

05 Morphology of Flowering Plants

Question: In Calotropis, aestivation is :

A Valvate

B Vexillary

C Imbricate

D Twisted

Answer: A

Explanation

When sepals or petals in a whorl just touch one another at margin, without overlapping, as in Calotropis, it is said to be valvate.

Imbricate aestivation is exhibited by Cassia,

Twisted aestivation is exhibited by China rose,

Vexillary aestivation is exhibited by Pea.

Question: In a pea flower, five petals are arranged in a specialized manner with one posterior, two lateral and two anterior. These are named as _____, _____ and _____ respectively.

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A Keel, Wings and Standard

B Vexillum, Keel and Standard

C Keel, Standard and Carina

D Standard, Wings and Keel

Answer: D

Explanation

The correct answer is :

Option D : Standard, Wings and Keel

In a typical pea flower, which is a type of papilionaceous flower, the petals are arranged in a specific pattern. The single large posterior petal, often larger and more visually striking than the others, is known as the 'standard' or 'banner'. The two lateral petals are referred to as 'wings'. The two anterior petals are usually fused at their edges and form a structure that looks like a boat's keel, which is why they are called the 'keel'. So, the arrangement is 'Standard, Wings and Keel'.

Question: Family Fabaceae differs from Solanaceae and Liliaceae. With respect to the stamens, pick out the characteristics specific to family Fabaceae but not found in Solanaceae or Liliaceae.

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A Polyadelphous and epipetalous stamens

B Monoadelphous and Monothealous anthers

☐ C Epiphyllous and Ditheous anthers

☐ D Diadelphous and Ditheous anthers

Answer: D

Explanation

Fabaceae → Diadelphous and ditheous anther.

Solanaceae → Polyandrous, epipetalous and ditheous anther.

Liliaceae → Polyandrous, epiphyllous and ditheous anther.

Question: Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :

Assertion A : A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem.

Reason R : Internode of the shoot gets condensed to produce different floral appendages laterally at successive node instead of leaves.

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

☐ A Both A and R are true but R is NOT the correct explanation of A

☐ B A is true but R is false

☐ C A is false but R is true

☐ D Both A and R are true and R is the correct explanation of A

Answer: D

Explanation

The correct answer is :

Option D : Both A and R are true and R is the correct explanation of A

Explanation :

Statement A is true. A flower is indeed a modified shoot wherein the shoot apical meristem changes to a floral meristem.

Statement R is also true. In the process of flower formation, the internodes of the shoot get condensed, and instead of leaves, different floral appendages (such as sepals, petals, stamens, and carpels) are produced laterally at successive nodes.

Moreover, Statement R is indeed the correct explanation for Statement A. The transition from the shoot apical meristem to the floral meristem involves the condensation of internodes and the lateral production of floral appendages at nodes, which leads to the formation of a flower.

2022

MCQ (Single Correct Answer)

Q.1. Which of the following statement is not correct?

- ☐ A The rhizome is thick, prostrate and branched
- ☐ B Rhizome is a condensed form of stem
- ☐ C The apical bud in rhizome always remains above the ground
- ☐ D The rhizome is aerial with no distinct nodes and internodes

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Ans. (D)

Explanation

Rhizome is an underground (sub-aerial) stem. It bears distinct nodes and internodes.

Q.2. The type of tissue commonly found in the fruit wall of nuts is :

- ☐ A Sclereid
- ☐ B Parenchyma
- ☐ C Collenchyma
- ☐ D Sclerenchyma

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Ans. (A)

Explanation

The sclereids are the spherical, oval or cylindrical, highly thickened dead cells with very narrow cavities (lumen). These are found commonly in the fruit wall of nuts.

Q.3. Match List - I with List - II :

	List - I		List - II
(a)	Imbricate	(i)	Calotropis
(b)	Valvate	(ii)	Cassia
(c)	Vexillary	(iii)	Cotton
(d)	Twisted	(iv)	Bean

Choose the correct answer from the options given below

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

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

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

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

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Ans. (C)

Explanation

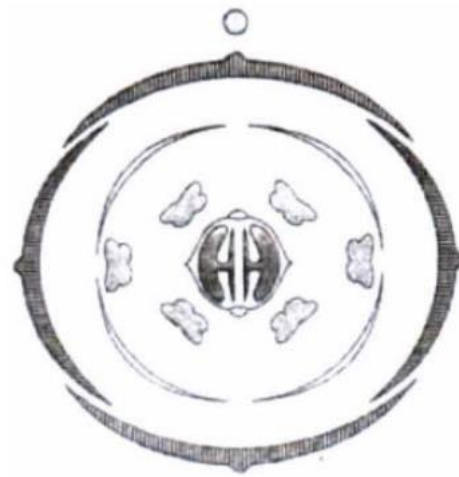
Imbricate aestivation is found in Cassia

Valvate aestivation is found in Calotropis

Vexillary aestivation is found in Bean

Twisted aestivation is found in cotton

Q.4. The Floral Diagram represents which one of the following families?



A Liliaceae

B Fabaceae

C Brassicaceae

D Solanaceae

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Ans. (C)

Explanation

The floral diagram given in the question represents Brassicaceae family. It can be easily identified by looking on its parietal placentation.

Q.5. Identify the correct set of statements:

- (a) The leaflets are modified into pointed hard thorns in Citrus and Bougainvillea
- (b) Axillary buds form slender and spirally coiled tendrils in cucumber and pumpkin
- (c) Stem is flattened and fleshy in Opuntia and modified to perform the function of leaves
- (d) Rhizophora shows vertically upward growing roots that help to get oxygen for respiration
- (e) Subaerially growing stems in grasses and strawberry help in vegetative propagation

Choose the correct answer from the options given below:

A (b) and (c) only

B (a) and (d) only

C (b), (c), (d) and (e) only

D (a), (b), (d) and (e) only

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Ans. (C)

Explanation

Axillary buds of stems get modified into woody, straight and pointed thorns. Thorns are found in many plants such as Citrus and Bougainvillea.

Q.6. Which one of the following plants shows vexillary aestivation and diadelphous stamens?

A *Colchicum autumnale*

B *Pisum sativum*

C *Allium cepa*

D *Solanum nigrum*

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Ans. (B)

Explanation

- vexillary aestivation and diadelphous stamens are the characteristic features of family Fabaceae.
- *Pisum sativum* (garden pea) belongs to family Fabaceae.
- *Allium cepa* (onion) and *Colchicum autumnale* (colchicine) belong to family Liliaceae.
- *Solanum nigrum* belongs to Solanaceae.

Q.7. The flowers are Zygomorphic in :

(a) Mustard (b) Gulmohar (c) Cassia (d) Datura (e) Chilly

Choose the correct answer from the options given below :

A (a), (b) and (c) only

B (b), (c) only

C (d), (e) only

D (c), (d), (e) only

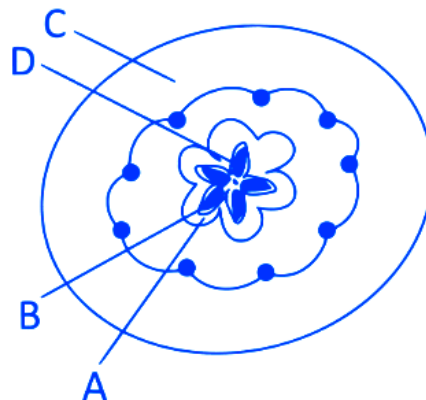
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Ans. (B)

Explanation

When a flower can be divided into two similar halves only in one particular vertical plane, it is zygomorphic for e.g. pea, gulmohar, bean, Cassia. Mustard, Datura and Chilly show actinomorphic flowers.

Q.8. Which part of the fruit, labelled in the given figure makes it a false fruit?



