

Morphology of Flowering Plants — NEET Biology PYQ (2005-2021)

Class 11 Biology · 74 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. Diadelphous stamens are found in :

- (A) China rose
- (B) Citrus
- (C) Pea
- (D) China rose and citrus

NEET 2020 · Q3

2. The roots that originate from the base of the stem are:

- (A) Fibrous roots
- (B) Primary roots
- (C) Prop roots
- (D) Lateral roots

NEET 2020 · Q20

3. Ray florets have:

- (A) Inferior ovary
- (B) Superior ovary
- (C) Hypogynous ovary
- (D) Half inferior ovary

NEET 2020 · Q58

4. The ovary is half inferior in:

- (A) Brinjal
- (B) Mustard
- (C) Sunflower
- (D) Plum

NEET 2019 · Q138

5. Placentation, in which ovules develop on the inner wall of the ovary or in peripheral part, is :

- (A) Basal
- (B) Axile
- (C) Parietal
- (D) Free central

NEET 2018 · Q126

6. Pneumatophores occur in

- (A) Carnivorous plants
- (B) Free-floating hydrophytes
- (C) Halophytes
- (D) Submerged hydrophytes

NEET 2018 · Q129

7. Sweet potato is a modified

- (A) Tap root
- (B) Adventitious root
- (C) Stem
- (D) Rhizome

NEET 2017 · Q58

8. In Bougainvillea thorns are the modifications of:

- (A) Stipules
- (B) Adventitious root
- (C) Stem
- (D) Leaf

NEET 2017 · Q63

9. The morphological nature of the edible part of coconut is:

- (A) Perisperm
- (B) Cotyledon
- (C) Endosperm
- (D) Pericarp

NEET 2017 · Q113

10. Root hairs develop from the region of:

- (A) Maturation
- (B) Elongation
- (C) Root cap
- (D) Meristematic activity

NEET 2017 · Q116

11. Plants which produce characteristic pneumatophores and show vivipary belong to:

- (A) Mesophytes
- (B) Halophytes
- (C) Psammophytes
- (D) Hydrophytes

NEET 2017 · Q131

12. Coconut fruit is a:

- (A) Drupe
- (B) Berry
- (C) Nut
- (D) Capsule

NEET 2017 (Gujarati paper) · Q62

13. In roots, absorption of water and minerals mostly occurs in the:

- (A) Region of elongation
- (B) Region of maturation
- (C) Meristematic region
- (D) Root cap

NEET 2017 (Gujarati paper) · Q76

14. Tetradynamous stamens are characteristic of:

- (A) Solanaceae
- (B) Fabaceae
- (C) Liliaceae
- (D) Brassicaceae

NEET 2017 (Gujarati paper) · Q107

15. Opposite type of phyllotaxy is not present in:

- (A) Guava
- (B) Calotropis
- (C) Mint
- (D) Mango

16. Which of the following pairs is not correctly matched?

Vegetative Propagules - Example

- (A) Offset – Water hyacinth
- (B) Eyes – Potato
- (C) Rhizome – Ginger
- (D) Stolons – Agave

17. The term 'polyadelphous' is related to

- (A) gynoeceium
- (B) androeceium
- (C) corolla
- (D) calyx

18. Radial symmetry is found in the flowers of

- (A) Brassica
- (B) Trifolium
- (C) Pisum
- (D) Cassia

19. Free-central placentation is found in

- (A) Dianthus
- (B) Argemone
- (C) Brassica
- (D) Citrus

20. Match Column-I with Column-II and select the correct option using the codes given below:

Column-I: a. Pistils fused together; b. Formation of gametes; c. Hyphae of higher Ascomycetes; d. Unisexual female flower

Column-II: (i) Gametogenesis; (ii) Pistillate; (iii) Syncarpous; (iv) Dikaryotic

- (A) a-(iv), b-(iii), c-(i), d-(ii)
- (B) a-(ii), b-(i), c-(iv), d-(iii)
- (C) a-(i), b-(ii), c-(iv), d-(iii)
- (D) a-(iii), b-(i), c-(iv), d-(ii)

