Reg. No:

Question Paper Code: U5A01

B.E./B.Tech. DEGREE EXAMINATION, NOV 2025

Fifth Semester

Agricultural Engineering

21UAG501-IRRIGATION AND DRAINAGE ENGINEERING

(Regulations 2021)

Duration: Three hours   Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. What is the gross command area (ha) if the cultural command area is 200 ha   CO2 -App
    and the rest of the area is under barren land, alkaline soil, local ponds, villages
    and roads which is 800 ha?

    (a) 200   (b) 600   (c) 1000   (d) 800

2. A reservoir with live storage of 400 million cubic meters of water is   CO2 -App
    available to irrigate an area of 40,000 hectares with 2 filllings in a
    year if the crop season is 125 days.The duty is ------ hectares/cumec

    (a) 440   (b) 540   (c) 940   (d) 1040

3. Which of the following method of applying water may be used on rolling   CO1 -U
    land?

    (a) Boarder flooding   (b) check flooding   (c) furrow flooding   (d) free flooding

4. An irrigation channel designed by lacey's theory has a mean velocity   CO2 -App
    of 1.5m/s. the silt factor is unity. The hydraulic mean radius will be

    (a) 2.5m   (b) 1.52m   (c) 5.625m   (d) 6.25m

5. Bhakra dam of our country is located in the state of   CO1 -U

    (a) Punjab   (b) Himachal Pradesh   (c) Uttar Pradesh   (d) Madhya Pradesh

6. The only arch dam of our country is idduki dam across periyar river in Kerala   CO1 -U
    state, whose height is

    (a) 81m   (b) 143m   (c) 149m   (d) 169m

7. Canals taken off from ice-fed perennial rivers, are known   CO1 -U

    (a) permanent canals   (b) Rigid canals   (c) perennial canals   (d) Inundation canals

8. The most appropriate and economical cross drainage work at the above site will be　　　　CO1 -U

(a) an aqueduct　　　(b) a super passage　　(c) a syphon aqueduct　　(d) a siphon

9. A tile drainage system draining 8 ha flows at a design capacity for two days in response to a storm. If the system is designed using a drainage coefficient of 0.75 cm/day, the amount of water removed from the drainage area during two days is (in m3)　　　　CO2 -App

(a) 3000m^3　　　　(b) 1200 m^3　　　　(c) 600 m^3　　　　(d) 2200 m^3

10. Darcy's law is strictly valid when Reynolds number (Re) is less than----　　　　CO1 -U

(a) 1　　　　　　(b) 15　　　　　　(c) 20　　　　　　(d) 25

PART – B (5 x 2= 10 Marks)

11. Find the delta for a crop when its duty is 864 hectares/cumec on the field. The base period of this crop is 120 days.　　CO2-App

12. Classify types of dams and list the comparative merits and demerits of various types of dams.　　CO1 -U

13. Discuss how a spillway differs from a sluice?　　　　　　　　CO1 -U

14. Why canal lining provided?　　　　　　　　　　　　　　CO1 -U

15. What are the difference between surface and subsurface drainage system?　　CO1 -U

PART – C (5 x 16= 80 Marks)

16. (a) An irrigation canal has gross commanded area of 80,000 hectares out of which 85% is culturable irrigable. The intensity of irrigation for Kharif season is 30% and for Rabi season is 60%. Find the discharge required at the head of canal if the duty at its head is 80 hectares/cumec for Kharif season and 1700 hectares/cumec for Rabi season.　　CO2-App　(16)

Or

(b) A stream of 135 litres per second was diverted from a canal and 100litres per second were delivered to the field. An area of 1.6 hectares was irrigated in 8 hours. The effective depth of root zone was 1.8 m. the runoff loss in the field was 432 cu.m. The depth of water penetration varied linearly from 1.8 m at the head end of the field to 1.2 m at the tail end. Available moisture holding capacity of the soil is 20 cm per meter depth of soil. Determine the water conveyance efficiency, water application efficiency, water storage efficiency and water distribution efficiency. Irrigation was started at a moisture extraction level of 50 percent of the available moisture.　　CO2-App　(16)

2

17. (a) Briefly describe and discuss the various methods of Lining canals. Give a cross section of lined canal.   CO1-U   (16)

Or

(b) Explain in detail about sprinkler method of irrigation and how far it is Suitable in Indian conditions.   CO1-U   (16)

18. (a) What are the types of weirs and Explain various components of weir?   CO1-U   (16)

Or

(b) Categorize the various types of spillways and types of gates used in Spillways.   CO1-U   (16)

19. (a) Design an irrigation Channel in alluvial soil from data using Laceys theory: Discharge = 15 cumec ; Laceys silt factor = 1.0; Side slope = ½:1   CO2-App   (16)

Or

(b) Design an irrigation channel for the following data using Kennedys theory:Full Supply Discharge = 14.16 cumec, Slope ,S = 1/5000, Kuttersrugosity coefficient, N=0.0225,Critical Velocity ratio , m=1,Side slope Z= 1/2.   CO2-App   (16)

20. (a) Explain in detail about different types of tile drainage system.   CO1-U   (16)

Or

(b) Explain in detail about different types of pipe materials used in agriculture drainage.   CO1-U   (16)