A A → Mesocarp

B B → Endocarp

C C → Thalamus

D D → Seed

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Ans. (C)

Explanation

The given figure is of a false unit. False fruit develops from other floral parts and thalamus alongwith the development of ovary wall.

TOPIC 1

Root

01 Identify the incorrect statement.
[NEET (Sep.) 2020]

- (a) Sapwood is involved in the conduction of water and minerals from root to leaf
- (b) Sapwood is the innermost secondary xylem and is lighter in colour
- (c) Due to deposition of tannins, resins, oils, etc., heartwood is dark in colour
- (d) Heartwood does not conduct water but gives mechanical support

Ans. (b)

Statement in option (b) is incorrect and can be corrected as :

Sapwood is outermost secondary xylem and is lighter in colour. There cell walls are not lignified and there is no deposition of organic compounds. Sapwood is involved in the conduction of water and minerals from root to leaf.

02 The roots that originate from the base of the stem are
[NEET (Sep.) 2020]

- (a) primary roots
- (b) prop roots
- (c) lateral roots
- (d) fibrous roots

Ans. (d)

The roots that originates from the base of the stem are fibrous roots. In fibrous root system, the primary roots stop

growing and becomes rudimentary, while new roots for anchorage and absorption develop from the base of the stem. This type of root formation is observed in monocot like wheat plant.

03 Pneumatophores occur in
[NEET 2018]

- (a) carnivorous plants
- (b) free-floating hydrophytes
- (c) halophytes
- (d) submerged hydrophytes

Ans. (c)

Pneumatophores are breathing or respiratory roots which are found in **halophytes** like mangroves. Halophytes grow in saline swamps, therefore respiratory roots come out of water and pick up oxygen for respiration. Excess CO_2 is also given out. It occurs through small pores, called lenticles.

Carnivorous plants, free-floating hydrophytes and submerged hydrophytes do not possess pneumatophores.

04 Plants, which produce characteristic pneumatophores and show vivipary belong to
[NEET 2017]

- (a) mesophytes
- (b) halophytes
- (c) psammophytes
- (d) hydrophytes

Ans. (b)

Plants that produce pneumatophores, i.e. negatively geotropic roots and show vivipary, i.e. germination of seeds inside the fruits are halophytes. These plants

are adapted to grow in highly saline areas such as mangroves. Pneumatophores help these plants in respiration as they do not get sufficient oxygen from the soil. On the other hand vivipary aids in perennation.

05 Roots play insignificant role in absorption of water in
[CBSE AIPMT 2015]

- (a) sunflower
- (b) *Pistia*
- (c) pea
- (d) wheat

Ans. (b)

Pistia is a hydrophyte where absorption of water by root is insignificant.

06 Roots of which plant contains an oxidising agent? [CBSE AIPMT 2001]

- (a) Carrot
- (b) Soyabean
- (c) Mustard
- (d) Radish

Ans. (b)

Leghaemoglobin is present in roots of soyabean plants. It is an oxygen-binding haem protein, which is present in the cytoplasm of infected nodule cells at high concentration and gives the nodules a pink colour. It's main function is to help in the transport of O_2 to the respiring symbiotic bacterial cells in a manner analogous to haemoglobin, which transports O_2 to respiring tissues in animals.

07 The plant, which bears clinging roots, is
[CBSE AIPMT 1999]

- (a) *Trapa*
- (b) orchid
- (c) screw pine
- (d) *Podostemon*

Ans. (b)

Orchids have clinging roots that are modified adventitious roots meant for providing mechanical support. These arise from the axils of leaves or nodes of the stem and pierce the substratum plant to facilitate fixation.

- 08** The plant which bears clinging roots is [CBSE AIPMT 1999]

(a) *Podostemon* (b) orchid
(c) *Trapa* (d) Screw pine

Ans. (b)

Clinging roots are modified adventitious roots meant for providing mechanical support. These arise from the axils of leaves or nodes of the stem and pierce the substratum plant to facilitate fixation e.g. orchids, ivy.

- 09** Buttress roots are found in [CBSE AIPMT 1995]

(a) *Sorghum* (b) Banyan
(c) *Terminalia* (d) *Pandanus*

Ans. (c)

Buttress roots refer to irregular, broad-like the wood plants that arise from basal parts of main stem of older plants, and spread in different directions in the soil, e.g. *Ficus religiosa* (peepal), *Terminalia*, *Bombax*, etc. These roots aids in providing mechanical support to the trees.

- 10** Velamen is found in [CBSE AIPMT 1991]

(a) roots of screw pine
(b) aerial and terrestrial roots of orchids
(c) leaves of *Ficus elastica*
(d) aerial roots of orchids

Ans. (d)

The aerial roots of orchids, (e.g. *Vanda*) are surrounded by a spongy tissue, (velamen) which is hygroscopic and absorbs moisture from the surrounding air.

TOPIC 2

Stem

- 11** In *Bougainvillea* thorns are the modifications of [NEET 2017]

(a) stipules
(b) adventitious root
(c) stem
(d) leaf

Ans. (c)

In *Bougainvillea*, thorns are the modifications of stem. They are stiff, sharp structures, which have lost their growing point and become hard. They reduce transpiration as well as browsing by animals.

- 12** Stems modified into flat green organs performing the functions of leaves are known as [NEET 2016, Phase I]

(a) phyllodes (b) phylloclades
(c) scales (d) cladodes

Ans. (b)

Phylloclades are aerial modified stem, in which stem becomes thick, fleshy succulent, green and perform the function of photosynthesis. The leaves are reduced to spines in this.

- 13** Which of the following is not a stem modification? [NEET 2016, Phase I]

(a) Thorns of *Citrus*
(b) Tendrils of cucumber
(c) Flattened structures of *Opuntia*
(d) Pitcher of *Nepenthes*

Ans. (d)

Pitcher of *Nepenthes* is modified leaf. It helps to trap insects, in insectivorous plants.

- 14** An example of edible underground stem is [CBSE AIPMT 2014]

(a) carrot (b) groundnut
(c) sweet potato (d) potato

Ans. (d)

Potato (*Solanum tuberosum*) is an edible underground stem which become fleshy and tuberous as a result of food storage.

- 15** The 'eyes' of the potato tuber are [CBSE AIPMT 2011, 01]

(a) flower buds (b) shoot buds
(c) axillary buds (d) root buds

Ans. (c)

Eyes of potato tubers are axillary buds. As tuber is oval or spherical swollen underground modified stem lacking adventitious roots.

It possesses a number of spirally arranged depressions called eyes. Each eye represents node and consists of 1-3 axillary buds in the axil of small scaly leaves.

- 16** Vegetative propagation in mint occurs by [CBSE AIPMT 2009]

(a) runner (b) offset
(c) rhizome (d) sucker

Ans. (d)

The vegetative propagation in mint (*Mentha arvensis*) occurs by sucker. Sucker is a non-green underground specialised stem developing from the underground base of an erect shoot or crown.

- 17** Vegetative reproduction of *Agave* occurs through [CBSE AIPMT 1991]

(a) rhizome (b) stolon
(c) bulbils (d) sucker

Ans. (c)

Bulbil is a condensed axillary bud meant for vegetative propagation, e.g. *Dioscorea* and *Agave*. In ananas, bulbils are associated with flowers and fruits. Tiny secondary bulb that forms in the angle between a leaf and stem or in place of flowers. in certain plants. Bulbils are called offsets when full-sized, fall or are removed and planted to produce new plants.

- 18** New banana plants develop from [CBSE AIPMT 1990]

(a) rhizome (b) sucker
(c) stolon (d) seed

Ans. (b)

Sucker is the subaerial modification of stem, which originates from the basal and underground portion of the main stem but it grows obliquely upwards and give rise to leafy shoot or a new plant, e.g. *Musa* (banana), *Chrysanthemum*, mint.

