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Question Paper Code:U9A74

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Open Elective

Agricultural Engineering

21UAG974-AGRICULTURE AUTOMATION

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following type of irrigation system is practiced on small scale in India? CO1 U
(a) Lift Irrigation (b) Flood Irrigation
(c) Natural sub-irrigation (d) Artificial sub-irrigation
2. Canal irrigation is generally preferred in _____. CO1 U
(a) Non-alluvial canal (b) Non-perennial Canal
(c) Alluvial canal (d) Feeder canal
3. Modern GIS technology uses _____ type of information. CO1 U
(a) Analog (b) Digital (c) Both (a) & (b) (d) none of the above
4. A traditional method traces geographical form using _____. CO1 U
(a) Directly (b) Indirectly (c) Digitizing tablet (d) none of the above
5. Which fundamental aspect of robotics is primarily concerned with designing intuitive interfaces and ensuring safety in collaborative environments? CO1 U
(a) Mechanics (b) Sensors
(c) Human-Robot Interaction (d) Artificial Intelligence and Machine Learning
6. Which component of robotics is responsible for moving robot parts? CO1 U
(a) Sensors (b) Actuators (c) Control Systems (d) Artificial Intelligence

7. What is the purpose of a charge controller in a solar-based automatic system? CO1 U
 - (a) Regulate water flow
 - (b) Convert DC to AC electricity
 - (c) Control solar panel tilt angle
 - (d) Prevent overcharging of batteries
8. Float switches are commonly used to measure CO1 U
 - (a) Soil moisture levels
 - (b) Ambient Temperature
 - (c) Water levels in tanks
 - (d) Solar radiation intensity
9. How do soil moisture sensors contribute to irrigation? CO1 U
 - (a) Measure wind speed
 - (b) Adjust planting schedules
 - (c) Trigger irrigation
 - (d) Track crop yields
10. What is the primary purpose of robotic harvesters? CO1 U
 - (a) Control pests
 - (b) Monitor soil Moisture
 - (c) Harvest ripe crops
 - (d) Analyze weather data

PART – B (5 x 2= 10 Marks)

11. Explain about Agriculture Automation? CO1 U
12. How would you apply precision farming techniques to improve crop management on a farm? Discuss how you would use technologies such as GPS, sensors, and data analytics to enhance productivity and resource efficiency. CO 3 -App
13. Name two examples of sensors commonly used in robotics. CO 1 U
14. Name two examples of microcontrollers or SBCs commonly used in IoT-based automated irrigation systems. CO 1 U
15. How would you implement a smart irrigation system to conserve water in a large agricultural field? CO 3 -App

PART – C (5 x 16= 80 Marks)

16. (a) Evaluate the role of Agriculture Automation in modern farming. Discuss its need and the benefits of using automation systems in the agricultural sector, with a focus on how it can address current challenges and improve farm productivity. CO2- App (16)

Or

- (b) Consider a farmer in an arid region where water is a limited resource. The farmer wants to maximize crop yield while minimizing water usage. The farmer installs a drip irrigation system, proving that Drip irrigation is a highly efficient and effective method of watering crops explain it with a neat sketch. CO2- App (16)
17. (a) Write about the working principles of remote sensing with neat sketch? CO1- U (16)
- Or
- (b) What is crop production modeling and explain their benefits and the future of Agronomics Using Crop modeling? CO1- U (16)
18. (a) Why are programming languages and algorithms important in robotics, and what are some common examples? CO1- U (16)
- Or
- (b) How do robotics contribute to precision agriculture, and what are the benefits and challenges? CO1- U (16)
19. (a) Compare different soil moisture sensors used in agriculture, focusing on their principles of operation, accuracy, and suitability for various soil types and crop needs. Analyze how each sensor type (e.g., capacitance, resistance, and tensiometer) performs under different conditions and its impact on irrigation management CO4- App (16)
- Or
- (b) Discuss the advantages and challenges of integrating solar energy into agricultural operations. Consider benefits such as cost savings, sustainability, and energy independence, as well as challenges like initial investment, intermittency, and maintenance. How do these factors influence the adoption of solar energy in agriculture? CO4- App (16)
20. (a) Explain the functioning of smart irrigation systems and their effectiveness in optimizing water usage in agriculture. Discuss how technologies like soil moisture sensors, weather data, and automated controls work together to improve irrigation efficiency. Assess the impact of these systems on water conservation, crop health, and overall agricultural productivity CO2- App (16)
- Or
- (b) Discuss the potential challenges and limitations associated with the widespread adoption of IoT-based systems in agriculture, and how can they be addressed? CO2- App (16)

