Code: R7310104

R7

B.Tech III Year I Semester (R07) Supplementary Examinations, May 2013
WATER RESOURCES ENGINEERING
(Civil Engineering)

Time: 3 hours   Max Marks: 80

Answer any FIVE questions
All questions carry equal marks
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1 (a) Explain weighing bucket rain gauge with neat sketch.
   (b) Give the advantages and disadvantages of recording rain-gauges.

2   Explain water balance and energy balance methods of evaporation measurement.

3   From the topographical map of a drainage basin the following quantities are measured. A = 3480 km^2, L = 148 km and L_c = 74 km. The 12h unit hydrograph derived for the basin has a peak ordinate of 155 m^3/sec occurring at 40h. Find the coefficients C_t and C_p for the synthetic unit hydrograph of the basin.

4 (a) Explain the principle of discharge measurement in the electromagnetic induction and ultrasonic method
   (b) How are the discharges adjusted when they are measured under unsteady flow conditions?

5 (a) For conducting permeability tests in a well penetrating an unconfined aquifer, two observation well A and B are located at distances 15 and 30 m respectively from the centre of the well. When the well is pumped at a rate of 5 lps, it is observed that the elevations of the water table above the impervious layer, up to which the well extends are 12.0 and 12.5 respectively and A and B. Calculate the permeability of the aquifer in m/day.
   (b) A 4.5 m diameter open well has a discharge of 30.0 m^3/h with a drawdown of 2.0 m.
        Estimate the:
        (i) Specific capacity per unit well area of the aquifer and
        (ii) Discharge from a 5.0 m open well in this aquifer under a depression head of 2.5 m.

6 (a) What are the different types of irrigation systems? Discuss each of these systems briefly.
   (b) Describe layout of fields, irrigation and drainage systems.

7 (a) Describe with the help of sketch various forms of soil moisture. Which of these soil moistures is mainly available for utilization by the plants?
   (b) Find the field capacity of a soil for the following data:
        (i) Depth of root zone   = 2 m
        (ii) Existing water content   = 6%
        (iii) Dry density of soil   = 1400 kg/ m^3
        (iv) Water applied to soil   = 500 m^3
        (v) Water lost due to evaporation and deep percolation = 10 %
        (vi) Area of land irrigated   = 1000 m^2

8   Derive an expression for the silt transporting capacity of a channel according to Kennedy's theory. Describe Lacey's theory for the design of irrigation channel in alluvial soil.
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