

Morphology of Flowering Plants

Case Study Based Questions

Read the following passages and answer the questions that follow.

1. Father asks Neha, a Biology student, to show him a flower of the sunflower plant by pointing to it. Neha plucked a blossoming twig and pointed to the large yellow structure at the twig's tip. Her father smiled and said that it is a bunch of multiple flowers grouped in different structures, not a single flower.

(A) What kind of petal arrangement is found in sunflowers?

(B) Give examples of racemose and cymose inflorescence.

(C) What is the difference between a racemose and a cymose inflorescence?

Ans. (A) In the sunflower, petal arrangement is centripetal, actinomorphic and radially symmetrical.

(B) Examples of flowers with racemose inflorescence are mustard and wheat.

Examples of flowers with cymose inflorescence are night jasmine and Drosera.

(C) The primary axis of a racemose inflorescence has a bud that develops indefinitely, resulting in lateral and axillary flowers. The main axis of the cymose type finishes in flowers, and growth is accomplished by lateral plant branches that reach below the terminal flower.

2. A group of students were told to identify some characteristics of the plant from a given leaf. The given picture shows the structure of the leaf. From the picture student identified the types of venation and characteristics of monocot leaf.



(A) The major veins diverge towards the tip is:

(a) divergent venation

(b) convergent venation

(c) both (a) and (b)

(d) none of the above

(B) Identify the correct option for venation.

(a) Veins on the lamina are arranged.

(b) Leaves are arranged on the stalk.

(c) Leaves are folded in bud.

(d) Arrangement of leaves in bud.

(C) Parallel venation is found in:

(a) Banana

(b) Syzygium

(c) Dalbergia

(d) Mentha

(D) Choose the correct botanical name of wild-type species of banana.

(a) Citrus sinensis

(b) Allium cepa

(c) Mangifera indica

(d) Musa balbisiana

(E) Parthenocarpy occurs in which of the plant species?

(a) Peach

(b) Mango

(c) Banana

(d) None of these

Ans. (A) (a) divergent venation

Explanation: The primary veins diverge towards the tip in divergent venation.

Castor and cotton are two examples. Convergent venation occurs when the veins converge at the leaf's apex.

(B) (d) Arrangement of leaves in bud.

Explanation: The phenomenon of venation is the arrangement of leaves in the bud stage.

(C) (a) Banana

Explanation: Banana leaf shows parallel venation.

(D) (d) Musa balbisiana

Explanation: (a) *Citrus sinensis*-Orange

(b) *Allium cepa*-Onion

(c) *Mangifera indica*-Mango

(E) (c) Banana

Explanation: The process of fruit growth in the absence of preceding fertilisation is known as parthenocarpy. Bananas produce fruits without the need for ovule fertilisation because they are seedless.

3. Ram used to go to the vegetable market with his father, who was a Biology professor. Father told Ram that potato, tomato, brinjal and chilli belong to the same family of plants, and asked Ram to find out the name of the family.



(A) What are some leaf features of the plants described in the paragraph?

(B) Describe about the seed of the plants described in the paragraph.

(C) Write about the inflorescence of the plants described in the paragraph.

Ans. (A) Leaves are alternate, simple, rarely pinnately compound, exstipulate (without stipulate), hairy, and show reticulate venation.

(B) Seeds are many, endospermic (mostly monocots, endosperm present).

(C) Inflorescence is solitary or cymose. Flower is bisexual and actinomorphic (flower can be divided into two equal or more radial halves).

4. Rahim's uncle is a farmer who took Rahim to his field, where Rahim observed a specific crop.



His uncle told him that this particular crop has bisexual flowers which have pentamerous floral appendages and shows radial symmetry. In this, hypogynous condition is seen and the ovary is said to be superior.

(A) The flower which shows radial symmetry is termed as:

- (a) Zygomorphic
- (b) Actinomorphic
- (c) Asymmetric
- (d) None of these

(B) What is the meaning of a hypogynous flower?

- (a) Ovary is superior.
- (b) Ovary is inferior.
- (c) Petals are fused.
- (d) Both (b) and (c)

(C) Identify the family of the above mentioned plant crop.

- (a) Monocotyledonae
- (b) Dicotyledonae
- (c) Solanaceae
- (d) All of these

(D) Match the correct options of systematic position for the above mentioned crop.

Column I	Column II
(A) Division	(i) Dicotyledonae
(B) Class	(ii) Polymoniales
(C) Order	(iii) Spermatophyta
(D) Family	(iv) Solanaceae

Codes:

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

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

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

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

(E) When is a flower said to be bisexual?

(a) When it has androecium and petals.

(b) When it has gynoecium and petals.

(c) When it has gynoecium and androecium.

(d) When it has sepals and petals.

Ans. (A) (b) Actinomorphic

Explanation: Actinomorphic (Radial symmetry): An actinomorphic flower is a flower with two equal radial halves in any radial plane that passes through its centre.

E.g., Mustard and Datura.

(B) (a) Ovary is superior

Explanation: Hypogynous flowers are those in which the ovary is superior to the other three whorls. Here the ovary is positioned high on the thalamus and other parts are below it. E.g., Tomato, Tulip, Brinjal, etc.

(C) (c) Solanaceae

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

Explanation: Correct matches are:

Division - Spermatophyta

Class - Dicotyledonae

Order - Polymoniales

Family - Solanaceae

(E) (c) When it has gynoecium and androecium.

Explanation: A flower is said to be bisexual when it has both gynoecium (female reproductive part) and androecium (male reproductive part).