21. The standard petal of a papilionaceous corolla is also called:

- (A) Carina
- (B) Pappus
- (C) Vexillum
- (D) Corona

22. Tricarpellary, syncarpous gynoeceium is found in flowers of:

- (A) Liliaceae
- (B) Solanaceae
- (C) Fabaceae
- (D) Poaceae

23. Which of the following is not a stem modification?

- (A) Pitcher of *Nepenthes*
- (B) Thorns of citrus
- (C) Tendrils of cucumber
- (D) Flattened structures of *Opuntia*

AIPMT 2015

24. Leaves become modified into spines in:

- (A) Silk Cotton
- (B) *Opuntia*
- (C) Pea
- (D) Onion

AIPMT 2015

25. The hilum is a scar on the:

- (A) Seed, where micropyle was present
- (B) Seed, where funicle was attached
- (C) Fruit, where it was attached to pedicel
- (D) Fruit, where style was present

AIPMT 2015

26. Keel is the characteristic feature of flower of:

- (A) Tomato
- (B) Tulip
- (C) *Indigofera*
- (D) Aloe

AIPMT 2015

27. Perigynous flowers are found in:

- (A) Rose
- (B) Guava
- (C) Cucumber
- (D) China rose

AIPMT 2015

28. In ginger vegetative propagation occurs through:

- (A) Runners
- (B) Rhizome
- (C) Offsets
- (D) Bulbils

AIPMT 2014

29. An example of edible underground stem is:

- (A) Groundnut
- (B) Sweet potato
- (C) Potato
- (D) Carrot

AIPMT 2014

30. Which one of the following statements is correct?

- (A) Mango is a parthenocarpic fruit
- (B) A proteinaceous aleurone layer is present in maize grain
- (C) A sterile pistil is called a staminode
- (D) The seed in grasses is not endospermic

AIPMT 2014

31. When the margins of sepals or petals overlap one another without any particular direction, the condition is termed as:

- (A) Imbricate
- (B) Twisted
- (C) Valvate
- (D) Vexillary

AIPMT 2014

32. An aggregate fruit is one which develops from:

- (A) Multicarpellary apocarpous gynoecium
- (B) Complete inflorescence
- (C) Multicarpellary superior ovary
- (D) Multicarpellary syncarpous gynoecium

AIPMT 2014

33. Placenta and pericarp are both edible portions in:

- (A) Banana
- (B) Tomato
- (C) Potato
- (D) Apple

AIPMT 2014

34. Non-albuminous seed is produced in:

- (A) Castor
- (B) Wheat
- (C) Pea
- (D) Maize

NEET 2013

35. In china rose the flowers are

- (A) Actinomorphic, hypogynous with twisted aestivation
- (B) Actinomorphic, epigynous with valvate aestivation
- (C) Zygomorphic, hypogynous with imbricate aestivation
- (D) Zygomorphic, epigynous with twisted aestivation

AIPMT 2012 Mains

36. How many plants in the list given below have marginal placentation? Mustard, Gram, Tulip, Asparagus, Arhar, Sun hemp, Chilli, Colchicum, Onion, Moong, Pea, Tobacco, Lupin

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

AIPMT 2012 Prelims

37. How many plants in the list given below have composite fruits that develop from an inflorescence? Walnut, poppy, radish, fig, pineapple, apple, tomato, mulberry.

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

AIPMT 2012 Prelims

38. The gynoecium consists of many free pistils in flowers of

- (A) Michelia
- (B) Aloe
- (C) Tomato
- (D) Papaver

AIPMT 2012 Prelims

39. Phyllode is present in

- (A) Opuntia
- (B) Asparagus
- (C) Euphorbia
- (D) Australian Acacia

AIPMT 2012 Prelims

40. Vexillary aestivation is characteristic of the family

- (A) Brassicaceae
- (B) Fabaceae
- (C) Asteraceae
- (D) Solanaceae

AIPMT 2012 Prelims

41. Cymose inflorescence is present in

- (A) Brassica
- (B) Solanum
- (C) Sesbania
- (D) Trifolium

AIPMT 2012 Prelims

42. Which one of the following is correctly matched ?

- (A) Yeast – Zoospores
- (B) Onion – Bulb
- (C) Ginger – Sucker
- (D) Chlamydomonas – Conidia