TOPIC 3

Leaf

- 19** Large, empty colourless cells of the adaxial epidermis along the veins of grass leaves are [NEET (Oct.) 2020]

(a) lenticels
(b) guard cells
(c) bundle sheath cells
(d) bulliform cells

Ans. (d)

Grass leaves are isobilateral or typical monocot leaves. In such leaves, at places, the upper or adaxial epidermis contain groups of larger, thin-walled,

colourless cells called bulliform cells. These cells are highly vacuolated and can store water, if available. However, these cells lose water and become flaccid in case of water deficiency.

- 20** Which of the following shows whorled phyllotaxy?
[NEET (Odisha) 2019]
- (a) Mustard (b) China rose
(c) *Alstonia* (d) *Calotropis*

Ans. (c)

Alstonia shows whorled phyllotaxy. In whorled phyllotaxy, more than two leaves arise at a node and form a whorl. Mustard and China rose show alternate phyllotaxy. *Calotropis* shows opposite phyllotaxy.

- 21** Phyllode is present in
[CBSE AIPMT 2012]
- (a) *Asparagus* (b) *Euphorbia*
(c) Australian *Acacia* (d) *Opuntia*

Ans. (c)

Modified petiole is called phyllode present in Australian *Acacia*. Phyllodes develop usually vertically and possess fewer stomata hence, reduce transpiration.

- 22** Choose the correct match.
Bladderwort, Sundew, Venus fly trap [CBSE AIPMT 2002]
- (a) *Nepenthes*, *Dionea*, *Drosera*
(b) *Nepenthes*, *Utricularia*, *Vanda*
(c) *Utricularia*, *Drosera*, *Dionea*
(d) *Dionea*, *Trapa*, *Vanda*

Ans. (c)

Utricularia, *Drosera* and *Dionea* are also known as bladderwort, sundew and venus fly trap, respectively.

TOPIC 4 Inflorescence

- 23** Hypanthodium is
[CBSE AIPMT 1994]
- (a) thalamus (b) fruit
(c) inflorescence (d) ovary

Ans. (c)

Hypanthodium is special type of inflorescence in which the axis becomes fleshy and pear-shaped with a hollow cavity inside. At the base lie female flowers and towards the apical opening, lie the male flowers, e.g. *Ficus*.

- 24** A family delimited by type of inflorescence is [CBSE AIPMT 1990]
- (a) Fabaceae (b) Asteraceae
(c) Solanaceae (d) Liliaceae

Ans. (b)

Asteraceae (Compositae) is characterised by the inflorescence head or capitulum, consisting of a few or large number of flowers closely arranged on an axis surrounded by involucre bracts.

The whole head or capitulum with racemose arrangement is apparently similar to a single flower.

TOPIC 5 Flower

- 25** Correct position of floral parts over thalamus in mustard plant is [NEET (Oct.) 2020]
- (a) gynoecium occupies the highest position, while the other parts are situated below it
(b) margin of the thalamus grows upward, enclosing the ovary completely and other parts arise below the ovary
(c) gynoecium is present in the centre and other parts cover it partially
(d) gynoecium is situated in the centre and other parts of the flower are located at the rim of the thalamus, at the same level

Ans. (a)

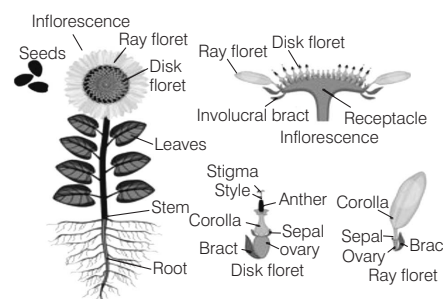
Option (a) is correct. It can be explained as
A flower, has four different whorls arranged successively on the swollen end of the stalk or pedicel called thalamus or receptacle. In mustard, flower is hypogynous, i.e., the gynoecium occupies the highest position while the other parts are situated below it. The ovary in such flowers is said to be superior.

- 26** Ray florets have [NEET (Sep.) 2020]
- (a) superior ovary
(b) hypogynous ovary
(c) half inferior ovary
(d) inferior ovary

Ans. (d)

Ray florets have inferior ovary as epigynous flowers have an inferior ovary with the flattened thalamus as

seen in the ray florets of sunflowers. In epigynous flowers, all the floral parts are present above the gynoecium. Ovary has been covered completely by thalamus, e.g. guava, apple, sunflower.



- 27** The ovary is half inferior in [NEET (Sep.) 2020]
- (a) mustard (b) sunflower
(c) plum (d) brinjal

Ans. (c)

The ovary is half inferior in plum. It is a perigynous condition in which ovary is at the top (origin wise) and other whorls are at the same level (position wise).

There are three possible arrangements of attachment of floral whorls with thalamus where thalamus is disc-like, cup-shaped and flask-shaped.

- 28** Placentation in which ovules develop on the inner wall of the ovary or in peripheral part, is [NEET (National) 2019]
- (a) axile (b) parietal
(c) free central (d) basal

Ans. (b)

In parietal placentation, the ovules develop on the inner wall of the ovary or in peripheral part. In this type, the ovary is compound or syncarpous type which is either unilocular or falsely two or more locular, e.g. mustard, *Argemone*, *Fumaris*, etc. Axial placentation is when ovules are placed along the central axis of the ovary.

Basal placentation is when ovules are placed at the base of the ovary.

Free-central placentation is when placenta develops at the centre of ovary as prolongation of floral axis. On this axis, the ovules are attached.

- 29** Bicarpellary ovary with obliquely placed septum is seen in [NEET (Odisha) 2019]
- (a) *Brassica* (b) *Aloe*
(c) *Solanum* (d) *Sesbania*

Ans. (c)

Solanum (family Solanaceae) has bicarpellary ovary with obliquely placed septum. *Brassica* (family Brassicaceae) has bicarpellary ovary with false septum. In *Sesbania* (subfamily Fabaceae), ovary is monocarpellary. *Aloe* (family Liliaceae) shows tricarpellary ovary.

- 30** Match the placental types (Column I) with their examples (Column II) [NEET (Odisha) 2019]

Column I	Column II
1. Basal	(i) Mustard
2. Axile	(ii) China rose
3. Parietal	(iii) <i>Dianthus</i>
4. Free-central	(iv) Sunflower

Select the correct option from the following

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

Ans. (c)

The correct matches are

The placental types	Examples
Basal	Sunflower
Axile	China rose
Parietal	Mustard
Free-central	<i>Dianthus</i>

- 31** The standard petal of a papilionaceous corolla is also called [NEET 2016, Phase I]

- (a) pappus (b) vexillum
 (c) corona (d) carina

Ans. (b)

The standard or large upper petal of a papilionaceous corolla is also called vexillum.

- 32** Tricarpellary, syncarpous gynoecium is found in flowers of [NEET 2016, Phase I]

- (a) Solanaceae (b) Fabaceae
 (c) Poaceae (d) Liliaceae

Ans. (d)

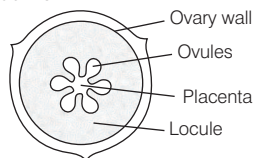
Liliaceae represents $G_{(3)}$. This family includes plants like garlic, onion, tulip, indigo, etc.

- 33** Free-central placentation is found in [NEET 2016, Phase II]

- (a) *Dianthus* (b) Argemone
 (c) Brassica (d) Citrus

Ans. (a)

The plant *Dianthus* has free-central placentation in its ovary. Ovules are attached on the main axis of the placenta.



Free-central placentation

- 34** Radial symmetry is found in the flowers of [NEET 2016, Phase II]

- (a) Brassica (b) *Trifolium*
 (c) *Pisum* (d) *Cassia*

Ans. (a)

The Brassica flower can be cut into two equal halves from any plane. So, it shows the radial symmetry. These flowers are referred to as actinomorphic flowers.

