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STRUCTURES AND FUNCTIONS OF PLANT PARTS

I. Multiple choice questions: Tick (✓) the correct choice.

1. Which of the following has a tap root?

- (a) Maize (b) Wheat (c) Pea (d) Rice

Ans. (c)

2. Which of the following plants possesses fibrous roots?

- (a) Balsam (b) Wheat (c) Marigold (d) Tulsi

Ans. (b)

3. Which of the following is a modified root?

- (a) Potato (b) Onion (c) Ginger (d) Turnip

Ans. (d)

4. Which of the following is a modified stem?

- (a) Radish (b) Sweet potato (c) Beet (d) Turmeric

Ans. (d)

5. Which of the following is a modified leaf?

- (a) Spines of cactus (b) Maize
(c) Sugarcane (d) Banyan

Ans. (a)

6. Banyan plant possesses

- (a) supporting roots (b) stem tendrils
(c) modified leaves (d) storage roots

Ans. (a)

7. Veins are present in

- (a) stems (b) roots (c) leaves (d) seeds

Ans. (c)

8. Pollen grains are produced in

- (a) flowers (b) ovaries (c) anthers (d) fruits

Ans. (c)

9. Seeds are produced from the

- (a) ovules (b) ovary (c) stigma (d) pollen grains

Ans. (a)

- 10.** The pistil consists of
(a) anthers and filaments (b) style, stigma, ovary
(c) ovary, ovule, female gamete (d) ovary, stigma, anther

Ans. (b)

- 11.** The functions of the roots are
(a) to absorb water and minerals
(b) to anchor the plant to the soil
(c) to store food (d) all of these

Ans. (d)

- 12.** The point on the stem where leaves arise is
(a) internode (b) node (c) bark (d) trunk

Ans. (b)

- 13.** The wide flat portion of the leaf is called the
(a) lamina (b) petiole (c) veins (d) midrib

Ans. (a)

- 14.** The calyx consists of
(a) sepals (b) stamens (c) anthers (d) petals

Ans. (a)

- 15.** The gynoecium consists of
(a) stigma and anthers (b) anthers and filaments
(c) stigma, pollen grains and ovary
(d) stigma, style and ovary

Ans. (d)

- 16.** Flowers with either male or female reproductive part are
(a) bisexual (b) hermaphrodite
(c) unisexual (d) none of the above

Ans. (c)

- 17.** The transfer of pollen grains from the anther to the stigma is termed as
(a) fertilisation (b) reproduction (c) fusion (d) pollination

Ans. (d)

- 18.** An ovary develops into a
(a) seed (b) leaf (c) fruit (d) stem

Ans. (c)

19. Which one of these is not a vegetative part of a plant?
(a) Root (b) Stem (c) Flower (d) Leaf

Ans. (c)

20. The modification of a leaf into a pitcher structure which is a trap is found in
(a) venus fly trap (b) pitcher plant
(c) bladderwort (d) American poppy

Ans. (b)

II. Fill in the blanks.

1. An example of plant showing taproot is
2. An example of a plant with fibrous roots
3. Ginger is a modified
4. Onion is a modified
5. In cactus, leaves are modified in
6. Leaves are green as they contain
7. In addition to a tap root, a banyan plant possesses roots arising from branches. These roots are meant for
8. The vegetables such as carrot and radish that you eat are modified
9. In pitcher plant, are modified for trapping insects.
10. In the shoot system, leaves arise from on the stem.
11. Plants synthesise food by the process of
12. The root system arises from in the embryo.
13. Tiny pores present on the leaf surface are called
14. The four whorls of a flower are,,, and
15. Pollen grain is produced in
16. Ovules grow into and ovaries into after fertilisation.
17. is the male reproductive organ of a flower.
18. The transference of pollen grains from the anther to the stigma is called