AIPMT 2012 Prelims

43. Placentation in tomato and lemon is

- (A) Axile
- (B) Parietal
- (C) Free central
- (D) Marginal

AIPMT 2011 Mains

44. Whorled simple leaves with reticulate venation are present in

- (A) China Rose
- (B) Alstonia
- (C) Calotropis
- (D) Neem

AIPMT 2011 Mains

45. Which one of the following pairs is wrongly matched while the remaining three are correct?

- (A) Bryophyllum – Leaf buds
- (B) Agave – Bulbils
- (C) Penicillium – Conidia
- (D) Water hyacinth – Runner

AIPMT 2011 Mains

46. Sweet potato is homologous to

- (A) Ginger
- (B) Turnip
- (C) Potato
- (D) Colocasia

AIPMT 2011 Prelims

47. The "eyes" of the potato tuber are

- (A) Axillary buds
- (B) Root buds
- (C) Flower buds
- (D) Shoot buds

AIPMT 2011 Prelims

48. Which one of the following statements is correct?

- (A) Flower of tulip is a modified shoot
- (B) In tomato, fruit is a capsule
- (C) Seeds of orchids have oil-rich endosperms
- (D) Placentation in primrose is basal

AIPMT 2011 Prelims

49. A drupe develops in

- (A) Tomato
- (B) Mango
- (C) Wheat
- (D) Pea

AIPMT 2011 Prelims

50. The ovary is half inferior in flowers of

- (A) Guava
- (B) Peach
- (C) Cucumber
- (D) Cotton

AIPMT 2011 Prelims

51. Flowers are zygomorphic in

- (A) Datura
- (B) Mustard
- (C) Gulmohur
- (D) Tomato

AIPMT 2010 Mains · Q7

52. Which one of the following is a xerophytic plant in which the stem is modified into the flat green and succulent structure?

- (A) Opuntia
- (B) Casuarina
- (C) Hydrilla
- (D) Acacia

AIPMT 2010 Mains · Q47

53. Consider the following four statements A, B, C and D and select the right option for two correct statements.

Statements

(A) In vexillary aestivation, the large posterior petal is called standard, two lateral ones are wings and two small anterior petals are termed keel

(B) The floral formula for Liliaceae is $\oplus \text{ } \overline{\text{K}}_3 \text{ } \overline{\text{C}}_{3+3} \text{ } \overline{\text{A}}_{3+3} + \text{ } \overline{\text{G}}_3$

(C) In pea flower the stamens are monadelphous

(D) The floral formula for Solanaceae is $\oplus \text{ } \overline{\text{K}}_{(3)} \text{ } \overline{\text{C}}_{(3)} \text{ } \overline{\text{A}}_{(4)} + \text{ } \overline{\text{G}}_{(2)}$

The correct statements are

- (A) (A) and (C)
- (B) (A) and (B)
- (C) (B) and (C)
- (D) (C) and (D)

AIPMT 2010 Mains · Q57

54. Vegetative propagation in Pistia occurs by

- (A) Stolon
- (B) Offset
- (C) Runner
- (D) Sucker

AIPMT 2010 Prelims · Q129

55. The scutellum observed in a grain of wheat or maize is comparable to which part of the seed in other monocotyledons?

- (A) Plumule
- (B) Cotyledon
- (C) Endosperm
- (D) Aleurone layer

AIPMT 2010 Prelims · Q134

56. In unilocular ovary with a single ovule the placentation is

- (A) Axile
- (B) Marginal
- (C) Basal
- (D) Free Central

AIPMT 2010 Prelims · Q136

57. The technical term used for the androecium in a flower of China rose (*Hibiscus rosasinensis*) is

- (A) Polyadelphous
- (B) Monadelphous
- (C) Diadelphous
- (D) Polyandrous

AIPMT 2010 Prelims · Q137

58. Ovary is half-inferior in the flowers of

- (A) Cucumber
- (B) Guava
- (C) Plum
- (D) Brinjal

AIPMT 2010 Prelims · Q139

59. Keel is characteristic of the flowers of

- (A) Bean
- (B) Gulmohur
- (C) Cassia
- (D) Calotropis

AIPMT 2009 Prelims · Q56

60. The floral formula $\oplus \text{ } \overline{\text{K}}_{(5)} \text{ } \overline{\text{C}}_{(5)} \text{ } \overline{\text{A}}_5 \text{ } \overline{\text{G}}_{(2)}$ is that of:

