

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (Old) EXAMINATION – WINTER 2019****Subject Code: 150602****Date: 06/12/2019****Subject Name: Hydrology & Water Resources Engineering****Time: 10:30 AM TO 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)** Describe a S-Hydrograph. Write the assumptions and its advantages. **07**
(b) Explain working of Symons rain gauge with a neatly labelled sketch. **07**

- Q.2 (a)** Discuss in short: 1) Water Harvesting techniques 2) Meteorological Drought **07**
(b) For a storm of 3-hr duration, the rainfall rates are as follows: **07**

Time Period (minutes)	30	30	30	330	30	30
Rainfall Rate (cm/hr)	1.5	3.5	4.5	3.2	2.0	1.0

If the surface runoff is 3.5cm, determine the ϕ -index and W-index.

OR

- (b)** Explain potential evapotranspiration and the methods to measure it. **07**
- Q.3 (a)** Write a short note on Yield of a reservoir. Discuss the significance of useful life of a reservoir. **07**
(b) Write short notes on: i) Reservoir sedimentation ii) Spillways **07**

OR

- Q.3 (a)** Discuss the factors affecting the selection of site for a dam. **07**
(b) Discuss the classification of Hydro-Electric Power Plant with examples of each. **07**
- Q.4 (a)** Explain the division of sub-surface water with a neatly labeled sketch. **07**
(b) Find the ordinates of a storm hydrograph resulting from a 3 hrs storm with rainfalls of 2.7, 6.45 and 3.55 cm during subsequent 3 hours intervals. The ordinates of Unit Hydrograph are given below. Assume an initial loss of 5 mm, infiltration index 2.5mm/hr and base flow of 50 cumecs. **07**

Time (hrs)	03	06	09	12	15	18	21	24
Ordinates of UH (cumecs)	0	112	360	515	385	320	255	230
Time (hrs)	27	30	33	36	39	42	45	48
Ordinates of UH (cumecs)	175	130	90	65	40	25	15	0

OR

- Q.4 (a)** During a recuperation test, the water in an open well was depressed, by pumping by 2.6 metres and it recuperated 1.9 metres in 90 minutes. Find i) yield from a well of 5 m diameter under a depression head of 3 metres ii) the diameter of the well to yield 10 litres/sec under a depression head of 3 metres. **07**
(b) Define the following: 1) Aquifuge 2) specific capacity 3) Specific retention 4) porosity 5) Storage Coefficient 6) Drawdown 7) Vadose water **07**
- Q.5 (a)** Explain channel routing and discuss its application and suitability. **07**
(b) Discuss the various methods of flood estimation. Explain any one in detail. **07**

OR

- Q.5** (a) Discuss structural measures of flood control with suitable sketches. **07**
(b) On the basis of isopleth map, the 50 year 24 hr maximum rainfall at any place is found to be 18 cm, Determine the probability of 24 hr rainfall of magnitude equal to or greater than 18 cm occurring (a) at least once in 10 successive years, **07**
(b) two times in 10 successive years and (c) once in 10 successive years.

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