Other flowers given in the option (*Trifolium*, *Pisum* and *Cassia*) can be cut into two equal halves only at one plane so they are called zygomorphic flowers. These three flowers belong to family-Fabaceae.

- 35** How many plants among *Indigofera*, *Sesbania*, *Salvia*, *Allium*, *Aloe*, mustard, groundnut, radish, gram and turnip have stamens with different lengths in their flowers? [NEET 2016, Phase II]

- (a) Three (b) Four
 (c) Five (d) Six

Ans. (b)

Only *Salvia*, mustard, radish and turnip have stamens of different length in their flowers.

Hence, correct answer is (b).

- 36** The term 'polyadelphous' is related to [NEET 2016, Phase II]

- (a) gynoecium (b) androecium
 (c) corolla (d) calyx

Ans. (b)

The term polyadelphous is related to androecium. In this condition, many stamens are present in more than 2 groups which are separated from each other.

- 37** Flowers are unisexual in [CBSE AIPMT 2015]

- (a) pea (b) cucumber
 (c) China rose (d) onion

Ans. (b)

Cucumber is a member of the family—Cucurbitaceae. In the members of this family, the flowers are unisexual, with male and female flowers on different plants (dioecious) or on the same plant (monoecious).

- 38** Axile placentation is present in [CBSE AIPMT 2015]

- (a) *dianthus* (b) lemon
 (c) pea (d) Argemone

Ans. (b)

Placentation refers to the arrangement of ovules inside the ovary.

In axile placentation, the ovules are axial as shown in the figure below.

Examples include, lemon, China rose and tomato.



- 39** Among China rose, mustard, brinjal, potato, guava, cucumber, onion and tulip, how many plants have superior ovary? [CBSE AIPMT 2015]

- (a) Five (b) Six
 (c) Three (d) Four

Ans. (b)

A superior ovary is an ovary attached to the receptacle above the attachment of other floral parts. In this case the flower is said to be hypogynous, e.g. China rose, mustard, brinjal, potato, onion and tulip. Guava and cucumber have inferior ovaries or epigynous flowers.

So, out of 8 given names, 6 have superior ovaries.

- 40** Placenta and pericarp are both edible portions in [CBSE AIPMT 2014]

- (a) apple (b) banana
 (c) tomato (d) potato

Ans. (c)

Tomato is botanically a fruit but it is considered as a vegetable for various purposes. Its edible parts are both placenta and pericarp.

Placenta is the connecting tissue which supply nutrition for embryo and pericarp is the remains of ovular wall. It is rich in lycopene.

- 41** When the margins of sepals or petals overlap one another without any particular direction, the condition is termed as [CBSE AIPMT 2014]

(a) vexillary (b) imbricate
(c) twisted (d) valvate

Ans. (b)

Imbricate aestivation is the arrangements of five petals being arranged in such a way that one petal is completely external and another petal is completely internal, while three petals are partially external and partially internal, e.g. *Cassia*, *Callistemon* and *Caesalpinia*



- 42** Among bitter gourd, mustard, brinjal, pumpkin, China rose, lupin, cucumber, sunnhemp, gram, guava, bean, chilli, plum, *Petunia*, tomato, rose, *Withania*, potato, onion, aloe and tulip, how many plants have hypogynous flower? [NEET 2013]

(a) Six (b) Ten
(c) Fifteen (d) Eighteen

Ans. (c)

All the given plants except bitter gourd, pumpkin, cucumber, guava, plum and rose are hypogynous flower, i.e. 15. Hypogynous flower have gynoecium present above all other floral parts and with superior ovary.

- 43** In China rose the flowers are [NEET 2013]

(a) actinomorphic, hypogynous with twisted aestivation
(b) actinomorphic, epigynous with valvate aestivation
(c) zygomorphic, hypogynous with imbricate aestivation
(d) zygomorphic, epigynous with twisted aestivation

Ans. (a)

Actinomorphic (star-shaped) can be divided into 3 or more identical sections, which are related to each

other by rotation about the centre of the flower, e.g. China rose. Zygomorphic flowers can be divided by only a single plane into two mirror image halves, e.g. orchids.

Valvate aestivation The sepals or petals in a whorl just touch one another at the margin, e.g. *Calotropis*.

Twisted aestivation One margin of the appendage overlaps that of the next one, e.g. China rose. In Imbricate aestivation the margins of sepals or petals overlap but not necessarily in specific direction, e.g. *Cassia*.

- 44** Placentation in tomato and lemon is [CBSE AIPMT 2012]

(a) parietal (b) free central
(c) marginal (d) axile

Ans. (d)

Lemon or *Citrus* (family-Rutaceae), tomato or *Lycopersicon* sp. (family-Solanaceae), China rose or *Hibiscus* (family-Malvaceae) etc. have axile placentation. It occurs in multicarpellary, syncarpous ovary. Inward growth of margins of carpels forms a multicarpellary condition which contains an axis in the centre. Placentae arise from this central axis which bear ovules.

- 45** Cymose inflorescence is present in [CBSE AIPMT 2012]

(a) *Solanum* (b) *Sesbania*
(c) *Trifolium* (d) *Brassica*

Ans. (d)

Cymose inflorescence seen in *Brassica* is also called definite or determinate inflorescence because the growing point of the peduncle is used up in the formation of a flower. Further growth of the flowering axis is continued by one or more lateral branches (peduncles) which also end in flowers. This type of inflorescence is found in family-Solanaceae.

- 46** The gynoecium consists of many free pistils in flowers of [CBSE AIPMT 2012]

(a) *Aloe* (b) tomato
(c) *Papaver* (d) *Michelia*

Ans. (d)

Apocarpous condition arises when the number of carpels is two or more and they are free from each other. e.g. *Clematis*, *Michelia* (Magnoliaceae), *Aconitum*, *Ranunculus* (buttercup), etc.

- 47** Which one of the following statements is correct? [CBSE AIPMT 2011]

(a) Seeds of orchids have oil-rich endosperm
(b) Placentation in primrose is basal
(c) Flower of tulip is a modified shoot
(d) In tomato, fruit is a capsule

Ans. (c)

The correct statement is 'c' because flower is highly condensed and modified shoot meant for sexual reproduction (Dr. Goethe; 1790). During the course of evolution, the nodes of the axis of shoot came in contact so, that internodes got reduced, and leaves get modified and specialised to form floral leaves.

- 48** Flowers are zygomorphic in [CBSE AIPMT 2011]

(a) gulmohur (b) tomato
(c) datura (d) mustard

Ans. (a)

When a flower can be divided into two similar halves only in one particular vertical plane, it is called zygomorphic, e.g. bean, pea, gulmohur, *Cassia*, etc.

- 49** The ovary is half inferior in flowers of [CBSE AIPMT 2011]

(a) cucumber (b) cotton
(c) guava (d) peach

Ans. (d)

If gynoecium is situated in the center and other parts of the flowers 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, i.e. plum rose, peach, etc.

- 50** Keel is characteristic of the flowers of [CBSE AIPMT 2010]

(a) gulmohur (b) *Cassia*
(c) *Calotropis* (d) bean

Ans. (d)

In bean-family the two-in-one petal is called the keel, like the keel of a boat. Bean blossoms with this configuration are said to be papilionaceous.

- 51** In unilocular ovary with a single ovule, the placentation is [CBSE AIPMT 2010]

(a) marginal
(b) basal
(c) free central
(d) axile

Ans. (b)

In **basal placentation**, ovary is bicarpellary, syncarpous and unilocular and a single ovule is borne at the base of ovary, e.g. marigold.

In **marginal placentation**, the ovary is simple, unilocular and the ovules are arranged along the margin of the unilocular ovary, e.g. pea.

In **free central placentation**, ovary is unilocular and the placenta bearing ovules arise from the central axis, e.g. *Stellaria*.