- (A) Soybean
- (B) Sunnhemp
- (C) Tobacco
- (D) Tulip

AIPMT 2009 Prelims · Q66

61. A fruit developed from hypanthodium inflorescence is called:

- (A) Sorosis
- (B) Syconus
- (C) Caryopsis
- (D) Hesperidium

AIPMT 2009 Prelims · Q105

62. An example of axile placentation is:

- (A) Dianthus
- (B) Lemon
- (C) Marigold
- (D) Argemone

AIPMT 2009 Prelims · Q122

63. Vegetative propagation in mint occurs by:

- (A) Offset
- (B) Rhizome
- (C) Sucker
- (D) Runner

AIPMT 2009 Prelims · Q124

64. Cotyledons and testa respectively are edible parts in:

- (A) walnut and tamarind
- (B) french bean and coconut
- (C) cashew nut and litchi
- (D) groundnut and pomegranate

AIPMT 2009 Prelims · Q146

65. An example of a seed with endosperm, perisperm, and caruncle is:

- (A) coffee
- (B) lily
- (C) castor
- (D) cotton

AIPMT 2008 Prelims · Q129

66. The fruit is chambered, developed from inferior ovary and has seeds with succulent testa in

- (A) Cucumber
- (B) Pomegranate
- (C) Orange
- (D) Guava

AIPMT 2008 Prelims · Q132

67. Dry indehiscent single-seeded fruit formed from bicarpellary syncarpous inferior ovary is

- (A) Cremocarp
- (B) Caryopsis
- (C) Cypsela
- (D) Berry

AIPMT 2008 Prelims · Q141

68. Replum is present in the ovary of flower of

- (A) Pea
- (B) Lemon
- (C) Mustard
- (D) Sunflower

AIPMT 2008 Prelims · Q142

69. The fleshy receptacle of syconus of fig encloses a number of

- (A) Mericarps
- (B) Achenes
- (C) Samaras
- (D) Berries

70. Pineapple (annanas) fruit develops from :

- (A) a unilocular polycarpillary flower
- (B) a multipistillate syncarpous flower
- (C) a cluster of compactly borne flowers on a common axis
- (D) a multilocular monocarpillary flower

71. In which of the following fruits is the edible part the aril ?

- (A) Custard apple
- (B) Pomegranate
- (C) Orange
- (D) Litchi

72. What type of placentation is seen in sweet pea ?

- (A) Basal
- (B) Axile
- (C) Free central
- (D) Marginal

73. Pentamerous, actinomorphic flowers, bicarpillary ovary with oblique septa, and fruit a capsule or berry, are characteristic features of :

- (A) Asteraceae
- (B) Brassicaceae
- (C) Solanaceae
- (D) Liliaceae

74. Which of the following represents the edible part of the fruit of litchi ?

- (A) Pericarp
- (B) Mesocarp
- (C) Juicy aril
- (D) Endocarp

Answer key and explanations

1. Answer: (C) Pea

In pea the ten stamens form two bundles (nine fused plus one free), so they are diadelphous. China rose has monadelphous stamens (one bundle) and citrus has polyadelphous stamens (many bundles).

2. Answer: (A) Fibrous roots

In monocots the primary root is short-lived and is replaced by many roots that arise from the base of the stem, forming the fibrous root system. Prop roots are adventitious roots that hang down from the branches (as in banyan), not from the stem base.

3. Answer: (A) Inferior ovary

Ray florets of sunflower (Asteraceae) are epigynous: the ovary is fused with the thalamus and the other floral parts arise above it, so the ovary is inferior. Superior (hypogynous) or half-inferior ovaries are not found in this family.

4. Answer: (D) Plum

In perigynous flowers such as plum, rose and peach the floral parts arise at the rim of the thalamus at about the level of the ovary, so the ovary is called half inferior. Brinjal and mustard have superior ovaries and sunflower an inferior ovary.

5. Answer: (C) Parietal

In parietal placentation (e.g. mustard, Argemone) ovules develop on the inner wall of the ovary or its peripheral part. In axile placentation ovules sit on a central axis in a multilocular ovary, and in free central they sit on a central axis without septa.

6. Answer: (C) Halophytes

Pneumatophores are negatively geotropic respiratory roots of mangroves such as Rhizophora, which are halophytes growing in waterlogged saline swamps where the soil is poor in oxygen. Hydrophytes take oxygen directly from the water or air and do not need them.