19. The ovary contains
20. During germination, plumule gives rise to the and radicle give rise to the
21. The part of a plant that holds the plant in the soil and takes in water and minerals is called the
22. Water and minerals are carried from the roots to the leaves by the
23. The hard, woody stem of a tree is called the
24. Plants with brightly coloured flowers are usually pollinated by
25. Flowers with both male and female reproductive parts are called flowers.
26. The flat green portion of the leaf is called the leaf blade or
27. The thick vein in the middle of the leaf blade is called the
28. The corolla consists of
29. All fruits are formed from the of the flower.
30. The root the plant firmly into the soil.
31. The shoot bears, and
32. Roots of money plant are

Ans. 1. Pea 2. Wheat 3. Stem 4. Stem 5. Spines 6. Chlorophyll
7. Supporting 8. Roots 9. Leaves 10. Nodes 11. Photosynthesis
12. Radicle 13. Stomata 14. Sepals, Petals, Stamen, Ristil
15. Anther 16. Seeds, fruits 17. Stamen 18. Pollination
19. Ovules 20. Shoot, Root 21. Root 22. Xylem 23. Trunk
24. Insects 25. Bisexual 26. Lamina 27. Midrib 28. Petals
29. Ovaries 30. Fixes 31. Stem, Leaves, Flowers 32. Climbing roots.

III. Write True or False for each statement.

1. The sugarcane plant has fibrous roots.
2. Sweet potato is a stem.

3. Potato is a root.
 4. Leaves are reduced to spines in a cactus plant.
 5. Most flowers have colourful sepals.
 6. Internode is the leafless portion of stem.
 7. Shoot system consists of stem and its branches, leaves, flowers and fruits.
 8. Roots absorb water and minerals from the soil.
 9. The wheat plant has fibrous root system.
 10. Plants can carry out photosynthesis without carbon dioxide.
 11. Stamens make egg cells.
 12. A fertilised egg becomes a seed.
 13. Insect-pollinated flowers are brightly coloured.
 14. Wind-pollinated flowers produce pollen grains in large quantity.
 15. The node is the portion of the stem between two internodes.
 16. The stem helps in absorbing water from the soil.
 17. Anther, style and stigma are the parts of a pistil.
 18. Ovules develop into fruits.
 19. A stamen has a long stalk called style.
 20. Fusion of the egg cell with the male cell is called fertilisation.
- Ans.** 1. True 2. False 3. False 4. True 5. False 6. True 7. True
8. True 9. True 10. False 11. False 12. True 13. True 14. True
15. True 16. False 17. False 18. False 19. False 20. True
- IV. Find the odd one out.**
1. Root, stem, flowers, leaves.
 2. Tuber, bulb, rhizome, tendrils.
 3. Petals, sepals, anthers, roots.
 4. Cross-pollination, self-pollination, wind pollination, water pollination.
 5. Style, ovary, stigma, filament.
 6. Herbs, roots, trees, shrubs.
 7. Ovules, lamina, midrib, petiole.
 8. Calyx, corolla, stamens, stem.
 9. Leaf, stigma, style, ovary.
 10. Root, respiration, leaf, stem.

11. Carrot, sweet potato, turnip, screwpine.

12. Rhizome, tuber, tendril, bulb.

13. Lamina, midrib, petiole, node.

Ans. 1. Flowers 2. Tendrils 3. Root 4. Self-pollination 5. Filament
6. Roots 7. Ovules 8. Stem 9. Leaf 10. Respiration 11.
Screwpine 12. Tendril 13. Node.

