united with other members such as petals or among themselves. 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. The stamens in a flower may either remain free (polyandrous) or may be united in varying degrees. The stamens may be united into one bunch or one bundle (monoadelphous) as in china rose, or two bundles (diadelphous) as in pea, or into more than two bundles (polyadelphous) as in citrus. There may be a variation in the length of filaments within a flower, as in *Salvia* and mustard.

Q47 Text Solution:

Generally, dicotyledonous plants have tap roots while monocotyledonous plants have fibrous roots. Leaves of dicotyledonous plants generally possess reticulate venation, while parallel venation is the characteristic of most monocotyledons. In a monocot seed, the plumule and radicle are enclosed in sheaths which are called coleoptile and coleorhiza respectively

Q48 Text Solution:

In pea and bean (family Leguminosae) 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 or papilionaceous.

Q49 Text Solution:

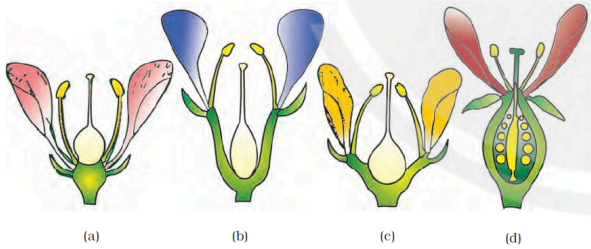
The cells of the elongation zone gradually differentiate and mature. Hence, this zone, proximal to region of elongation, is called the region of maturation. From this region some of the epidermal cells form very fine and delicate, thread-like structures called root hairs. These root hairs absorb water and minerals from the soil.

Q50 Text Solution:

Androecium is composed of stamens. Each stamen which represents the male reproductive organ consists of a stalk or a filament and an anther. Each anther is usually bilobed and each lobe has two chambers, the pollen-sacs. The pollen grains are produced in pollen-sacs. A sterile stamen is called staminode.

Q51 Text Solution:

In epigynous flowers, the margin of thalamus grows upward enclosing the ovary completely and getting fused with it, the other parts of flower arise above the ovary. Hence, the ovary is said to be inferior as in flowers of guava and cucumber, and the ray florets of sunflower.



Position of floral parts on thalamus : (a) Hypogynous (b) and (c) Perigynous (d) Epigynous

Q52 Text Solution:

In parietal placentation, the ovules develop on the inner wall of the ovary or on peripheral part. Ovary is one-chambered but it becomes two-chambered due to the formation of the false septum.

Q53 Text Solution:

In some leguminous plants the leafbase may become swollen, which is called the pulvinus. Flowers with bracts-reduced leaf found at the base of the pedicel- are called bracteate and those without bracts, ebracteate.

Q54 Text Solution:

A bud is present in the axil of petiole in both simple and compound leaves, but not in the axil of leaflets of the compound leaf.

Q55 Text Solution:

Axillary buds of stems may get modified into woody, straight and pointed thorns. Thorns are found in many plants such as *Citrus*, *Bougainvillea*. Leaves are often modified to perform functions other than photosynthesis. They are converted into tendrils for climbing as in peas or into spines for defence as in cacti.

Q56 Text Solution:

In mango and coconut, the fruit is known as a drupe. They develop from monocarpellary superior ovaries and are one seeded. In mango the pericarp is well differentiated into an outer thin epicarp, a middle fleshy edible mesocarp and an inner stony hard endocarp. In coconut which is also a drupe, the mesocarp is fibrous.

Q57 Text Solution:

Fruits of okra (lady's fingers) *Abelmoschus esculentus* are used as vegetable.

Q58 Text Solution:

The stem is the ascending part of the axis bearing branches, leaves, flowers and fruits. It develops from the plumule of the embryo of a germinating seed. The stem bears nodes and internodes. The region of the stem where leaves are born are called nodes while internodes are the portions between two nodes. The stem bears buds, which may be terminal or axillary. Stem is generally green when young and later often become woody and dark brown.

Q59 Text Solution:

Fusion is indicated by enclosing the figure within bracket and adhesion by a line drawn above the symbols of the floral parts.

Q60 Text Solution:

In mango and coconut, the fruit is known as a drupe. They develop from monocarpellary superior ovaries and are one seeded.

Development from monocarpellary ovary makes the drupe fruit one seeded.