7. Answer: (B) Adventitious root

The edible part of sweet potato is a swollen adventitious root that stores food. It is not a stem or rhizome, unlike potato (a stem tuber), and it is not a tap root like carrot or radish.

8. Answer: (C) Stem

Thorns of Bougainvillea arise from axillary buds, which marks them as modified stems. Spines of cacti are modified leaves, and stipules can also form spines, but neither applies to Bougainvillea.

9. Answer: (C) Endosperm

The edible white kernel and the coconut water are the endosperm (cellular and free-nuclear respectively). The pericarp of the drupe forms the outer fibrous husk and hard shell, which is not eaten.

10. Answer: (A) Maturation

Cells of the region of elongation gradually differentiate in the region of maturation, and some epidermal cells there form root hairs. The region of elongation is mainly responsible for growth in length, and the root cap only protects the tip.

11. Answer: (B) Halophytes

Mangroves such as Rhizophora are halophytes of salty swamps; they bear negatively geotropic breathing roots (pneumatophores) and show vivipary, seeds germinating on the parent plant. Hydrophytes are freshwater plants and psammophytes grow on sand.

12. Answer: (A) Drupe

Coconut develops from a monocarpellary superior ovary and is one-seeded, with a fibrous mesocarp and a hard stony endocarp, which makes it a drupe like mango. A berry has a fleshy pericarp throughout, and a nut has a single hard woody pericarp.

13. Answer: (B) Region of maturation

The region of maturation bears root hairs, which enormously increase the absorbing surface, so most water and mineral uptake happens there. The region of elongation is mainly concerned with growth in length, and the meristematic region and root cap do not absorb significantly.

14. Answer: (D) Brassicaceae

Tetradynamous condition, six stamens with four long and two short, is characteristic of Brassicaceae (mustard family). Fabaceae has diadelphous stamens, Solanaceae has five epipetalous stamens and Liliaceae has six stamens in two whorls.

15. Answer: (D) Mango

Mango has alternate phyllotaxy, with a single leaf at each node. Guava and Calotropis have opposite leaves (a pair at each node), and mint has opposite decussate leaves.

16. Answer: (D) Stolons - Agave

Agave propagates by bulbils, which are modified buds, not by stolons. Water hyacinth spreads by offsets, potato tubers sprout from their eyes (nodes), and ginger is a rhizome.

17. Answer: (B) androecium

Polyadelphous describes stamens whose filaments are united into more than two bundles, as in citrus, so it is a term for the androecium. Terms for fused carpels (syncarpous) or fused petals and sepals (gamopetalous, gamosepalous) are different.

18. Answer: (A) Brassica

Brassica (mustard) has actinomorphic flowers that can be cut into two equal halves along any radial plane. Trifolium and Pisum have papilionaceous zygomorphic flowers, and Cassia flowers are also zygomorphic.

19. Answer: (A) Dianthus

In Dianthus and Primrose the ovules are borne on a central axis with no septa, which is free-central placentation. Argemone and Brassica have parietal placentation, and Citrus has axile placentation.

20. Answer: (D) a-(iii), b-(i), c-(iv), d-(ii)

Fused pistils make a syncarpous gynoecium, gamete formation is gametogenesis, the hyphae of higher ascomycetes and basidiomycetes are dikaryotic, and a unisexual female flower is pistillate. Only one code gives all four of these pairs.

21. Answer: (C) Vexillum

In papilionaceous (vexillary) aestivation the large posterior standard petal is the vexillum, the two lateral ones are wings (alae) and the two anterior fused ones form the keel (carina). Pappus is a modified calyx of Asteraceae.

22. Answer: (A) Liliaceae

Liliaceae have a tricarpeal, syncarpous, superior ovary with axile placentation. Solanaceae is bicarpeal syncarpous, Fabaceae is monocarpeal, and Poaceae has a monocarpeal-appearing ovary.

23. Answer: (A) Pitcher of Nepenthes

The pitcher of Nepenthes is a modified leaf (lamina) used to trap insects. Thorns of Citrus, tendrils of cucumber and the flattened phylloclade of Opuntia are all stem modifications.

24. Answer: (B) Opuntia

In Opuntia the leaves are reduced to spines that cut water loss, while the flattened green stem (phylloclade) does photosynthesis. Pea has leaflets modified into tendrils, onion has fleshy storage leaves and silk cotton has normal leaves with prickles on the stem.

