

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. Sem. - V - Examination – June- 2011****Subject code: 150602****Subject Name: Hydrology and Water Resources Engineering****Date: 22/06/2011****Time: 10:30 am – 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** What are the various causes for the reservoir sedimentation? **07**
How would you reduce the rate of sedimentation?
- (b)** What are the principal components of a hydro-electric scheme? Discuss the utility of each component. **07**

- Q.2 (a)** Discuss the use of levees and flood walls for the flood control. What are their relative advantages and disadvantages? **07**
- (b)** How would you estimate the design flood for a flood control project? Explain in briefly. **07**

OR

- (b)** What are the various causes of floods? **07**
- Q.3 (a)** What is Darcy's Law? What are its limitations? How will you measure the coefficient of permeability of soil? **07**
- (b)** The ordinates of 3 hour unit hydrograph are given below: **07**

Time in hour	0	3	6	9	12	15	18	21	24	27	30
ordinates cum/sec	0	10	25	20	16	12	9	7	5	3	0

Find the ordinates of a 6 hour unit hydrograph for the same basin analytically. Also sketch this unit hydrograph. What is the peak value of discharge in this unit hydrograph.

OR

- Q.3 (a)** What is unit hydrograph? What are the basic proposition of the unit hydrograph theory? What are the limitations of the unit hydrograph theory? **07**
- (b)** A catchment area of 30 Sq.km. has one recording gauge. During a storm, the following mass curve of rainfall was recorded: **07**

Time from start of storm(h)	0	2	4	6	8	10	12	14
Accumulated rainfall (mm)	0	6	17	57	70	81	87	90

If the volume of runoff due to the storm measured is $1.2 \times 10^6 \text{ m}^3$, estimate the ϕ index of the catchment.

- Q.4 (a)** What is the hydrological cycle? Give a brief description of different components of a hydrologic cycle. **07**
- (b)** Explain the terms : **07**
- i. ϕ index
 - ii. W index
 - iii. W_{\min} index

OR

- Q.4 (a)** What is transpiration? What are the various factors that affect transpiration? How would you measure transpiration? What is transpiration ratio? **07**
- (b)** Differentiate between the infiltration capacity and the infiltration index. How would you measure the infiltration capacity? **07**

- Q.5 (a)** Discuss briefly the various steps involved in planning of water resources projects. **07**
- (b)** Discuss the environment impact of multi purpose water resources projects. **07**

OR

- Q.5 (a)** What is meant by water harvesting? Describe in brief, the rain water harvesting designed for agricultural use, with advantages and disadvantages. **07**
- (b)** What are the causes of drought? What measures you will suggest for the water conservation and augmentation? **07**
