Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

P.D.D.C Sem-III Examination May 2011

Subject code: X30601

Subject Name: Hydrology & Water Resources Engineering

Date:18/05/2011 **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 is hydrology? Explain the hydrology cycle with neat sketch. **07**

(b) Define the following terms: **07**

(i) Evaporation (ii) Depth of runoff (iii) Infiltration (iv) Hyetograph

(v) Base flow (vi) Design flood (vii) Basin

Q.2 **(a)** Explain with neat sketch the Thiessen polygon method of computing average rainfall over a catchment. **07**

(b) Determine the optimum number of rain gauges in a catchment area from the following data: **07**

(i)Number of existing rain gauges=8

(ii) Mean annual rainfall at the gauges

= 1000, 950, 900, 850, 800, 700, 600, and 400 mm

(iii) Permissible error=6%

OR

(b) What is evaporation? Discuss the various methods of measurement of evaporation **07**

Q.3 **(a)** Define the term 'runoff'. Describe the various factors affecting runoff **07**

(b) For a storm of 2-hour durations, the rainfall rate are as follows: **07**

Time period (minutes)	20	20	20	20	20	20
Rainfall rate (cm/hr)	2.5	2.5	10.0	7.5	5.1	1.25

If Ø-index is 3-cm/hr, estimate the surface runoff.

Also determine w-index.

OR

Q.3 **(a)** What is flood? What are the causes of floods? **07**

Discuss the various methods of flood controls.

(b) Explain the chance flood. **07**

What return period you would adopt in the design of a culvert on a drain if you are allowed to accept only 5% risk of flooding in the 25 years of expected life of the culvert?

Q.4 **(a)** What is hydrograph? Draw neat sketch of a storm hydrograph and explain its components. **07**

(b) What is unit hydrograph? **07**

The ordinates of a 3-hr. unit hydrograph are given bellow: Find out the ordinates of a 6-hr. unit hydrograph for the same basin.

Time (hr.)	0	3	6	9	12	15	18	21	24	27	30
O.U.H. of 3hr (cumecs)	0	10	25	20	16	12	9	7	5	3	0

OR

Q.4 **(a)** Discuss the surface and subsurface investigation of ground water. **07**

(b) Write short notes on: **07**

(i)Flood routing (ii) Flood forecasting and warning.

Q.5 **(a)** What is unit hydrograph? Which assumptions are made in unit hydrograph theory? Explain the method to find out the ordinates of unit hydrograph from the ordinates of a storm hydrograph. **07**

(b) The following are ordinates of 4-hr. unit hydrograph. Determine ordinates of a 12-hr. unit hydrograph for the catchment by s-curve method. **07**

Time (hr.)	0	4	8	12	16	20	24	28	32	36	40
O.U.H. of 4hr (cumecs)	0	40	90	100	130	80	70	50	30	10	0

OR

Q.5 **(a)** Discuss the applications of hydrology in practice **07**

(b) Explain with neat sketch the Symon's rain gauge. **07**

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