25. Answer: (B) Seed, where funicle was attached

The hilum is the scar on the seed coat where the funicle (stalk) attached the ovule to the placenta. The micropyle is a separate small pore next to the hilum, not the scar itself.

26. Answer: (C) Indigofera

A keel (carina) of two fused anterior petals is part of the papilionaceous corolla of Fabaceae, to which Indigofera belongs. Tomato is Solanaceae and tulip and Aloe are Liliaceae, which do not have a keel.

27. Answer: (A) Rose

In perigynous flowers the ovary is half-inferior, with sepals, petals and stamens on the rim of a cup-like thalamus, as in rose, plum and peach. Guava and cucumber are epigynous, and China rose is hypogynous.

28. Answer: (B) Rhizome

Ginger has an underground stem, the rhizome, with nodes and buds, and pieces of it are planted to raise new plants. Runners and offsets are creeping stems of plants like grasses and Pistia, and bulbils are seen in Agave.

29. Answer: (C) Potato

Potato is a stem tuber: its 'eyes' are nodes bearing buds, which proves it is a modified underground stem. Sweet potato and carrot are modified storage roots, and groundnut is a fruit that develops underground.

30. Answer: (B) A proteinaceous aleurone layer is present in maize grain

The endosperm of a maize grain is surrounded by a proteinaceous aleurone layer, so this statement is correct. Mango is not parthenocarpic, a sterile stamen (not pistil) is a staminode, and grass seeds are endospermic.

31. Answer: (A) Imbricate

In imbricate aestivation the margins of sepals or petals overlap one another but not in any particular direction, as in Cassia and gulmohur. In twisted aestivation the overlap is regularly in one direction, valvate whorls just touch without overlapping, and vexillary is the papilionaceous arrangement of pea.

32. Answer: (A) Multicarpellary apocarpous gynoecium

An aggregate fruit develops from a multicarpellary apocarpous (free-carpel) gynoecium, each carpel forming a fruitlet, as in Annona and strawberry. A syncarpous gynoecium gives a single simple fruit, and a whole inflorescence gives a composite (multiple) fruit.

33. Answer: (B) Tomato

Tomato is a berry in which both the fleshy pericarp and the placenta are eaten. In banana the edible part is the mesocarp and endocarp, in apple it is the fleshy thalamus, and potato is a stem tuber, not a fruit.

34. Answer: (C) Pea

In pea the endosperm is fully consumed by the developing embryo and food is stored in the cotyledons, so the seed is non-albuminous. Castor, wheat and maize retain endosperm in the mature seed (albuminous).

35. Answer: (A) Actinomorphic, hypogynous with twisted aestivation

China rose (Hibiscus, Malvaceae) has radially symmetrical (actinomorphic) flowers with a superior ovary (hypogynous) and twisted aestivation of petals. It is neither zygomorphic nor epigynous, and its corolla aestivation is not valvate.

36. Answer: (C) Six

Marginal placentation is typical of the monocarpellary ovary of Fabaceae: gram, arhar, sun hemp, moong, pea and lupin, which makes six. Mustard has parietal placentation and tulip, asparagus, colchicum, onion, chilli and tobacco have axile placentation.

37. Answer: (A) Three

Composite (multiple) fruits develop from a whole inflorescence: fig (syconus), pineapple (sorosis) and mulberry (sorosis), which makes three. Walnut, poppy, radish, apple and tomato develop from a single flower.

38. Answer: (A) Michelia

Michelia has a multicarpellary apocarpous gynoecium, with many free pistils on an elongated thalamus. Papaver, tomato and Aloe have syncarpous ovaries with fused carpels.

39. Answer: (D) Australian Acacia

In Australian Acacia the petiole becomes flat, green and leaf-like (a phyllode) and takes over photosynthesis. Opuntia has a phylloclade (flattened stem), Asparagus has cladodes, and Euphorbia has a fleshy stem.

40. Answer: (B) Fabaceae

Vexillary (papilionaceous) aestivation, with a large standard petal overlapping two wings that overlap the keel, is characteristic of Fabaceae such as pea and bean. Brassicaceae, Asteraceae and Solanaceae show other types.

41. Answer: (B) Solanum

Solanum (Solanaceae) bears a cymose inflorescence, where the main axis ends in a flower. Brassica, Sesbania and Trifolium have racemose inflorescences with indefinite growth of the main axis.