V. Match the items in Column A with those in Column B:

<i>Column A</i>	<i>Column B</i>
1. Tap root	(a) Support
2. Fibrous root	(b) Leaf
3. Tuberous root	(c) Flower
4. Supporting root	(d) Grape vine
5. Breathing roots	(e) Mango
6. Rhizome	(f) Respiration
7. Stem tendril	(g) Maize
8. Leaf modification	(h) Ginger
9. Stomata	(i) Storage
10. Stamen	(j) Pitcher plant

Ans. 1. (e) 2. (g) 3. (i) 4. (a) 5. (f) 6. (h) 7. (d) 8. (j) 9. (b) 10. (c)

VI. Give the differences between the following:

1. Root and Stem

Ans.	Root	Stem
	(1) It is underground part.	(1) It is overground part.
	(2) Nodes and internodes are absent.	(2) It has nodes and internodes.
	(3) It is never green.	(3) It is often green.
	(4) Leaves and buds are not present.	(4) Leaves and buds are present.
	(5) It develops from the radicle part of seed.	(5) It develops from plumule part of seed.

2. Node and Internode

Ans.	Node	Internode
	(1) It is the place where leaves arise on stem.	(1) It is the portion of stem between two nodes.

3. Simple and Compound Leaves

Ans.	Simple Leaves	Compound Leaves
	(1) A simple leaf is a leaf with a single undivided leaf blade.	(1) A compound leaf is a leaf with a leaf blade that is divided into several parts called leaflets.
	(2) A simple leaf has an axillary bud. Example – mango, cotton	(2) Leaflets do not bear axillary buds. Example – neem, rose
	(3) Stipules may be present at its base.	(4) Stipules may be present at the base of rachis but not at the base of leaflet.

4. Seed and Fruit

Ans.	Seed	Fruit
	(1) A seed is formed from ovule.	(1) A fruit is ripened ovary formed after fertilisation.
	(2) A seed contains an embryo, one or two cotyledons and a protective seed coat.	(2) A fruit consists of two parts – The fruit wall (Pericarp) and seeds.
	(3) Seed protects embryo from unfavourable climatic conditions.	(3) Fruits protect the seeds from unfavourable climatic conditions.

5. Reticulate and Parallel Venation

Ans.	Reticulate Venation	Parallel Venation
	(1) It is the characteristic of dicot plants.	(1) It is the characteristic of monocot plants.
	(2) In reticulate venation, veins in the leaf lamina divide repeatedly and forming a network. Example: mango	(2) In parallel venation, veins in the leaf lamina run parallel to each other. Example. wheat, naize.

6. Self-pollination and Cross-pollination

Ans.	Self-pollination	Cross-pollination
	(1) It takes place within a single flower or two flowers present on the same parent plant.	(1) It takes place between two flowers present on two separate plants.
	(2) Self-pollination does not involve various external agencies.	(2) Cross-pollination often involves various external agencies to carry pollen grains from one flower to another, e.g. air, water.
	(3) Most of the self-pollinated plants are bisexual i.e. male and female reproductive part present in the same flower.	(3) Most of the cross-pollinated plants are unisexual, i.e. male and female reproductive parts present in separate flowers.

7. Terminal and Axillary Bud

Ans.	Terminal Bud	Axillary Bud
	(1) Terminal bud is present at the tip of the stem or a branch.	(1) Axillary bud is present in the axils of leaves.
	(2) Around the terminal bud there is a complex arrangement of nodes and internodes with maturing leaves.	(2) Axillary bud develops from the nodes which then becomes a new stem.
	(3) The terminal bud is the main area of growth in most plants.	(3) Axillary bud develops into a new stem.

8. Complete and Incomplete Flower

Ans.	Complete Flower	Incomplete Flower
	(1) A flower that has all the four whorls calyx, corolla, stamens and carpels is called a complete flower, e.g. mustard, china rose, pea.	(1) A flower in which one or more whorls may be missing is called incomplete flower, e.g. mulberry, date palm.

9. Dorsiventral and Isobilateral leaf

Ans.	Dorsiventral leaves	Isobilateral leaves
	(1) Receives sunlight from the upper side.	(1) Receives sunlight equally from both the sides-upper and lower.
	(2) Stomata are much high on lower side, e.g. rose, neem	(2) Stomata are equally present on both sides, e.g. wheat, maize, barley.

