Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–III • EXAMINATION – WINTER • 2014

Subject Code: X30601 **Date: 24-12-2014**

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)** What is hydrology? Explain the hydrology cycle with neat sketch. **07**

(b) Define precipitation. Enlist types of precipitation and describe any one type in brief. **07**

Q.2 **(a)** What are the instruments used to measure precipitation? Explain any one in detail. **07**

(b) What is unit hydrograph? Which assumptions are made in unit hydrograph theory? **07**

OR

(b) Explain factors affecting run-off. **07**

Q.3 **(a)** What is evaporation and evapotranspiration? Discuss factors affecting them. **07**

(b) What is infiltration? Explain factors affecting infiltration. **07**

OR

Q.3 **(a)** Define aquifer. Enlist its different types and explain any one in detail. **07**

(b) Enlist different properties of an aquifer and discuss any two in detail. **07**

Q.4 **(a)** Define flood. What are the causes of flood? Enlist the methods of estimating flood. **07**

(b) Describe any one method of flood estimation in detail. **07**

OR

Q.4 **(a)** The isohyets for annual rainfall over a catchment basin were drawn. The areas of strips between the isohyets are indicated below. Find the average depth of annual precipitation over the basin. **07**

Isohyets (cm)	Area in km^2	Isohyets (cm)	Area in km^2
75-85	580	105-115	1000
85-95	2960	115-135	610
95-105	2850	135-155	160

(b) Write a brief note on Depth-Area-Duration relationship. **07**

Q.5 **(a)** Explain flood control by (i) construction of flood control reservoir (ii) construction of levees. Explain the interdependence between the two measures. **07**

(b) The following are the rates of rainfall for successive 20 minutes period of a 140 minutes storm: 2.5,2.5, 10.0, 7.5, 1.25, 1.25, 5.0 cm/hr. taking the value of ϕ_{index} as 3.2 cm/hr, find out the net runoff in cm, the total rainfall and the value of W_{index}. **07**

OR

Q.5 The isohyetal map for 24 hr storm gave the areas enclosed between different isohyets, as follows: **14**

Isohyets in mm	21	20	19	18	17	16	15	14	13	12
Enclosed area in km^2	543	1345	2030	2545	2955	3280	3535	3710	3880	3915

Determine the average depth of rainfall over the basin.

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