42. Answer: (B) Onion - Bulb

Onion is a bulb, an underground stem with fleshy scale leaves. Ginger is a rhizome, yeast reproduces by budding, and Chlamydomonas forms zoospores; conidia are formed by Penicillium.

43. Answer: (A) Axile

Tomato and lemon have axile placentation: a multilocular ovary with ovules attached to the central axis. Parietal placentation is seen in mustard, free central in Dianthus and marginal in pea.

44. Answer: (B) Alstonia

Alstonia has whorled phyllotaxy (more than two leaves at a node) with simple leaves showing reticulate venation. China rose has alternate phyllotaxy, Calotropis opposite phyllotaxy, and neem has pinnately compound leaves.

45. Answer: (D) Water hyacinth - Runner

Water hyacinth (Eichhornia) propagates vegetatively by offsets, not runners, so this pair is wrongly matched. Bryophyllum forms buds on leaf margins, Agave forms bulbils and Penicillium reproduces by conidia.

46. Answer: (B) Turnip

Sweet potato is a modified (adventitious) root swollen with food, and turnip is also a modified root, so the two are homologous. Ginger and potato are modified stems (rhizome and tuber) and Colocasia has a corm, so they are only analogous to sweet potato.

47. Answer: (A) Axillary buds

The potato tuber is an underground stem, and each 'eye' is a node carrying an axillary bud in the axil of a scale leaf. These buds sprout into new shoots, which is why potato pieces with eyes are used for propagation. They are not root buds, since roots do not form tubers with nodes.

48. Answer: (A) Flower of tulip is a modified shoot

A flower is a modified shoot in which the axis is condensed and the floral parts are modified leaves, and the tulip flower is no exception. Tomato fruit is a berry, orchid seeds are minute and lack endosperm, and primrose shows free central placentation, not basal.

49. Answer: (B) Mango

A drupe develops from a monocarpellary superior ovary and has a stony endocarp, as in mango and coconut. Tomato is a berry, wheat is a caryopsis and pea is a legume.

50. Answer: (B) Peach

In perigynous flowers such as peach, plum and rose, the thalamus forms a cup around the ovary at about its level, so the ovary is described as half inferior. Guava and cucumber have epigynous flowers with an inferior ovary, and cotton has a superior ovary.

51. Answer: (C) Gulmohur

Gulmohur (and Cassia) have zygomorphic flowers, which can be divided into two equal halves in only one plane. Datura, mustard and tomato have actinomorphic flowers that can be divided into equal halves in any radial plane.

52. Answer: (A) Opuntia

Opuntia is a desert plant whose stem is flattened, green, fleshy and photosynthetic (a phylloclade), while its leaves are reduced to spines. Hydrilla is an aquatic plant, and Acacia and Casuarina do not have succulent flattened stems.

53. Answer: (B) (A) and (B)

Statement A describes vexillary aestivation correctly, and B gives the Liliaceae formula (actinomorphic, bisexual, 3+3 tepals, 3+3 stamens, tricarpeal superior ovary). Pea stamens are diadelphous (9 + 1), not monadelphous, and Solanaceae has five fused sepals, five fused petals and five stamens, not 3, 3 and 4.

54. Answer: (B) Offset

In aquatic plants like Pistia and Eichhornia, a short lateral branch with one internode grows out and bears a rosette of leaves and a tuft of roots at its tip; this is an offset, and it separates to form a new plant. Runners and stolons are longer creeping branches of land plants such as grasses and strawberry.

55. Answer: (B) Cotyledon

In grasses, the single large shield-shaped cotyledon of the embryo is called the scutellum. It sits next to the endosperm and absorbs food from it, but it is not part of the endosperm or the aleurone layer.

56. Answer: (C) Basal

In basal placentation, the placenta is at the base of a one-chambered ovary and carries a single ovule, as in sunflower and marigold. Free central placentation also has a unilocular ovary, but its ovules are many and sit on a central axis.

57. Answer: (B) Monadelphous

In China rose, the filaments of all stamens fuse into one bundle, the staminal tube, around the style. This is the monadelphous condition. Diadelphous (two bundles) is seen in pea, and polyadelphous (many bundles) in citrus.