10. Fasciculated Root and Nodulosa Root

Ans.	Fasciculated Root	Nodulosa Root
	(1) These roots arise in bunches from the lower nodes of stem and become swollen due to storage, e.g. dahlia.	(1) These are the adventitious roots that get swollen at their tips, e.g. mango.

VII. State the function of the following:

- (a) Leaf tendril (b) Leaf spine (c) Scale leaf (d) Phyllode
(e) Leaf of insectivorous plant.

Ans. (a) **Function of leaf tendril.** Leaf tendrils are delicate thread-like structure that coil around any object and support the plant to climb up, e.g. pea.

- (b) **Function of leaf spine.** Leaf spines serves the purpose of protection and in some weak-stemmed plants, it also help to climb, e.g. *Opuntia*, Bignonia.
- (c) **Function of scale leaf.** These leaves are present on the buds of aerial and underground stems. These leaves protect the young buds, e.g. Ginger.
- (d) **Function of phyllode.** Phyllode is green petiole or leaf stalk and its main function is photosynthesis.
- (e) **Function of leaf of insectivorous plants.** Insectivorous plants modify their leaves to trap and digest insects, e.g. pitcher plant, bladder wort.

VIII. We eat different parts of various plants. For each plant, write the part of the plant that you eat.

- | | | | |
|------------------|-------|--------------|-------|
| 1. Carrot | ..... | 2. Cucumber | ..... |
| 3. Radish | ..... | 4. Tomato | ..... |
| 5. Onion | ..... | 6. Potato | ..... |
| 7. Ginger | ..... | 8. Sugarcane | ..... |
| 9. Lady's finger | ..... | 10. Mint | ..... |
| 11. Pea | ..... | 12. Apple | ..... |
| 13. Groundnut | ..... |  |  |

Ans. 1. Root 2. Fruit 3. Root 4. Fruit 5. Leaves 6. Stem 7. Stem
8. Stem 9. Fruit 10. Leaves 11. Seeds 12. Flashy thalamus
13. Seeds.

IX. Here is the picture of a plant. Study the picture and answer the following questions:

- 1. Which plant organ holds up the leaves and flowers?
- 2. Which plant organ makes food?
- 3. Which plant organ is needed for reproduction?
- 4. Which plant organ carries water to the leaves?

Ans. 1. Stem
2. Leaf
3. Flower
4. Xylem

X. Answer the following questions:

1. Mention the two main systems found in plants.

Ans. Plants contain two main systems:

- (i) Root systems (ii) Shoot systems

Root systems consist of roots while shoot systems consist of stem, branches, leaves, flowers and fruits.

2. Describe the root systems found in plants. Give examples.

Ans. Root system is underground part of plant that fixes plant to the soil. It may be of two types:

- (i) **Tap root.** It contains a main root from which lateral roots develop. For example: Mango, Pea, gram, neem, etc. contain tap roots.
- (ii) **Fibrous root.** These are the roots of equal size that is present below stem in dusters and spread out in the soil. For example: wheat, maize, grasses, etc. contain fibrous roots.

3. What are the functions of roots?

Ans. Functions of roots

- (i) Roots are present below the soil so they fix the plant to the soil.
- (ii) Roots absorb water and minerals from the soil which are then conducted to the stem and leaves.
- (iii) Roots hold the soil particles together, thus, they prevent soil erosion and helps in the conservation of soil fertility.
- (iv) In some plants, roots are modified for storage, support and respiration.

4. Why certain plant parts are modified?

Ans. Some plants develop adaptability to leave in conditions. This adaptability may be for storage of food, support respiration, photosynthesis, etc. Stems and roots play a major role in these adaptations.

Modification of roots

For storage as in turnip, sweet potato, carrot.

For additional support, as in sugarcane, maize.

For respiration, as in mangrove plants (Rhizophora)

Modification of stems

For storage as in potato, ginger, onion.

For photosynthesis as in cactus.

For support as in grape vine, gourd.

5. (a) Mention any two modifications found in roots.

(b) Name two plants having supporting roots.