In **axile placentation**, ovary is two or more chambered, usually as many as the number of carpels, e.g. *Petunia*.

- 52** The technical term used for the androecium in a flower of China rose (*Hibiscus rosa sinensis*) is

[CBSE AIPMT 2010]

- (a) monadelphous (b) diadelphous
(c) polyandrous (d) polyadelphous

Ans. (a)

In **monadelphous** condition, all filaments become fused and form a group, while anther remain free, e.g. China rose, *Achyranthes*, etc. In **diadelphous**, two separate bundles of united filaments are formed, e.g. pea. In **polyadelphous**, more than two separate bundles of filaments are formed, e.g. *Ricinus*.

- 53** An example of axile placentation is

[CBSE AIPMT 2009]

- (a) Argemone (b) *Dianthus*
(c) lemon (d) marigold

Ans. (c)

Lemon (*Citrus* sp.) belongs to family-Rutaceae, characterised by axile placentation.

Argemone belongs to family-Papaveraceae, contains parietal placentation. *Dianthus* belongs to family-Caryophyllaceae, contains free-central placentation. Marigold belongs to family-Asteraceae, contains basal placentation.

- 54** What type of placentation is seen in sweet pea? [CBSE AIPMT 2006]

- (a) Axile (b) Free central
(c) Marginal (d) Basal

Ans. (c)

In sweet pea (*Pisum sativum*), the placentation is **marginal**, in which, the placenta develops along the junction of two carpels, in a unilocular ovary.

In **basal placentation**, the ovules are few or reduced to one and are borne at the base of ovary e.g. Compositae.

In **axile placentation**, margins of carpels fold inwards, fusing together in centre of ovary to form a single central placenta. Ovary is divided into as many locules, as there are carpels, e.g. *Hibiscus*, *Asphodelus*. Free-central placentation possesses a placenta arises as a central upgrowth from ovary base, e.g. *Stellaria*.

- 55** Long filamentous threads protruding at the end of the young cob of maize are

[CBSE AIPMT 2006]

- (a) styles (b) ovaries
(c) hairs (d) anthers

Ans. (a)

In a cob of maize, each ovary has a long silky (hairy) **style**, called as **corn silk**. Collectively these styles protrude at the end of a young cob. The grains are formed on the cob which remain covered by the leafy bracts.

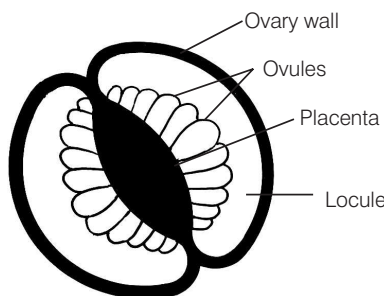
- 56** Bicarpellary gynoecium and oblique ovary occurs in

[CBSE AIPMT 2001]

- (a) mustard (b) banana
(c) *Pisum* (d) brinjal

Ans. (d)

Brinjal belongs to family-Solanaceae. Obliquely placed bicarpellary ovary is characteristic of Solanaceae.



Obliquely placed bicarpellary ovary

- 57** The type of placentation in which ovary is syncarpous, unilocular and ovules on sutures is called

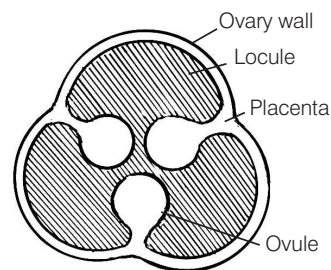
[CBSE AIPMT 1999]

- (a) apical placentation
(b) parietal placentation
(c) marginal placentation
(d) superficial placentation

Ans. (b)

Parietal placentation occurs in bicarpellary to polycarpellary

syncarpous pistils in which the ovary is unilocular. The placentae are formed along the fused margins of the carpels from where the ovules arise.



Parietal placentation

- 58** Angiosperm to which the largest flowers belong is [CBSE AIPMT 1999]

- (a) total stem parasite
(b) partial stem parasite
(c) total root parasite
(d) partial root parasite

Ans. (c)

Rafflesia, a **total root parasite**, produces largest flower in the world.

- 59** Floral features are chiefly used in angiosperms identification because [CBSE AIPMT 1998]

- (a) flowers are of various colours
(b) flowers can be safely pressed
(c) reproductive parts are more stable and conservative than vegetative parts
(d) flowers are nice to work with

Ans. (c)

Vegetative parts are relatively less stable and exhibit changes due to the environmental factors quite readily. On the other hand, floral features are more conservative and can be relied upon. On the basis of reproductive parts of different flowers Linnaeus classified plants into different groups.

- 60** Which one yields fibre? [CBSE AIPMT 1988]

- (a) Coconut (b) Oak
(c) Teak (d) Sissoo

Ans. (a)

On the basis of their origin, commercial fibres are of three types : surface fibres (fibres obtained from seeds), e.g. cotton, coconut (coir), *Calotropis*, bast fibres (fibres present in phloem), e.g. *Cannabis* (hemp), *Linum* (flax), jute, sunnhemp, and leaf fibres (fibres extracted from leaves), e.g. *Agave* (sisal hemp), *Musa* (masnila hemp).

TOPIC 6

Fruit

- 61** Identify the correct features of mango and coconut fruits. [NEET (Oct.) 2020]

- (i) In both fruit is a drupe
- (ii) Endocarp is edible in both
- (iii) Mesocarp in coconut is fibrous and in mango it is fleshy
- (iv) In both, fruit develops from monocarpellary ovary

Select the correct option.

- (a) (i), (iii) and (iv) (b) (i), (ii) and (iii)
- (c) (i) and (iv) (d) (i) and (ii)

Ans. (a)

Both mango and coconut are drupe, belonging to the class of simple succulent fruits. These are also called stone fruit as the endocarp is stony and non-edible. These fruits develop from monocarpellary ovary. In coconut, epicarp is membranous and mesocarp is fibrous. In mango, mesocarp is fleshy and pulpy.

Thus, statements (i), (iii), (iv) are correct while (ii) is incorrect.

- 62** An aggregate fruit is one which develops from [CBSE AIPMT 2014]

- (a) multicarpellary syncarpous gynoecium
- (b) multicarpellary apocarpus gynoecium
- (c) complete inflorescence
- (d) multicarpellary superior ovary

Ans. (b)

Aggregate fruits or etario are those fruits that develops from the multicarpellary apocarpus gynoecium (ovary). In contrast, a simple fruit develops from one ovary.

Aggregate fruit may also be called accessory fruits in which part of the flower other than the ovary become fleshy and form part of the fruit, e.g. raspberry, etc.

- 63** How many plants in the list given below have composite fruits that develop from an inflorescence? [CBSE AIPMT 2012]

Walnut, poppy, radish, fig, pineapple, apple, tomato, mulberry

- (a) Four (b) Five
- (c) Two (d) Three

Ans. (d)

Fig, pineapple and mulberry are composite fruits.

SN	Plant	Botanical Name	Fruit	Inflorescence
1.	Fig	<i>Ficus carica</i>	Sycous	Hypant-hodium
2.	Pineapple	<i>Annanas sativus</i>	Sorosis	Spike
3.	Mulberry	<i>Morus</i> sp.	Sorosis	Catkin

- 64** The coconut water and the edible part of coconut are equivalent to [CBSE AIPMT 2012]

- (a) endosperm
- (b) endocarp
- (c) mesocarp
- (d) embryo

Ans. (a)

The coconut water obtained from the coconut is the free nuclear endosperm (made up of thousands of nuclei) and the surrounding white kernel is the cellular endosperm.

- 65** A drupe develops in [CBSE AIPMT 2011, 1994]

- (a) wheat (b) pea
- (c) tomato (d) mango

Ans. (d)

In mango, coconut, plum, etc. the fruit is known as drupe (stony fruit). 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.