58. Answer: (C) Plum

In plum and rose, the flower is perigynous: the thalamus forms a cup at the level of the ovary, so the ovary is called half-inferior. Cucumber and guava are epigynous with inferior ovaries, and brinjal is hypogynous with a superior ovary.

59. Answer: (A) Bean

Bean belongs to Fabaceae, which has papilionaceous corolla with a large standard, two wings and two anterior petals fused into a keel. Gulmohur and Cassia have imbricate ascending (non-papilionaceous) corolla, so they lack a true keel.

60. Answer: (C) Tobacco

The formula shows an actinomorphic bisexual flower with five fused sepals, five fused petals, five epipetalous stamens and a bicarpeal syncarpous superior ovary, which is the Solanaceae formula (tobacco). Soybean and sunn hemp (Fabaceae) are zygomorphic with a monocarpeal pistil, and tulip (Liliaceae) has a trimerous perianth.

61. Answer: (B) Syconus

A hypanthodium (as in fig) is a hollow fleshy receptacle with tiny flowers inside, and the composite fruit formed from it is a syconus. Sorosis develops from a spike or spadix (mulberry, pineapple), while caryopsis and hesperidium are simple fruits.

62. Answer: (B) Lemon

In lemon (like china rose and tomato) the ovules are attached to a central axis in a multilocular ovary, which is axile placentation. Dianthus has free central, Argemone parietal and marigold (sunflower family) basal placentation.

63. Answer: (C) Sucker

Mint propagates by suckers: lateral branches arise from the underground base of the stem, grow horizontally under the soil and then turn upward to form new leafy shoots. Runners are found in grasses and Oxalis, and offsets in aquatic plants like Pistia and Eichhornia.

64. Answer: (D) groundnut and pomegranate

In groundnut we eat the fleshy cotyledons of the seed, and in pomegranate the juicy outer seed coat (testa). In litchi the edible part is the aril and in coconut it is the endosperm, so those pairs fail.

65. Answer: (C) castor

Castor seed is endospermic and has a caruncle, a spongy outgrowth near the micropyle; a thin remnant of nucellus (perisperm) is also reported. Cotton seeds bear hairs, not a caruncle.

66. Answer: (B) Pomegranate

Pomegranate (balausta) develops from an inferior ovary, is divided into chambers, and its edible part is the juicy outer seed coat (testa). In orange the edible part is juicy hairs from the endocarp, and orange develops from a superior ovary.

67. Answer: (C) Cypsela

A cypsela, as in sunflower and other Asteraceae, is a dry, one-seeded indehiscent fruit from a bicarpellary, syncarpous, inferior ovary. A cremocarp splits into two mericarps, and a caryopsis comes from a monocarpellary superior ovary.

68. Answer: (C) Mustard

In mustard (Brassicaceae) the ovary is bicarpellary with parietal placentation and becomes two-chambered by a false septum called the replum. Pea has a monocarpellary ovary with marginal placentation and no replum.

69. Answer: (B) Achenes

The fig syconus is a composite fruit: a hollow fleshy receptacle encloses many tiny achene-like fruitlets formed from the female flowers. Mericarps are parts of a schizocarpic fruit like a cremocarp, not the fruitlets of a fig.

70. Answer: (C) a cluster of compactly borne flowers on a common axis

Pineapple is a composite (multiple) fruit called sorosis, formed from a whole inflorescence of many flowers borne compactly on a common axis. A multipistillate syncarpous flower is not correct because the fruit comes from many flowers, not one flower.

71. Answer: (D) Litchi

In litchi the juicy white edible part is a fleshy aril, an outgrowth around the seed. In pomegranate the edible part is the juicy outer seed coat (testa), and in orange it is juicy hairs on the inner fruit wall.

72. Answer: (D) Marginal

Sweet pea (Fabaceae) has a monocarpellary ovary with ovules along one ventral suture, which is marginal placentation. Axile placentation needs a multilocular syncarpous ovary, as in tomato.

73. Answer: (C) Solanaceae

Solanaceae has pentamerous, actinomorphic flowers and a bicarpellary syncarpous ovary placed obliquely, with a capsule or berry fruit. Brassicaceae is tetramerous, and Liliaceae is trimerous with a tricarpellary ovary.

74. Answer: (C) Juicy aril

The juicy white flesh of litchi is an aril, a fleshy outgrowth of the seed, not part of the fruit wall. The pericarp is the inedible rough outer rind.

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