

## MSc Sem.-2 Examination

409

Botany

May-2025

Time : 2-30 Hours]

[Max. Marks : 70

**Q.1** Explain the processes involved in nitrogen, phosphorus, and potassium assimilation in plants. Discuss the role and mechanism of biological nitrogen fixation (BNF). (14)

Or

**Q.1A** Describe the biosynthesis and metabolic pathways of carbohydrates in plants. (7)

**Q.1B** How do the macromolecules contribute to plant physiology? (7)

**Q.2** Discuss the translocation of photosynthates through the phloem. Explain the source-sink relationship and the factors influencing photoassimilate partitioning and allocation. (14)

Or

**Q.2A** Discuss the role of mitochondria in aerobic respiration. (7)

**Q.2B** Explain the process of glycolysis in detail. (7)

**Q.3** Explain how growth is measured in plants. Define and calculate RGR, LWR, and NAR. Discuss their significance in understanding plant growth correlations. (14)

Or

**Q.3A** Describe the stages of seed germination, causes of dormancy, and various methods of breaking dormancy. (7)

**Q.3B** Describe physiological effects of ethylene and abscisic acid. (7)

**Q.4** Describe the role of signaling molecules such as jasmonic acid, salicylic acid, brassinosteroids, polyamines, reactive oxygen species (ROS), and nitric oxide in plant defense and development. (14)

Or

**Q.4A** Discuss recent biotechnological approaches to improve stress tolerance. (7)

**Q.4B** Explain photomorphogenesis and photoperiodism. (7)

**Q.5 Write short answers for the following questions (Any 7 out of 12)** (14)

1) Name two essential micronutrients and their functions.

2) What is the role of phosphorus in plant growth?

3) How is potassium involved in stomatal movement?

4) What is the final electron acceptor in the electron transport chain during respiration?

5) Mention two substrates (other than glucose) that can be used in plant respiration.

6) What is the significance of measuring photosynthesis in plant studies?

7) What is the role of gibberellins in seed germination?

8) Name any two methods used to break seed dormancy.

9) Mention two physiological effects of ABA.

10) What is LWR (Leaf Weight Ratio)?

11) Name two Photosystems and their absorption peaks.

12) What is the function of RuBisCO enzyme?