Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER • 2014

Subject Code: 150602 Date: 13-06-2014

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)** Explain the various methods of determining average rainfall over a catchment due to storm. Discuss relative merits and demerits of each. **07**

(b) Define unit hydrograph. Describe the procedure of deriving a unit hydrograph from a given flood hydrograph. **07**

Q.2 **(a)** Explain the following terms **07**
(1) Precipitation (2) Infiltration capacity (3) Evapo-transpiration (4) Infiltration rate (5) Hydrograph (6) Floods (7) Drought

(b) Describe in detail the factors affecting infiltration. **07**

OR

(b) A storm with 11cm precipitation produces a direct surface runoff of 6.2 cm. The time distribution of the storm is given in the following table. **07**

Time from start in hour	1	2	3	4	5	6	7	8
Incremental rainfall in each hour in cm	0.5	1.0	1.8	2.6	2.0	1.5	1.2	0.4

Compute the Φ – index of the storm.

Q.3 **(a)** Define runoff, sub-surface runoff and direct runoff. Explain the factors affecting runoff. **07**

(b) The ordinates of flood hydrograph from a 4 hour rainfall are given below. Derive the ordinates of 4 hour unit hydrograph for a catchment area of 640 km^2. **07**

Time (hours)	0	4	8	12	16	20	24	28	32	36	40
Discharge m3/s	30	68	205	410	330	254	195	133	95	58	30

OR

Q.3 **(a)** Define the following in relation to aquifer **07**
(1) Confined aquifer (2) Unconfined aquifer (3) Aquiclude (4) Aquifuge (5) Transmissibility (6) Storage coefficient (7) Specific yield

(b) A 30 cm diameter well completely penetrates a confined aquifer of permeability 45 m/day. The length of strainers is 20 m. Under steady state of pumping, the drawdown at the well was found to be 3.0 m and radius of influence was 300 m. Calculate the discharge. **07**

Q.4 **(a)** Write a note on **07**
(1) Rational formula for flood estimation (2) Flood forecasting and warning

(b) Explain various causes of flood and their preventive measures. **07**

OR

Q.4	**(a)**	Explain the procedure to determine the reservoir capacity using mass curve.	**07**
	(b)	Describe in brief (1) Reservoir sedimentation (2) Components of power house	**07**
Q.5	**(a)**	Write a note on (1) Causes of drought (2) Water conservation	**07**
	(b)	Explain various methods of water harvesting.	**07**
		OR	
Q.5	**(a)**	Explain flood frequency analysis.	**07**
	(b)	Explain functional requirements of water resources projects.	**07**

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