

B.Tech. Civil (Water Resources Engineering)

Term-End Examination

December, 2017

00577

ET-533(A) : IRRIGATION ENGINEERING

Time : 3 hours

Maximum Marks : 70

Note : *Attempt any five questions. All questions carry equal marks. Choose suitable data, if not given. Use of non-programmable scientific calculator is permitted.*

1. A stream of 130 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 cu.m. The depth of water penetration varied linearly from 1.7 m at the head end of the field to 1.1 m at the tail end. Available moisture holding capacity at 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 a moisture extraction level of 50% of available moisture.

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2. (a) Explain the general design aspects of turbine pumps and also discuss specific speed as well as performance curve. 7
- (b) Discuss the direct method and cascade method to supply irrigation water to check basin. Also discuss the limitations of check basin method of irrigation. 7
3. (a) Describe Drip Irrigation method. Also discuss the advantages and disadvantages of this method. 7
- (b) Under what conditions are centrifugal and turbine pumps used in irrigation? 7
4. (a) Why is land grading needed? What aspects are considered in land grading design? 7
- (b) Explain the procedure of gravel pack design for a tubewell. 7
5. (a) What is Sediment? How is sediment transported? What are Dunes and Antinodes? 7
- (b) The depths of penetrations along the length of a border strip at points 30 metres apart were probed. Their observed values are 2.0, 1.9, 1.8, 1.6 and 1.5 metres. Compute the water distribution efficiency. 7

6. (a) What is meant by Canal Lining and what are its advantages ? Enumerate the different types of canal linings and discuss the design and construction features of concrete linings. 10
- (b) Distinguish between the functioning of a turbine pump and a centrifugal pump. 4
7. Explain any *seven* of the following : 14
- (a) Field Capacity
 - (b) Drainage Coefficient
 - (c) Infiltration
 - (d) Adverse Effects of Waterlogging
 - (e) Water Allocation Method
 - (f) Sustainable Development
 - (g) Contour Bunding
 - (h) Radial Flow Pump
 - (i) Evapotranspiration
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