Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–III EXAMINATION – WINTER 2015

Subject Code:X30601 **Date:18/12/2015**

Subject Name: Hydrology and Water Resources Engineering

Time: 10:30pm to 01:00pm **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)** Describe the hydrological cycle with neat sketch. Explain briefly human interference in various parts of this cycle. **07**

(b) What factors should be considered in selecting a site for a stream gauging station. Describe briefly the procedure of using a current meter for measuring velocity in a stream. **07**

Q.2 **(a)** Describe the factors affecting evapotranspiration process. **07**

(b) For a drainage basin of 600 km^2, isohyetals drawn for a storm gave the following data. Estimate the average depth of precipitation over the catchment. **07**

Isohytels (Interval), cm	15-12	12-9	9-6	6-3	3-1
Inter-isohyetal area, km^2	92	128	120	175	85

OR

(b) The mass curve of an isolated storm in a 500 ha watershed is as follows: **07**

Time from start (h)	0	2	4	6	8	10	12	14	16	18
Cumulative rainfall (cm)	0	0.8	2.6	2.8	4.1	7.3	10.8	11.8	12.4	12.6

If the direct runoff produced by the storm is measured at the outlet of the watershed as 0.340 Mm^3, estimate the Ø-index of the storm and duration of rainfall excess.

Q.3 **(a)** Explain the procedure of using a unit hydrograph to develop the flood hydrograph due to a storm in a catchment. **07**

(b) Given below are the observed flows from a storm of 6-hr duration on a stream with a basin area of 320 sqkm. Assuming constant base flow of 20 cumecs, derive and plot a 6-hr unit hydrograph. **07**

Time (hr)	0	6	12	18	24	30	36	42	48	54	60
Discharge(cumec)	20	110	250	200	160	120	90	75	55	34	20

OR

Q.3 **(a)** What is S-curve hydrograph? How is it constructed and what is it used for? **07**

(b) The ordinates of a 6-h Unit Hydrograph are given below. If two storms, each of 1 cm rainfall excess and 6-h duration occurs in succession. Calculate the resulting hydrograph of flow. Assume base flow to be uniform at 10 m^3/s. **07**

Time (hr)	0	6	12	18	24	30	36	42	48	54	60	66
Ordinate UHG,m^3/s	0	20	60	150	120	90	66	50	32	20	10	0

Q.4 **(a)** Explain the rational method of computing the peak discharge of a small catchment. Where this method commonly used and what are its merits and demerits? **07**

(b) Distinguish between : **07**

(i) Hydraulic and hydrologic method of flood routing

(ii) Prism storage and wedge storage

OR

Q.4 **(a)** Explain briefly the following terms: **07**

(i) Design flood (ii) standard project flood

(ii) Probable maximum flood (iv) design storm

(b) What is Run-off ? What are the factors that affect the run-off from a Basin. **07**

Q.5 **(a)** Distinguish between : **07**

(i) Aquifer and Aquitard (ii) water table and piezometric surface

(b) Describe a procedure by using Jacob's method to calculate the aquifer parameters of confined aquifer by using the well pumping test data. **07**

OR

Q.5 **(a)** Explain any one simulation model. **07**

(b) Explain the following : **07**

(i) Flowing well (ii) Influent steams

(ii) Drawdown (iv) Radius of influence.

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