

No. of Printed Pages : 3

Roll No. ....

**312161**

**S-2112**

**M.Sc. (Second Semester)**

**Examination, 2024-25**

**BOTANY**

**Paper – First**

**(Plant development and Reproductive Biology)**

**[BOT-007]**

**Time : Two Hours]**

**[Maximum Marks : 60**

**Note :** Attempt any *four* questions. All questions carry equal marks. Draw diagrams wherever necessary.

1. Discuss the physiological and biochemical processes involved in seed germination with emphasis on the mobilization of food reserves. How do different stored food components contribute to early seedling development?
2. Give reasons :
  - (a) Mutations in the WUSCHEL gene result in premature termination of the SAM. What does this suggest about its role in meristem maintenance, and how might this gene interact with CLAVATA in regulating stem cell populations?

- (b) Seed dormancy is considered a crucial survival strategy in many plants. However, there are exceptions where dormancy is absent or delayed. Discuss how the loss of dormancy might impact plant fitness and survival, especially under changing environmental conditions.
3. Describe the role of vascular cambium in the formation of secondary xylem. How does the activity of the cambium contribute to radial growth, and what are the seasonal variations in xylem development?
  4. Describe the organization of the root apical meristem (RAM) and explain how distinct cell fates and lineages are established during root development. How does this organization contribute to the continuous growth and patterning of the root?
  5. Discuss the process of vascular tissue differentiation and the formation of lateral roots and root hairs. How do these structures contribute to water and nutrient uptake, and what is the role of root-microbe interactions in enhancing root function?
  6. Describe the structure of anthers and the process of microsporogenesis. Discuss the role of the tapetum in pollen development and explain how gene expression regulates microspore maturation into a functional male gametophyte.

7. Explain the mechanisms of self-incompatibility in plants. Compare and contrast the cytological, biochemical, and molecular aspects of SSIGSI. Discuss their roles in preventing self-fertilization and promoting outcrossing.
8. Explain the following :
- (a) Aestivation.
  - (b) Cohesion of stamens.
  - (c) Dehiscence of Fruits.
  - (d) Polyembryony.
  - (e) Embryo rescue.
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