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

Question Paper Code : 40312

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Sixth Semester

Civil Engineering

CE 8603 – IRRIGATION ENGINEERING

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. If wheat requires about 7.5 cm of water after every 28 days and the base period for wheat is 140 days , find out the value of delta for wheat.

2. List the different types of irrigation systems.

3. Illustrate different components of direct canal irrigation system.

4. Determine the water requirements per sq. m per row of the crop having pan evaporation of the region as 8 mm/day with crop coefficient as 0.7 and 50% area is covered by foliage.

5. Differentiate between weir and barrage.

6. Write the difference forces acting on gravity dam.

7. Mention the different cross drainage works.

8. Enlist different canal alignments and explain one in brief.

9. What are the different on farm development structures needed to be constructed on the field channel?

10. What are different indicators used for performance evaluation of canal irrigation systems?

PART B — (5 × 13 = 65 marks)

11. (a) What is evaportranspiration? Enlist and explain experimental methods of estimation of evapotransiration (13)

Or

(b) The gross commanded area for a distributary is 6000 ha, 80% of which is culturable irrigable. The intensity of irrigation for rubi season is 50% and that for *Kharif* season is 25% . If the average duty at the head of the distributary is 2000 ha/cumec for *rabi* season and 900 ha/cume for *kharif* season , find out the discharge required at the head of distributary from averaga demand considerations.

12. (a) Design a drip irrigation system for 1 ha fruit crop using following data:

(i) Type of crop = sapota

(ii) Spacing 6 m × 6 m

(iii) Size of land = 1 ha (100 m × 100m), assume square plot

(iv) Type of soil = medium black

(v) Land slope 0.2 per cent (North to south)

(vi) Maximum evaporation = 10 mm/day

(vii) Water source = well at the corner for the field

(viii) Static head = 12 m

(ix) Wetted area of citrus = 25 percent

(x) Age of orchard 5 years

(xi) Assume crop factor = 0.7

(xii) Hazen–William constant = 150 for PVC pipe and 140 for LDPE pipes.

Or

(b) Determine the uniformity coefficient from the following data obtained from a field test on a square plot bounded by four sprinklers:

Sprinkler: 4.365 × 2.381 mm nozzles at 2.8 kg/cm^2

Spacing: 24 m × 24 m

Wind: 3.5 km/hr from south-west

Humidity: 42 per cent

Time of test: 1 hour

S	8.9	7.6	6.6	S
8.1	7.6	9.9	10.2	8.3
8.9	9.1	9.1	9.4	8.9
9.4	7.9	9.1	8.6	9.1
S	7.9	6.6	6.8	S

13. (a) What are different galleries present in the dam? Describe them with their functions.

Or

(b) Illustrate the different types of earthen dams based on the use of construction method.

14. (a) Design an irrigation channel to carry 40 cumecs of discharge, with B/D, that is base width to depth ratio as 2.5. The critical velocity ratio is 1.0. Assume a suitable value of Kutter's rugosity coefficient and use Kennedy's method.

Or

(b) Design a lined channel to carry a discharge of 15 cumecs. The available and accepted country slope is 1 in 9000. Assume side slopes of the channel be 1.25H: IV and Manning's rugosity coefficient be 0.015 for good brick work.

15. (a) State the main objectives and necessity of participatory irrigation management (PIM).

Or

(b) What are different on farm development (OFD) works? Describe the general approach to design and execute on farm development works.

PART C — (1 × 15 = 15 marks)

16. (a) Design a regime channel for a discharge of 50 cumecs and silt factor 1.1 using Laceys theory.

Or

(b) A stream of 120 litres per second was diverted from a canal and 100 litres 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 1.7 m. The runoff loss in the field was 420 m^3. The depth of water penetration varied linearly from 1.7 in at the head end of the field to 1.1 m at the tail end. Available moisture holding capacity of the soil is 20 cm per metre depth of soil. It is required to determine the water conveyance efficiency, water application efficiency, water storage efficiency and water distribution efficiency. Irrigation was started at moisture extraction level of 50% of the available moisture.

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