

Reg. No. :

Question Paper Code : 20336

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

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. $5\text{m}^3/\text{s}$ of water is pumped into a farm distribution system. $4.2\text{ m}^3/\text{s}$ is delivered to a turn-out, 0.9 km from the well. Compute the conveyance efficiency.
2. Find the delta for rice, when its duty is 2580 hectares/ m^3/s on the field. Assume the base period of the crop as 120 days.
3. When will we adopt sprinkler irrigation in the field?
4. Enlist any two merits and demerits of basin flooding in irrigation.
5. Enumerate any four types of crest gates used in spillway structures.
6. Write down the importance of divided wall placed in weir.
7. What is the purpose of berms provided in a canal?
8. State the drawbacks of Kennedy's theory.
9. Write the need for optimisation of water use.
10. What is the significance of water user association?

PART B — (5 × 13 = 65 marks)

11. (a) The gross commanded area for a distributary is 18750 hectares, where 80% is culturable irrigable area. The intensity of irrigation for Rabi is 40% and for Kharif season is 15%. If the total water requirement of 2 crops is 37.5 cm and 120 cm and the periods of the growth are 160 days and 140 days respectively. (i) Determine the outlet discharge from average demand considerations. (ii) Also determine the peak demand discharge, assuming that Kor water depth for 2 crops are 13.5 cm and 19 cm, and their Kor periods are 4 weeks and 2 weeks respectively.

Or

- (b) A stream of 265 litres/sec of water is delivered from a canal and 180 litres/sec is delivered to the field. An area of 3.8 hectares was irrigated in 16 hours. The effective depth of the root zone is 1.6 m. The runoff loss in the field was 380 m³/s. The depth of water penetration is measured at various points. The observed values are 0.8 m, 0.9 m, 0.6 m, 0.75 m, 0.85 m and 1.1 m respectively from the head end. The available moisture holding capacity of the soil is 25 cm/m depth of soil. Irrigation was started at a moisture extraction level of 35% of the available moisture. Determine the water conveyance efficiency, water application efficiency, Water Storage efficiency and water distribution efficiency.

12. (a) Explain in detail about the drip irrigation method, efficiency, suitability, merits and demerits with a neat sketch.

Or

- (b) Explain in detail about the furrow irrigation techniques with a neat sketch.

13. (a) Write a detailed note about the preliminary investigations that are to be carried out for the site selection of dam. Discuss the case study of any dam in India.

Or

- (b) Discuss in detail about the types of spillways. Explain the working principle of shaft spillway with neat sketches.

14. (a) Design an irrigation channel on Kennedy's Theory to carry a discharge of 45 m³/s. Take $N = 0.0225$ and $m = 1.05$. The channel has a bed slope of 1 in 5000. Assume Trial Depth = 2m; Trapezoidal section side slope = 0.5:1.

Or

- (b) Design an irrigation channel in alluvial soil according to Lacey's silt theory, given the following data.

Full supply discharge = 15 m³/s

Lacey's silt factor = 1

Channel side slopes = 0.5: 1

15. (a) How will you minimize the water losses in an existing irrigation water distribution system? Explain.

Or

- (b) Describe in detail about the participatory irrigation management in India.

PART C — (1 × 15 = 15 marks)

16. (a) Explain with a case study about the various types of river training works implemented in Narmada River and its streams.

Or

- (b) Public work department has planned to construct a new branch canal in a Cauvery river. Explain in detail about the regulatory works which is needed in this situation.