- 66** A fruit developed from hypanthodium inflorescence is called [CBSE AIPMT 2009]

- (a) hesperidium
- (b) sorosis
- (c) syconus
- (d) caryopsis

Ans. (c)

Syconus fruit develops from hypanthodium inflorescence, e.g. *Ficus carica*, *F. religiosa*, *F. benghalensis*. The flask shaped receptacle encloses female flowers that gives rise to achene-like fruitlets. This fruit possesses a small pore protected by scaly leaves. The receptacle that becomes fleshy is edible.

- 67** The fruit is chambered, developed from inferior ovary and has seeds with succulent testa in

[CBSE AIPMT 2008]

- (a) pomegranate (b) orange
- (c) guava (d) cucumber

Ans. (a)

Balausta is special type of false or pseudocarpic berry, that develops from multilocular, syncarpous inferior ovary. The whole fruit is enclosed by a hard rind made up of exocarp (epicarp fused with thalamus) and part of mesocarp. Plate-like infoldings are developed by mesocarp. The papery endocarp covers the individual group of seeds. The seeds possess bright red juicy testa that form edible part of fruit, e.g. pomegranate.

The fruit of cucumber is pepo. In this the exocarp is not separable from mesocarp and the seeds from placentae.

The fruit of guava is berry. A berry is pulpy, indehiscent, few to multiseeded fruit derived from multicarpellary syncarpous gynoecium.

The fruit of orange is hesperidium. It develops from multicarpellary, syncarpous, multilocular, superior ovary with axile placentation.

- 68** The fleshy receptacle of syconous of fig encloses a number of

[CBSE AIPMT 2008]

- (a) achenes (b) samaras
- (c) berries (d) mericarps

Ans. (a)

Syconus is a composite fruit that develops from hypanthodium inflorescence, e.g. *Ficus carica*, *Ficus benghalensis*. The flask-shaped receptacle encloses female flowers that give rise to achene-like fruitlets. This fruit possesses a small pore protected by scaly leaves. The receptacle that becomes fleshy is edible.

Samara is a single seeded, dry indehiscent fruit. Its pericarp becomes membranous and flat-like wings that help in dispersal, e.g. *Ulmus*, *Holoptelia indica*.

A berry is a pulpy-indehiscent, few to multiseeded fruit derived from multicarpellary syncarpous gynoecium. The fleshy pericarp of berry consists of three parts i.e. epicarp that make the rind of fruit, mesocarp and endocarp.

Schizocarpic fruits are simple, dry, multiseeded fruits, which breakup into single seeded parts. The single seeded parts, which further do not dehisce are called mericarps.

- 69** Dry indehiscent single-seeded fruit formed from bicarpellary syncarpous inferior ovary is [CBSE AIPMT 2008]

(a) caryopsis (b) cypsela
(c) berry (d) cremocarp

Ans. (b)

Cypsela is dry indehiscent single seeded fruit that develops from unilocular, single ovulate inferior ovary of bicarpellary syncarpous gynoecium possessing basal placentation. The fruit wall develops from pericarp and thalamus and is thin and remains attached to the seed at one point, e.g. *Helianthus*.

Caryopsis is dry indehiscent, small, single seeded fruit develop from unilocular, single ovuled, superior ovary of multicarpellary gynoecium. It differs from typical achenes as their pericarp is completely fused with the seed coat testa, e.g. Poaceae.

Cremocarp are bilocular and two seeded schizocarpic fruits (small, dry) developed from inferior ovary of bicarpellary, syncarpous gynoecium possessing persistent stylopodium, e.g. Apiaceae.

Berry is a fleshy, indehiscent few to multiseeded fruit derived from multicarpellary syncarpous gynoecium. The fleshy pericarp of berry consists of epicarp, mesocarp and endocarp.

- 70** Pineapple (ananas) fruit develops from [CBSE AIPMT 2006]

(a) a multipistillate syncarpous flower
(b) a cluster of compactly borne flowers on a common axis
(c) a multilocular monocarpellary flower
(d) a unilocular polycarpellary flower

Ans. (b)

The fruit of *Ananas comosus* (pineapple or ananas) is sorosis, (a type of multiple fruits), developing from spike, spadix or catkin. In this type, the flowers associate by their succulent tepals, the axis bearing them grows and becomes fleshy or woody, thus, the whole inflorescence turns into a compact fruit.

- 71** Juicy hair-like structures observed in the lemon fruit develop from [CBSE AIPMT 2003]

(a) mesocarp and endocarp
(b) exocarp
(c) mesocarp
(d) endocarp

Ans. (d)

Lemon is a hesperidium type of fruit. Epicarp of this fruit contains many oil glands. Below epicarp is present a fibrous part which fuses with epicarp, this is known as mesocarp. While endocarp projects inwards and forms distinct chambers. Many unicellular juicy hairs are present on the inner side of endocarp which are edible parts of this fruit.

- 72** Edible part in mango is [CBSE AIPMT 2002, 04]

(a) mesocarp (b) epicarp
(c) endocarp (d) epidermis

Ans. (a)

Mango is a drupe fruit which develops from a monocarpellary, syncarpous, unilocular and superior ovary. Epicarp of mango fruit forms skin while mesocarp is fleshy and fibrous which is edible part of this fruit. Endocarp is hard and stony.

- 73.** Geocarpic fruits are produced by [CBSE AIPMT 2000, 02]

(a) onion (b) watermelon
(c) ground nut (d) carrot

Ans. (c)

Geocarpy refers to the ripening of fruits underground. In the case of ground nut, the young fruits are pushed into the soil as a result of post-fertilisation curvature of the stalk.

- 74** Geocarpic fruit is [CBSE AIPMT 2002]

(a) potato (b) groundnut
(c) onion (d) garlic

Ans. (b)

The groundnut fruits ripen underground, the young fruits being pushed into the soil by a post-fertilisation curvature of the stalk.

- 75** Which is correct pair for edible part? [CBSE AIPMT 2001]

(a) Tomato — Thalamus
(b) Maize — Cotyledons
(c) Guava — Mesocarp
(d) Date palm — Pericarp

Ans. (d)

Each fruit of date palm (*Phoenix dactylifera*) is one seeded oblong berry. Fleshy pericarp of date palm is edible. We eat mesocarp of tomato, endosperm of maize and thalamus and pericarp of guava.

- 76** Edible part of banana is [CBSE AIPMT 2001]

(a) epicarp
(b) mesocarp and less developed endocarp
(c) endocarp and less developed mesocarp
(d) epicarp and mesocarp

Ans. (b)

Fleshy mesocarp and rudimentary endocarp of banana are edible.

Banana (*Musa sapientum*) is a perennial herb and belongs to family-Musaceae.

A fully ripened fruit of banana contains near about 75.6% moisture, 20.4% sugars (mainly glucose and fructose), 1.2% starch, 2% fats, 1.22% protein, 6% crude fibres and 0.8% ash characteristic of Solanaceae.

- 77** Edible part in litchi is [CBSE AIPMT 1999, 2005, 06]

(a) mesocarp (b) fleshy aril
(c) endosperm (d) pericarp

Ans. (b)

Aril is a fleshy covering on the seed, arising as an upgrowth of the funicle or base of the ovule. It is the edible part of litchi.

- 78** Which plant will lose its economic value if its fruits are produced by induced parthenocarpy? [CBSE AIPMT 1997]

(a) Grape (b) Pomegranate
(c) Banana (d) Orange

Ans. (b)

Testa is the edible part in pomegranate. It is not formed if fruits are produced by parthenocarpy (no seeds will be formed). Fruits of banana, grape and orange have seeds, so induced parthenocarpy in these fruits is beneficial.

