039/2025

PART – II

Total Number of Questions : 38	Maximum Marks : 200	Time : 3 Hours

INSTRUCTIONS (നിർദ്ദേശങ്ങൾ)

1. Question cum Answer Booklets are processed by electronic means. The following instructions are to be strictly followed to avoid invalidation of answer scripts.
(ചോദ്യവും ഉത്തരവും അടങ്ങുന്ന ഈ ബുക്ക് ലെറ്റുകൾ ഇലക്ട്രോണിക് സാങ്കേതിക വിദ്യയുടെ സഹായത്തോടുകൂടെ മൂല്യനിർണ്ണയം നടത്തുന്നതിനാൽ ഇവ അസാധുവാകാതിരിക്കുവാൻ താഴെപ്പറയുന്ന നിർദ്ദേശങ്ങൾ പൂർണ്ണമായും പാലിക്കുക.)

2. The first page of this question cum Answer Booklet is an OMR data Sheet (Part I). All entries in the OMR sheet are to be made with blue or black ball point pen only.
(ഈ പുസ്തകത്തിന്റെ ഒന്നാമത്തെ പേജ് ഒരു ഒ.എം.ആർ. ഡാറ്റാ ഷീറ്റാണ് (പാർട്ട് I). ഇത് നീലയോ, കറുപ്പോ നിറത്തിലെ ബോൾ പോയിന്റ് പേന ഉപയോഗിച്ച് മാത്രമേ പൂരിപ്പിക്കാവൂ.)

3. Make sure that register number is bubbled correctly and completely; no correction is permitted.
(രജിസ്റ്റർ നമ്പർ രേഖപ്പെടുത്തുന്നതിനുള്ള കുമിളകൾ കൃത്യമായും പൂർണ്ണമായും കറുപ്പിച്ചിട്ടുണ്ടെന്ന് ഉറപ്പു വരുത്തുക. തിരുത്തലുകൾ അനുവദനീയമല്ല.)

4. Do not tamper the bar code printed on the OMR sheet and subsequent pages. Tampering of bar code will result in the invalidation of this booklet.
(ഈ പുസ്തകത്തിൽ എവിടെയും പ്രിന്റ് ചെയ്തിരിക്കുന്ന ബാർ കോഡിൽ ഒരു കാരണവശാലും തിരുത്തലുകളോ, മാർക്കുകളോ പാടില്ല. ഇതിനു വിരുദ്ധമായി ചെയ്യുന്ന പക്ഷം ഈ പുസ്തകം അസാധുവാകുന്നതാണ്.)

5. Answers should be written with blue or black ball point pen only.
(ഉത്തരങ്ങൾ നീലയോ, കറുപ്പോ നിറത്തിലെ ബോൾ പോയിന്റ് പേന ഉപയോഗിച്ച് മാത്രമേ എഴുതാവൂ.)

6. Do not write anything outside the margin of space provided for writing the answer and write only one line of answer between two lines.
(പുസ്തകത്തിൽ ഉത്തരം എഴുതുവാൻ നൽകിയിരിക്കുന്ന സ്ഥലത്തിനു വെളിയിൽ യാതൊന്നും തന്നെ എഴുതുവാൻ പാടില്ല. രണ്ടു വരകൾക്കിടയിൽ ഒരു വരി ഉത്തരം മാത്രമേ എഴുതുവാൻ പാടുള്ളൂ.)

7. Rough work should be done only in the specific page provided with.
(റഫ് വർക്കുകൾ ഇതിനായി നൽകിയിരിക്കുന്ന പേജിൽ മാത്രമേ ചെയ്യുവാൻ പാടുള്ളൂ.)

