

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER- V (New) EXAMINATION – WINTER 2019****Subject Code: 2150602****Date: 02/12/2019****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.

MARKS

- Q.1** (a) Define: Drought, Evapotranspiration, Ground water. **03**
- (b) Enlist types of dams based on their function. Explain any one in brief. **04**
- (c) What is hydrological cycle? Give a brief discussion of different components of hydrological cycle with neat sketch. **07**
- Q.2** (a) Enlist the types of Precipitation. Explain any one with neat sketch in brief. **03**
- (b) Write short note on Levees and flood walls. **04**
- (c) The recording rain gauge was installed on a basin having catchment area of 40 km². The mass curve of rainfall is recorded during a storm is given below. If the volume of measured runoff due to storm is 1.35x10⁶m³, estimate w-index and Ø-index of the basin. Consider start of storm in hours and cumulative rainfall in mm. **07**

Time from start of storm	0	2	4	6	8	10	12	14	16
Cumulative rainfall	0	7	19	58	70	85	93	99	102

OR

- (c) Find out the ordinates of a storm hydrograph resulting from a 9 hr storm with rainfall of 2.0, 5.75 and 2.75 cm during subsequent 3-hr intervals. The ordinates of 3 hr UH at 3 hr interval are 0, 100, 355, 510, 380, 300, 260, 225, 165, 120, 85, 55, 30, 22, 10, 0 cumecs. Assume an initial loss of 0.5 cm, an infiltration index of 0.25cm/hr and a base flow of 10 cumecs. **07**
- Q.3** (a) Explain the terms with suitable example: Aquifuge, Aquiclude, Aquitard. **03**
- (b) A fully penetrating well of diameter 0.5m is drilled in a confined aquifer 2.5m thick. If a steady state draw downs at 12m and 50m are observed to be 2.50m and 0.6m. Determine the discharge. Take $k=1 \times 10^{-3}$ m/s. **04**
- (c) Discuss the various methods of determining the average depth of rainfall over a catchment. **07**

OR

- Q.3** (a) What is spillway? Explain function of spillway. **03**

- (b) What is Darcy's Law? How will you measure co-efficient of permeability of a soil? **04**
- (c) Give difference between: (I) Hyetograph and Direct runoff hydrograph, (II) Unit hydrograph and S-Hydrograph. **07**
- Q.4** (a) Explain factors affecting the selection of site for a dam. **03**
- (b) Give difference between Penstocks and Turbines. **04**
- (c) Discuss with neat sketch, the various zones of reservoir. **07**

OR

- Q.4** (a) Explain Ogee spillway and Chute spillway. **03**
- (b) Define: (I) Safe yield, (II) Density current, (III) Trap efficiency, (IV) Useful life of a reservoir. **04**
- (c) Write principle components of hydro electrical scheme and explain them with their utility. **07**
- Q.5** (a) Give difference between hydrological drought and meteorological drought. **03**
- (b) Write short note on flood forecasting and warning. **04**
- (c) A bridge has an expected life of 25 years and designed for flood management of return period of 100 years. (a) What is the risk of this hydrologic design? (b) If a 12% risk is acceptable, what return period will have to be adopted? **07**

OR

- Q.5** (a) Explain various causes of flood. **03**
- (b) Explain: (I) Hydrologic Storage routing, (II) Hydrologic channel routing. **04**
- (c) What is Water harvesting? Explain various methods water harvesting. **07**
