

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

- 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. $A = 3480 \text{ km}^2$, $L = 148 \text{ km}$ and $L_c = 74 \text{ km}$. The 12h unit hydrograph derived for the basin has a peak ordinate of $155 \text{ m}^3/\text{sec}$ 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 methods.
(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 wells 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 at A and B. Calculate the permeability of the aquifer in m/day.
(b) A 4.5 m diameter open well has a discharge of $30.0 \text{ m}^3/\text{h}$ 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.