- 79** Which one of the following is a true fruit? [CBSE AIPMT 1996]

(a) Apple (b) Pear
(c) Cashewnut (d) Coconut

Ans. (d)

Coconut is a true fruit, when a fruit develops from ripened ovary, it is called **true fruit** as in majority of fruits. A **false fruit** develops from any part of the flower except the ovary, e.g. apple, pear, cashewnut and all composite fruits (mulberry, pine apple).

80 Which part of the coconut produces coir? [CBSE AIPMT 1996]

- (a) Seed coat (b) Mesocarp
(c) Epicarp (d) Pericarp

Ans. (b)

In coconut (drupe or stone fruit), epicarp is thin, mesocarp is fibrous, produces coir, endocarp bears three eye spots and encloses a single seed with brown testa, oily endosperm, embryo and watery fluid.

81 Mango juice is got from [CBSE AIPMT 1989]

- (a) epicarp
(b) mesocarp
(c) endocarp
(d) pericarp and thalamus

Ans. (b)

In mango (a drupe) edible part is mesocarp, which is fibrous, pulpy and juicy.

82 Fruit of groundnut is [CBSE AIPMT 1988]

- (a) legume (b) caryopsis
(c) berry (d) nut

Ans. (a)

Legume or pod develops from monocarpellary gynoecium. It is a dry dehiscent fruit occurs in Leguminosae (pea, gram, bean and groundnut).

TOPIC 7

Seed

83 The body of the ovule is fused within the funicle at [NEET (Sep.) 2020]

- (a) micropyle (b) nucellus
(c) chalaza (d) hilum

Ans. (d)

The attachment point of funicle and body of ovule is known as hilum. It is the point where ovule attaches to the base. It is generally present as an eye of the seed as it is present as a scar.

84 Persistent nucellus in the seed is known as [NEET (National) 2019]

- (a) perisperm (b) hilum
(c) tegmen (d) chalaza

Ans. (a)

Persistent nucellus in the seed is known as perisperm.

The albuminous seeds usually retain a part of endosperm as it is not completely used up during embryo development.

But in some seeds, remnants of nucellus are also persistent, e.g. black pepper and beet.

85 The morphological nature of the edible part of coconut is [NEET 2017]

- (a) perisperm (b) cotyledon
(c) endosperm (d) pericarp

Ans. (c)

The edible part of coconut is endosperm. Coconut water is free nuclear endosperm and white kernel is the cellular endosperm.

86 Which one of the following statements is correct? [CBSE AIPMT 2014]

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

Ans. (c)

A proteinaceous aleurone protein layer of maize starts developing approximately 10-15 days after pollination in stach that take 40 days for the aleurone to mature completely. Thus is the correct statement. Correct sentences for other options are

- (a) Seed in grasses are endospermic
(b) Banana is a parthanocarpic fruit but mango is not a parthenocarpic fruit.
(c) Sterile pistil is called pistillode.

87 Seed coat is not thin, membranous in [NEET 2013]

- (a) maize (b) coconut
(c) groundnut (d) gram

Ans. (b)

Seed coat is thick in coconut seed and thin, membranous in groundnut, gram and maize seeds.

88 Perisperm differs from endosperm in [NEET 2013]

- (a) being a haploid tissue
(b) having no reserve food
(c) being a diploid tissue
(d) its formation by fusion of secondary nucleus with several sperms

Ans. (b)

The main difference between perisperm and endosperm is that perisperm is present in seeds and endosperm is present in developing embryo as its reserved food which is completely consumed by it during development.

89 Cotyledons and testa are edible parts of [CBSE AIPMT 2009]

- (a) groundnut and pomegranate
(b) walnut and tamarind
(c) french bean and coconut
(d) cashew nut and litchi

Ans. (a)

Cotyledons and testa are edible parts of groundnut and pomegranate respectively.

The edible part of walnut is cotyledon, tamarind-mesocarp, french bean-seeds, coconut-endosperm, testa, cotyledons and embryo, cashewnut-cotyledons and fleshy pedicels and of litchi is fleshy aril.

90 An example of a seed with endosperm, perisperm and caruncle is [CBSE AIPMT 2009]

- (a) cotton (b) coffee
(c) lily (d) castor

Ans. (d)

The seeds of castor (*Ricinus communis*, family-Euphorbiaceae) are endospermic dicot seeds. They possess endosperm which acts as the food storage tissue of seed. They also possess perisperm and caruncle.

91 In a cereal grain the single cotyledon of embryo is represented by [CBSE AIPMT 2006]

- (a) scutellum (b) prophyll
(c) coleoptile (d) coleorhiza

Ans. (a)

In a cereal grain (e.g. wheat), the single cotyledon of embryo is represented by the **scutellum**. Scutellum is specialised for nutrient absorption from the endosperm.

Coleoptile is a modified ensheathing leaf that covers and protects the young primary leaves of a grass seedling.

Coleorhiza is a sheath like structure found on the radicle which covers and protects it during the growth into the soil.

92 The embryo in sunflower has [CBSE AIPMT 1998]

- (a) one cotyledon
- (b) two cotyledons
- (c) many cotyledons
- (d) no cotyledon

Ans. (b)

Sunflower is a dicotyledonous plant, so the number of cotyledons in sunflower is two. Monocotyledons contain only one cotyledon in their embryo. It belongs to order-Asterales and family-Asteraceae.

93 Heterospory and seed habit are often discussed in relation to a structure called [CBSE AIPMT 1997]

- (a) spathe
- (b) bract
- (c) petiole
- (d) ligule

Ans. (d)

Heterospory and seed habit are discussed mostly with respect to ligule. Development of two types of spores (microspores and megaspores) is called heterospory. Though all seed-bearing plants are heterosporous, it evolved in some pteridophytes. In early heterosporous plants, megaspores were released from the parent.

But in seed plants, these are retained and fertilised to become seed. This habit is seen in *Selaginella* which bears a small multicellular scale-like structure called ligule at the base of leaf on adaxial side.

94 Plant having column of vascular tissues, bearing fruits and having a tap root system is [CBSE AIPMT 1994]

- (a) monocot
- (b) dicot
- (c) gymnosperm or dicot
- (d) gymnosperm or monocot

Ans. (b)

Dicotyledoneae is the group of angiosperm with two cotyledons, flower bi or pentamerous, leaves net-vened, stem with open collateral vascular bundle arranged in a ring and roots form tap root system.

95 Vivipary is [CBSE AIPMT 1992]

- (a) seed germination with subterranean cotyledons
- (b) seed germination with epiterranean cotyledons
- (c) fruit development without pollination
- (d) seed germination inside the fruit while attached to the plant

Ans. (d)

Germination of seeds inside the fruit which is still attached to the parent tree is called vivipary. It is a special type of seed germination occurring in plants growing in sea coasts and salt lakes, (e.g. mangroves). These seeds lack any dormant period.

96 Oil reserve of groundnut is present in [CBSE AIPMT 1990]

- (a) embryo
- (b) cotyledons
- (c) endosperm
- (d) underground tubers

Ans. (b)

Cotyledons are the leaves of embryo, usually store food for the use of embryo during development. Groundnut, a dicot stores food in the form of oil reserve in the cotyledons.

97 Vivipary is characteristics of [CBSE AIPMT 1990]

- (a) mesophytes (b) xerophytes
- (c) hygrophytes (d) halophytes

Ans. (d)

Vivipary is a special type of seed germination, known to occur in halophytes, e.g. *Rhizophora* where seeds germinate inside the fruit, while it is still attached to the parent plant. The embryo gets nourishment from the parent plant and grows out of seed as well as fruit. Projecting out in the form of a green seedling.

