Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–V • EXAMINATION – WINTER • 2014

Subject Code: 150602   **Date: 28-11-2014**
Subject Name: Hydrology and Water Resources Engineering
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)**	Discuss various causes of drought.	**07**
	(b)	Discuss water resources planning and its objectives.	**07**
Q.2	**(a)**	Explain the methods of estimating flood.	**07**
	(b)	Describe the flood routing with neat sketch.	**07**

OR

	(b)	Differentiate between followings. (i) Flood proofing and Flood forecasting (ii) Flood walls and Flood ways.	**07**
Q.3	**(a)**	Describe the process of the hydrological cycle with a neat sketch.	**07**
	(b)	In a watershed, the average annual precipitation for four sub-basins was recorded as follows: 100.84,112.27,84.84 & 73.406 cm. the areas of the sub-basins were : 93264.3, 71243.5, 108808.2 & 168393.8 ha., calculate the average precipitation of the total watershed using the Thiessen method.	**07**

OR

Q.3	**(a)**	Discuss the various methods used to measure rate of evaporation from a reservoir.	**07**
	(b)	The excess rainfall (direct runoff) produced from a 10.0 cm rainfall of a storm is 6.0 cm. the rainfall at each hour of the storm recorded by a rain gauge is as under. Calculate the infiltration index of the storm.	**07**

Time (h)	1	2	3	4	5	6	7	8
Incremental rainfall (cm)	0.1	1.0	1.4	2.6	2.0	1.5	1.0	0.4

Q.4	**(a)**	What is drainage basin? Discuss various characteristics of drainage basin.	**07**
	(b)	The ordinates of a 4 h UH of a basin of area 300 km^2 measured at 1 h intervals are 6,36,66,91,106,93,79,68,58,49,41,34,27,23,17,13,9,6,3 and 1.5 m^3/s respectively. Obtain the ordinates of a 3 h UH for the basin using the S-curve technique.	**07**

OR

Q.4	**(a)**	Discuss types of aquifers with neat sketches.	**07**
	(b)	The direct runoff hydrograph resulting from a 5.0 cm effective rainfall of 6 h duration is given below. Determine the area of the catchment and the ordinates of the 6 h Unit hydrograph.	**07**

Time (h)	0	6	12	18	24	30	36	42	48	54	60	66	72
Direct runoff (m^3/s)	0	25	175	320	360	310	230	165	105	60	30	10	0

Q.5	**(a)**	Describe briefly the various types of reservoirs and also differentiate between single and multipurpose reservoirs.	**07**
	(b)	Discuss various classifications of hydropower plants.	**07**

OR

Q.5	**(a)**	Explain the terms : density current, Normal pool level, Dead storage, reservoir yield.	**07**
	(b)	Write short notes on : Surge tank, Penstocks	**07**

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