

7E4032

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**B.Tech. (Sem.VII) (Main/Back) Examination- Dec. 2012**  
**Civil Engineering**  
**7CE2 Water Resources Engineering - I**

Time : 3 Hours

Total Marks : 80  
Min. Passing Marks : 24

**Instructions to Candidates :**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

**UNIT - I**

- 1. (a) Discuss the present status of irrigation in India. Suggest for the optimum utilization of water in irrigation. (8)
- (b) Define field capacity and permanent wilting point. The root zone of a crop in a certain soil has a field capacity of 40% and permanent wilting point of 12%, determine the depth of moisture in the root zone per metre at the field capacity and at the permanent wilting point. Also find the available depth of water if the root zone depth in 1.3 m. Take the dry unit weight of soil as 15kN/m<sup>2</sup>. (8)

OR

- 1. (a) What is the necessity of water harvesting? Describe the various water harvesting technologies used in the fields. (8)
- (b) Establish a relationship between duty base period and delta. Discuss the factors affecting duty. (8)

**UNIT - II**

- 2. (a) Discuss the factors affecting canal alignment. (8)
- (b) Design an irrigation channel by Kennedy's theory to carry a discharge of 1 cumecs. Take  $N = 0.0225$ ,  $m = 1$  and  $S = 1$  in 4000. (8)

OR

- 2. (a) Describe the Lacey's Regime Theory. Write down the Lacey's derived equations for various components of channel design. (8)
- (b) Discuss the command area development. Also describe the rotational delivery system. (8)

**UNIT - III**

- 3. (a) Discuss various types of outlets. Also describe the criteria for selection of outlet capacity. (8)
- (b) Describe bed load and suspended load. Describe the estimation of suspended load by stream sampling. (8)

OR

- 3. (a) Define flexibility, setting, proportionality, sensitivity and efficiency in terms of canal outlets. Design a non-modular pipe outlet for the following conditions :
  - (i) Discharge through the outlet = 0.02 cumecs
  - (ii) Length of outlet = 15 m
  - (iii) F.S.L. of the distributary = 200.00
  - (iv) Available working head = 6 cm
  - (v) Coefficient of discharge = 0.51
 (8)
- (b) Discuss the various stage of a river what are the general features of meandering. (8)

**UNIT - IV**

- 4. (a) Design a lined canal to carry a discharge of 50 cumecs. Assume bed slopes as 1 in 8000,  $N$  as 0.015 and side slope as 45°. (8)
- (b) Describe the various causes of water logging and its ill effects. (8)

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OR

4. (a) Discuss the various types of lining of canals and the relative merit of the each method. (8)  
(b) Describe the various types of tube wells, with neat sketches. (8)

UNIT - V

5. (a) Sketch and explain the hydrological cycle. (8)  
(b) Describe Hydrograph and its different segments. What are the different methods of base flow separation ? (8)

OR

5. (a) Describe the theory of unit hydrograph: Explain the method of derivation of a unit hydrograph from an isolated storm hydrograph. (8)  
(b) Discuss the factors affecting runoff. Also describe the Rational method of determination of runoff. (8)

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