Morphology of Flowering Plants

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. In dicots, the primary root grows directly from the radicle and forms a:
(a) adventitious root system **(b)** prop root system
(c) fibrous root system **(d)** tap root system

2. The hinged trap of Venus flytrap is a modified:
(a) leaf **(b)** root **(c)** stem **(d)** flower

3. The placentation in sunflower is:
(a) marginal **(b)** free central **(c)** parietal **(d)** basal

4. The aestivation of the corolla in china rose is:
(a) twisted **(b)** valvate **(c)** imbricate **(d)** vexillary

5. In the floral formula % ♂ K(5) C1+2+(2) A(9)+1 G1, the number of petals is:
(a) 5 **(b)** 10 **(c)** 6 **(d)** 4

6. The ovary of guava is:
(a) absent **(b)** superior **(c)** half-inferior **(d)** inferior

7. The phyllotaxy of guava is:
(a) opposite **(b)** spiral only in roots
(c) alternate **(d)** whorled

8. Assertion (A): The fleshy, round storage organ of turnip is a modified root.
Reason (R): Every underground storage organ is a root.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Section B — Short answer — 8 × 2 = 16 marks

9. What is the difference between a tap root and a fibrous root system?

10. What is modified in carrot, into what, and for what job?

11. Name the type of placentation in mustard, and give one more plant with it.

12. Write the floral formula of the family Solanaceae and name two of its members.

13. What type of aestivation is seen in china rose? Describe it.

14. Is the flower of the ray florets of sunflower hypogynous, perigynous or epigynous? What is the position of its ovary?

15. Is the maize seed endospermic or non-endospermic? Where is its food stored?

16. What is the edible part of orange?

Section C — Word problems — 4 × 4 = 16 marks

17. Describe the modifications of roots with examples.

18. The floral formula of a family is Br ⊕ ♂ P(3+3) A3+3 G(3). (a) Name the family. (b) What is the symmetry of the flower? (c) Describe the calyx, corolla, androecium and gynoecium. (d) Give the placentation and two members.

19. For each plant, say which organ is modified, into what, and why: grapevine, Opuntia, ginger, pitcher plant.

20. (a) What is the placentation in Argemone? (b) What is the aestivation in bean? (c) Is the flower of the ray florets of sunflower hypogynous, perigynous or epigynous? Explain each term.

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Answer key

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Q	Answer	Working
1	**(d) tap root system**	—
2	**(a) leaf**	—
3	**(d) basal**	—
4	**(a) twisted**	—
5	**(a) 5**	C = corolla (petals)
6	**(d) inferior**	the flower is epigynous
7	**(a) opposite**	—
8	**(c) A is true, but R is false.**	A is true: it is a modified root. R is false.
9	**A tap root system has one main root from the radicle with lateral roots (dicots, mustard). In a fibrous root system the primary root is short-lived and many roots arise from the base of the stem (monocots, wheat).**	—
10	**The root, into a fleshy, conical storage organ, for food storage**	—
11	**Parietal; Argemone**	—
12	**⊕ ♂ K(5) C(5) A5 G(2); ashwagandha, chilli**	—
13	**Twisted: one margin of each overlaps the next in a regular direction**	—
14	**Epigynous; ovary inferior**	—
15	**Endospermic: food is stored in the endosperm**	—
16	**The juicy hairs (juice sacs) of the endocarp**	—
17	**Storage: tap roots of carrot and turnip, adventitious roots of sweet potato. Support: prop roots of banyan and stilt roots of maize and sugarcane. Respiration: pneumatophores of Rhizophora in mangroves, which grow up out of the swampy soil to get oxygen.**	—
18	**(a) Liliaceae; (b) actinomorphic; (c) no separate calyx: 6 tepals in two whorls (3 + 3), often united; perianth of 6 tepals; 6 stamens (3 + 3), epiphyllous;**	—

Q	Answer	Working
	tricarpellary, syncarpous, superior ovary, trilocular; (d) axile; Colchicum, asparagus	
19	**grapevine: stem, tendrils, for climbing; Opuntia: stem, a flattened green phylloclade, for photosynthesis; ginger: stem, a rhizome, for food storage; pitcher plant: leaf, a pitcher, for trapping insects**	—
20	**(a) parietal; (b) vexillary; (c) epigynous (ovary inferior). Placentation is the arrangement of ovules in the ovary; aestivation is the arrangement of sepals or petals in the bud; the position describes where the floral parts arise relative to the ovary.**	—