TOPIC 8

Important Angiospermic Families

98 Match the Column -I with Column -II. [NEET 2021]

Column I	Column II
A. $\% \text{ } \overline{\text{O}} \text{ } \text{K}_{(5)} \text{C}_{1+2+(2)} \text{A}_{(9)+1} \underline{\text{G}}_1$	1. Brassicaceae
B. $\oplus \text{ } \overline{\text{O}} \text{ } \text{K}_{(5)} \text{C}_{(5)} \text{A}_5 \underline{\text{G}}_2$	2. Liliaceae
C. $\oplus \text{ } \overline{\text{O}} \text{ } \text{P}_{(3+3)} \text{A}_{3+3} \underline{\text{G}}_3$	3. Fabaceae
D. $\oplus \text{ } \overline{\text{O}} \text{ } \text{K}_{2+2} \text{C}_4 \text{A}_{2-4} \underline{\text{G}}_{(2)}$	4. Solanaceae

Select the correct answer from the options given below.

- | | | | | |
|-----|---|---|---|---|
| | A | B | C | D |
| (a) | 3 | 4 | 2 | 1 |
| (b) | 1 | 2 | 3 | 4 |
| (c) | 2 | 3 | 4 | 1 |
| (d) | 4 | 2 | 1 | 3 |

Ans. (a)

(A)-(3), (B)-(4), (C)-(2), (D)-(1)

Fabaceae was earlier called Papilionoideae. Flowers of Fabaceae are zygomorphic (%),

hermaphrodite ($\overline{\text{O}}$), have 5 fused

sepals ($\text{K}_{(5)}$),

have 5 petals out of which 2 are fused ($1+2+(2)$) have 9 united stamens and 1 free stamen (C_9+1) and have 1 superior ovary ($\underline{\text{G}}_1$).

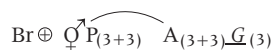
This way the floral formula is made and thus, similarly for Brassicaceae, Liliaceae and Solanaceae.

99 Which of the following is the correct floral formula of Liliaceae? [NEET (Oct.) 2020]

- (a) $\% \text{ } \overline{\text{O}} \text{ } \text{C}_{1+2+(2)} \text{A}_{(9)+1} \underline{\text{G}}_1$
- (b) $\oplus \text{ } \overline{\text{O}} \text{ } \text{K}_{(5)} \text{C}_{(5)} \text{A}_1 \underline{\text{G}}_1$
- (c) $\text{Br} \oplus \text{ } \overline{\text{O}} \text{ } \text{P}_{(3+3)} \text{A}_{3+3} \underline{\text{G}}_{(3)}$
- (d) $\oplus \text{ } \overline{\text{O}} \text{ } \text{K}_{(5)} \text{C}_{(5)} \text{A}_5 \underline{\text{G}}_{(2)}$

Ans. (c)

Floral formula of Liliaceae is



It represents bracteate, actinomorphic, bisexual flowers having six tepals and six epitepalous stamens. Ovary is superior with three lobed stigma.

100 Vexillary aestivation is characteristic of the family
[CBSE AIPMT 2012]

- (a) Fabaceae (b) Asteraceae
(c) Solanaceae (d) Brassicaceae

Ans. (a)

Vexillary aestivation of corolla is a characteristic of family-Fabaceae. In corolla, the posterior petal called vexillum is largest, two lateral, curved petals are called wings and two anterior, boat-shaped petals are called keels.

101 The correct floral formula of chilli is
[CBSE AIPMT 2011]

- (a) $\oplus \overline{\text{Q}}^{\text{K}_{(5)}} \text{C}_{(5)} \text{A}_5 \text{G}_{(2)}$
(b) $\oplus \overline{\text{Q}}^{\text{K}_{(5)}} \text{C}_{(5)} \text{A}_{(5)} \text{G}_2$
(c) $\oplus \overline{\text{Q}}^{\text{K}_5} \text{C}_5 \text{A}_{(5)} \text{G}_2$
(d) $\oplus \overline{\text{Q}}^{\text{K}_{(5)}} \text{C}_5 \text{A}_5 \text{G}_{(2)}$

Ans. (a)

Floral formula of chilli (*Capsicum annum*) is $\oplus \overline{\text{Q}}^{\text{K}_{(5)}} \text{C}_{(5)} \text{A}_5 \text{G}_{(2)}$. It belongs to family-Solanaceae. In this family, flower is actinomorphic, complete and bisexual, calyx has five sepals which are gamosepalous showing valvate aestivation, corolla has five petals which are polypetalous showing valvate aestivation, androecium has five free stamens (polyandrous) but epipetalous, gynoecium is bicarpellary, syncarpous, bilocular with superior ovary having axile placentation.

102 Which of the following is a correct pair?
[CBSE AIPMT 2002]

- (a) *Cuscuta* – Parasite
(b) *Dischidia* – Insectivorous
(c) *Opuntia* – Predator
(d) *Capsella* – Hydrophyte

Ans. (a)

Cuscuta, commonly known as dodder or amarbel, is a parasitic plant. It belongs to order Solanales and family-Convolvulaceae.

103 Match the following and indicate which is correct?
[CBSE AIPMT 2000]

- (a) Cucurbitaceae – Orange
(b) Malvaceae – Cotton
(c) Brassicaceae – Wheat
(d) Leguminosae – Sunflower

Ans. (b)

Sunflower belongs to Asteraceae (Compositae), orange to Rutaceae wheat to Poaceae (Gramineae) while cotton (*Gossypium*) belongs to Malvaceae.

104 Tetradynamous stamens are found in family
[CBSE AIPMT 1995, 2001]

- (a) Malvaceae
(b) Solanaceae
(c) Cruciferae
(d) Liliaceae

Ans. (c)

Tetradynamous stamens refer to four long and two short stamens arranged in a flower, e.g. members of Cruciferae (*Brassica*).

105 Pulses are obtained from
[CBSE AIPMT 1993]

- (a) Fabaceae
(b) Asteraceae
(c) Poaceae
(d) Solanaceae

Ans. (a)

Fabaceae (Leguminaceae) is economically important family containing a number of legumes or pulses, e.g. gram (*Cicer arietinum*), green gram (*Vigna radiata*), black gram (*Phaseolus mungo*), pigeon pea (*Cajanus cajan*), soyabean, etc.

106 Epipetalous and syngenesious stamens occur in [CBSE AIPMT 1991]

- (a) Solanaceae (b) Brassicaceae
(c) Fabaceae (d) Asteraceae

Ans. (d)

In disc florets of family-Asteraceae (Compositae), androecium consists of five stamens, which are epipetalous, with free filaments and fused anthers (e.g. syngenesious), ditheous, introse and dehiscent longitudinally.

107 Botanical name of cauliflower is
[CBSE AIPMT 1991]

- (a) *Brassica oleracea* var. *capitata*
(b) *Brassica campestris*
(c) *Brassica oleracea* var. *botrytis*
(d) *Brassica oleracea* var. *gemmifera*

Ans. (c)

Brassica oleracea var. *botrytis* (cauliflower = phulgobhi), *B. oleracea* var. *capitata* (cabbage = bandgobhi), *B. oleracea* var. *caulorapa* (knol khol = ganth gobhi), *B. campestris* var. *sarson* (yellow mustard), *B. rapa* (turnip).

108 Floral formula of tomato/tobacco is
[CBSE AIPMT 1989, 92]

- (a) $\oplus \overline{\text{Q}}^{\text{K}_{4-5}} \text{A}_{10} \text{G}_{(2)}$
(b) $\oplus \overline{\text{Q}}^{\text{K}_{2+2}} \text{C}_4 \text{A}_{2+4} \text{G}_1$
(c) $\oplus \overline{\text{Q}}^{\text{P}_2} \text{A}_3 \text{G}_1$
(d) $\text{Br} \oplus \overline{\text{Q}}^{\text{K}_{(5)}} \text{C}_{(5)} \text{A}_5 \text{G}_{(2)}$

Ans. (d)

Tomato and tobacco are the members of family-Solanaceae, with floral formula