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Question Paper Code : 80056

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2025.

Seventh/Eighth Semester

Biomedical Engineering

AI 3021 — IT IN AGRICULTURAL SYSTEM

(Common to: Computer Science and Design/Computer Science and Engineering/Computer Science and Engineering (Artificial Intelligence and Machine Learning)/Computer Science and Engineering (Cyber Security)/Computer and Communication Engineering/Electronics and Communication Engineering/Electronics and Telecommunication Engineering/Medical Electronics/Artificial Intelligence and Data Science/Computer Science and Business Systems/Information Technology)

(Regulations – 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define precision agriculture and state its primary objective.
2. Brief about Crop Production Modeling.
3. What is Leaf Area Index (LAI)?
4. What is fertigation, and how does it benefit crop production?
5. Differentiate between CPM and PERT in project scheduling.
6. What is a Decision Support System (DSS) in farm management?
7. What is seasonal forecasting?
8. Define Climate variability and give example.
9. List two benefits of e-learning for rural learners.
10. Define an expert system.

PART B — (5 × 13 = 65 marks)

11. (a) Explain the working principle of ground-based sensors in precision agriculture, including their types and applications.

Or

- (b) Analyse the role of yield mapping systems and crop production modelling in addressing spatial variability in fields, with case studies or examples.

12. (a) Discuss the use of hydroponics in greenhouse nutrient management, focusing on nutrient solution monitoring.

Or

- (b) Describe the role of IoT-based sensor networks in real-time plant growth monitoring in greenhouses.

13. (a) A vegetable farm has tasks: ploughing (5 days), planting (3 days), fertilizing (2 days), and harvesting (4 days). Ploughing must precede planting, and fertilizing follows planting but precedes harvesting. Use CPM to find the critical path and total project duration.

Or

- (b) Formulate a linear programming problem to optimize crop allocation on a large hectare farm with constraints on water and labor.

14. (a) Describe the working principle of Global Climatic Models (GCMs) and their strengths in seasonal forecasting.

Or

- (b) Discuss the importance of climate variability and seasonal forecasting for global food security with examples.

15. (a) Elaborate on the architecture and applications of expert systems with a focus on their limitations in modern contexts.

Or

- (b) Evaluate the combined impact of e-governance, mobile banking, and e-commerce on rural economic empowerment with examples.

PART C — (1 × 15 = 15 marks)

16. (a) Evaluate the impact of technology-enhanced learning systems on modern education. Discuss the role of Learning Management Systems (LMS) and AI in personalizing learning experiences, along with the limitations of TEL.

Or

- (b) Discuss the role of resource optimization in sustainable agriculture. Explain how GIS and drip irrigation can be integrated to improve water and land use efficiency with a case study.
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