

Code: CE5T3

III B.Tech - I Semester – Regular Examinations - November 2014

WATER RESOURCES ENGINEERING - I
(CIVIL ENGINEERING)

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Explain the scope of hydrology and its applications in water resources development programmes. 7 M

b.) The isohyets drawn for a storm which occurred over a drainage basin of area 975 km^2 yielded the following information. Determine the mean depth of rainfall over the basin: 7 M

Isohyets Interval (mm)	95-85	85-75	75-65	65-55	55-45
Area between Isohyets (km^2)	135	246	274	185	160

2. a) What is run-off? What are the factors that affect the run-off from a catchment area? 7 M

b) A storm with a uniform intensity of 1.6 cm/hr for a period of 8 hours occurring over a basin of area 650 km^2 produced a run-off estimated to be 57.2 million m^3 . Find the average infiltration rate during the storm. 7 M

3. a) What do you understand by unit hydrograph? How is it derived? 7 M

b.) The ordinates of a 4 h U.H. of a basin area 295 km^2 measured at 4 h intervals are 54.0, 68.6, 43.2, 22.0, 10.7, 4.8 and $1.4 \text{ m}^3/\text{s}$ respectively. Obtain the ordinates of 3 h U.H. and 5 h U.H of the basin using the S-curve method. 7 M

4. a) Explain the procedure of routing of given flood hydrograph through reservoir knowing elevation versus storage and elevation versus outflow curves of the reservoir. 7 M

b) For a river valley project, the following results were obtained from flood frequency analysis using Gumbel's method: 7 M

Return period T (Years)	Peak flood (m^3/s)
40	27000
80	31000

Estimate the flood magnitude with a return period of 240 years. 7 M

5. a) Derive an expression for steady state discharge of well fully penetrating into a confined aquifer. 7 M

b.) In an Artesian aquifer of 8 mm thick, a 10 cm diameter well is pumped at a constant rate of $100 \text{ lit}/\text{min}$. The steady state drawn down observed in two wells located are 10 m and 50 m distances from centre of wells are 3 m and 0.05 m respectively. Compute the transmissivity and hydraulic conductivity of aquifer. 7 M

6. a) With the help of sketch, describe the various methods of irrigation applicable to crops. 7 M
- b) Define irrigation; explain the importance and development of irrigation in our country. 7 M
7. a) Describe with the help of diagram various forms of soil moisture and explain how frequency of irrigation is computed. 7 M
- b) Explain various irrigation efficiencies uses and state their appropriate values in the Indian context. 7 M
8. a) Design an irrigation channel using Kennedy's theory to carry a discharge of $9 \text{ m}^3/\text{s}$ of water. Assume Manning's 'n' as equal to 0.0225 and bed slope as 1 in 5000. 7 M
- b) Explain in brief the various classifications of channels. 7 M