Ans. (a) Modification of root for storage, e.g. turnip
modification of root for respiration, e.g. Rhizophora.

(b) Maize and sugarcane both have supporting roots.

6. (a) Which plant organs are modified for storage of food in a potato and an onion?

(b) Name the stem modifications found in potato, ginger and onion.

Ans. (a) Stem — In potato
Leaves — In onion.

(b) Tuber — In potato
Rhizome — In ginger
Bulb — In onion.

7. Name some modified roots and stems, which are eaten by man.

Ans. Turnip, Sweet potato, and carrot are the modified roots eaten by man. Potato and ginger are the modified stems eaten by man.

8. Describe the modifications found in a cactus plant.

Ans. Cactus is found in the areas where very dry conditions are present. So its leaves change into spines and stem into leaf-like structure. This fleshy leaf-like stem manufactures food for the plant.

9. Why is the stem of a cactus plant thick and green? What is the role of spines?

Ans. Stem of a cactus plant is thick and green because it is the adaptation of very dry conditions. Green and fleshy stem

manufactures food and retains water. Green leaves change into spines that gives protection to the plant.

- 10.** Give one example of a plant with stem tendrils.
Ans. In grape vine, small thread-like structures arising from the stem to support the plant.
- 11.** Name two insectivorous plants. Which part of the plant body is modified in these plants?
Ans. Insectivorous plants: Pitcher plant, Bladder wort. In these plants, leaves are modified to trap insects.
- 12.** Mention three functions of leaves.
Ans. Three functions of leaves:
(i) The main function of leaves is food manufacturing by the process of photosynthesis.
(ii) Leaves have tiny pores on the surface called stomata through which gaseous exchange occurs.
(iii) In some plants, leaves modified into spines or tendrils or pitcher to trap insects.
- 13.** What part is played by stamens and carpels in reproduction?
Ans. Stamens are the male reproductive parts of plant in which male reproductive cells, i.e. pollen grains are produced.
Carpels are the female reproductive parts of plant in which female reproductive cells, i.e. egg cells are produced.
- 14.** In which part of the flower is the ovule found?
Ans. Ovules are present in the ovary which is present in the carpel.
- 15.** Name the three agents of pollination.
Ans. Pollination in flowers may be of following types:
(i) Insect pollination (ii) Water pollination
(iii) Air pollination
- 16.** Where does fertilization occur in a flowering plant?
Ans. The fusion of the male gamete with the female gamete is called fertilisation. It occurs in the ovary.
- 17.** Outline the structure of a seed. Name its parts.
Ans. A seed is a discrete body from which a new plant develops.

It is formed from a fertilised ovule. A seed comprises an outer seed coat that encloses a food store and an embryo plant. An embryo is represented by plumule and radicle. On germination, plumule gives rise to the shoot system and radicle gives rise to the root system and develop a new plant.

18. Plants that are to be moved are dug out of the ground with a ball of soil around the root. Why?

Ans. When we dug out a plant, it comes out with a ball of soil around the root. Because we know, root is underground part of plant which fixes the plant firmly to the soil particles.

19. What is pollination?

Ans. The transfer of pollen grains from the anther to the stigma of pistil is called pollination. It is of two kinds:

(i) Self-pollination

(ii) Cross-pollination.

20. Why are seeds produced in large quantity?

Ans. Seeds are produced in large quantities because it is impossible that all the seeds fall and germinate at the same place. There would be a tough competition for light, water and minerals amongst seeds. So, it is necessary to carry away seeds to distant places by various agents. So, due to this reason seeds are produced in large quantities.

21. What is the role of human beings in dispersal of seeds?

Ans. Human beings play a major role in dispersal of seeds. Because they feed upon the fleshy portion of fruit and throw the seeds on another places. These seeds germinate and develop into new plants.

22. Why do we call potato and ginger as stems, although as found underground?

Ans. Potato and ginger both are underground stems because both have nodes and internodes.
