Reg. No: | | | | | | | | | | | | |

Question Paper Code: U6A01

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Sixth semester

Agricultural Engineering

21UAG601 MICROIRRIGATION SYSTEMS

(Regulation 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which pump is used for irrigation purpose if the distance between the water surface and pump inlet is greater than 8m ? CO1-U

   (a) Submersible pumps (b) Centrifugal pumps

   (c) Deep well turbine pumps (d) Air lift pumps

2. What is the term for the pressure at which a liquid transitions into vapor? CO 1 - U

   (a)Atmospheric Pressure (b) Gas Pressure

   (c) Vapour Pressure (d) Suction pressure

3. Throttling refers to the process of controlling or regulating the flow of a fluid by CO 1- U

   (a) Increasing the fluid temperature (b) Decreasing the fluid pressure

   (c) Increasing the fluid velocity (d) Decreasing the fluid viscosity

4. In which industry are electromagnetic flow meters primarily utilized? CO 1- U

   (a) Pump stations (b) Municipal water supply

   (c) Waste water treatment (d) Irrigation channels

5. For a sloping terrain which type of irrigation system is used? CO 1- U

   (a) Drip Irrigation (b) Sprinkler Irrigation

   (c) Both a and b (d) Surface irrigation

6. What is the primary objective of automation in irrigation systems? CO 1- U

(a) To increase water usage (b) To reduce labor costs

(c) To promote soil erosion (d) To decrease crop yield

7. Which crop among the following gives high yield for drip irrigation? CO 1- U

(a) Brinjal (b) Carrot (c) Tomato (d) Banana

8. What is the cost of drip irrigation per hectare? CO 1-U

(a) 2,47,000 (b) 1,51,500 (c) 2,20,500 (d) 3,30,500

9. What is the cost incurred per hectare for a sprinkler system in india?Which type of crop is suitable for sprinkler irrigation among the listed crops? CO 1- U

(a) 2,52,000 b) 1,51,500 (c) 1,10,00 (d) 2,10,000

10. For which sprinkler irrigation system the laterals are portable while the main lines connecting to the water source and pumping plant remain stationary? CO 1- U

(a) Semi permanent system (b) Semi portable system

(c) Portable system (d) Permanent system

PART – B (5 x 2= 10 Marks)

11. Explain and Illustrate the Diaphram pump CO1- U

12. Summarize the function of a pressure-reducing valve and include a labeled diagram showing its parts. CO1- U

13. Report the reasons why you prefer MIS over conventional methods CO1- U

14. Calculate the emission uniformity of a drip irrigation system segment employing drip emitters with a coefficient of discharge (kd) of 0.25, an exponent (x) of 0.6, and a coefficient of variation (Cv) of 0.08. Each plant utilizes two emitters. The average pressure is 110 kPa, and the minimum pressure is 80 kPa. CO2-App

15. Describe four general rules that must be considered while designing sprinkler irrigation system. CO1- U

PART – C (5 x 16= 80 Marks)

16. (a) Create a comprehensive mind map illustrating various irrigation methods, including surface irrigation, sprinkler irrigation, and drip irrigation. Explain and define each method, providing detailed insights into their operational principles, advantages, and limitations. Enhance your analysis by incorporating diagrams to visually represent the functionality of each irrigation method CO3-Ana (16)

Or

	(b)	Develop a comprehensive mind map showcasing various types of pumps. Explain and differentiate each pump type, highlighting their operational principles, applications, advantages, and limitations. Enhance your analysis by incorporating diagrams to visually represent the functionality of each pump type and its suitability for different irrigation scenarios5	CO3-Ana	(16)
17.	(a)	Contrast the functions and applications of check, butterfly, and solenoid valves, emphasizing their unique characteristics and suitability for diverse agricultural engineering contexts.	CO 1-U	(16)
		Or		
	(b)	Examine the selection criteria, repair procedures, and maintenance strategies for valves in agricultural systems, detailing the factors influencing valve choice, and preventative maintenance measures to ensure optimal performance and longevity.	CO 1-U	(16)
18.	(a)	Explain the various types of micro-irrigation systems, including drip irrigation and sprinkler irrigation, detailing their respective operational mechanisms. discuss the merits and demerits associated with each type and provide comprehensive insights into the functionality and practical implications of micro-irrigation systems.	CO 1-U	(16)
		Or		
	(b)	Describe the diverse equipment and methods available for fertilizer injection in micro-irrigation systems. Include illustrations to demonstrate the functionality	CO 1-U	(16)
19.	(a)	Outline the standard procedure for evaluating the performance of a drip irrigation system along with the merits and demerits of Drip Irrigation System.	CO 1-U	(16)
		Or		
	(b)	Describe the essential factors for fixing, positioning, installing, and operating a drip irrigation system.	CO 1-U	(16)

20. (a) In a visionary role as a forward-thinking agricultural engineer, design a futuristic sprinkler irrigation system. Interpret the general rules for sprinkler system design and Organise the merits and demerits of Sprinkler Irrigation system in a form of comprehensive mindmap. CO3-Ana (16)

Or

(b) As a future agricultural engineer, delve into the realm of Horsepower. Define Horsepower and classify its types. Following this, address a practical scenario: you encounter a situation where you need to determine the Horsepower required for a pump. The given parameters are the discharge Q and the total head H. Analyze the steps you would take to calculate the Horsepower needed for optimal pump selection. Consider an agricultural scenario where you need to select a pump for a field. The discharge (Q) is 200 liters per second, and the total head (H) is 30 meters. Calculate the Horsepower required for the pump, taking into account the efficiency of the system. Justify your calculations and explain how the derived Horsepower value influences your choice of a suitable pump for the given agricultural application. CO3-Ana (16)