1. Incompatibility is a natural barrier in the fusion of gametes. Justify this statement. (5 Marks)

2. Describe the monosporic embryo sac development with examples. (5 Marks)

3. Explain extra stelar secondary growth in plants. (5 Marks)

4. Comment on various types of secretory structures seen in plants. (5 Marks)

5. Describe the post fertilizational changes seen in Polysiphonia. (6 Marks)

6. Puccinia is called polymorphic and heteracious fungi? Discuss. (6 Marks)

7. Write short notes on various types of genetic recombinations seen in bacteria. (6 Marks)

8. Explain plant disease cycle with its major events. (6 Marks)

9. Write down the General characteristic features of Marchantia. (5 Marks)

10. Draw a neatly labelled diagram of the T.S. of Selaginella stem. (5 Marks)

11. Briefly explain the internal structure of Pinus needle. (5 Marks)

12. What is Petrifaction? How is it formed? (5 Marks)

13. (a) Explain the symbols present in a floral formula. (3 Marks)

    (b) Write down the floral formula of Solanaceae. (2 Marks)

14. Briefly mention about the morphological characters of Rutaceae. (5 Marks)

15. Briefly explain about the dyes obtained from the leaves. (5 Marks)

16. What is the scientific name of 'Ragi'? Write down its economic importance. (5 Marks)

17. What are the Levels of Biodiversity? (5 Marks)

18. Draw a labelled diagram of Carbon Cycle. (5 Marks)

19. What are the major pollutants for air pollution and write down its impacts. (6 Marks)

20. Analyse how the Emerson enhancement effect led to the discovery of two distinct photosystems in the light reaction of photosynthesis. (5 Marks)

21. Critically assess how fluctuations in sodium levels influence plant physiology, emphasizing the contrasting impacts of sodium deficiency and toxicity on cellular homeostasis and growth. (5 Marks)

22. Fatty acid oxidation disorders can severely affect energy metabolism in plants. Analyse the steps of β-oxidation in peroxisomes and justify why it is crucial for seed germination. (5 Marks)

23. Enzyme classification is universally based on the type of reaction catalysed rather than the specific substrate involved. Critically analyse the rationale behind this principle and explain its biochemical significance. (5 Marks)

24. A cell exhibits uncontrolled division and fails to enter the G_0 phase. Based on the regulation of cell cycle stages and checkpoints, identify the phase most likely deregulated and analyse how this disruption contributes to tumour development. (6 Marks)

25. Discuss how nucleosome-mediated chromatin organisation regulates gene expression and explain its dynamic reorganisation during mitosis and meiosis. (6 Marks)

26. RNA interference (RNAi) is a vital tool in modern gene regulation. Describe the mechanism of RNAi, its role in gene silencing in eukaryotic cells and its potential therapeutic applications. (6 Marks)

27. Z-DNA is a non-canonical DNA structure that forms transiently under specific physiological conditions. Analyse the molecular and regulatory roles that justify its evolutionary conservation despite its instability. (6 Marks)

28. Highlight the advantages of *Agrobacterium* mediated gene transfer. (5 Marks)

29. Discuss the molecular techniques to assess somaclonal variants at the DNA level. (5 Marks)

30. What are cybrids? List out the various methods to produce cybrids. (5 Marks)

31. Explain the technique of RT-PCR. (5 Marks)

32. Expand these abbreviations
(1) IRRI (2) ICRISAT (3) IIHR (4) IPGRI (5) CPCRI. (5 Marks)

33. Classify the different styles of Bonsai. (5 Marks)

34. Define synthetic variety. Describe the methods of production of synthetic variety. Briefly discuss the merits of synthetic variety. (6 Marks)

35. Compare and contrast natural and artificial regeneration in forestry. Discuss the advantages and challenges associated with each method in the context of sustainable forest management. (5 Marks)

36. Explain the concept of Joint Forest Management (JFM) in India. Analyze its role in forest conservation and discuss the challenges in its implementation. (5 Marks)

37. Discuss the principles of sustained yield in forest management. What are its limitations, and how can modern silvicultural practices address these challenges. (5 Marks)

38. Evaluate the importance of Non-Timber Forest Products (NTFPs) in rural livelihoods and forest conservation. How can sustainable harvesting of NTFPs contribute to biodiversity conservation and economic development? (5 Marks)