

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI(NEW) EXAMINATION – WINTER 2022****Subject Code:3160610****Date:13-12-2022****Subject Name:Water Resources Engineering and Hydrology****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1**
- (a) Explain the terms (i) Infiltration capacity (ii) Infiltration rate (iii) Rainfall excess **03**
- (b) What is evaporation? Mention the factors affecting evaporation. **04**
- (c) List various methods of calculating average rainfall over area and explain Isohyetal method. **07**
- Q.2**
- (a) Define (i) Direct runoff hydrograph (ii) Unit hydrograph (iii) S-hydrograph **03**
- (b) Explain mass curve? Explain how mass curve is prepared ? **04**
- (c) A rain gauge recorded the following accumulated rainfall during the storm. Draw the mass rainfall curve and the hyetograph. **07**

Time (A.M.)	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00
Accumulated rain fall (mm)	0.0	8.5	16	27	37	48	62	80	90

OR

- (c) A peak of flood hydrograph due to 6 hr storm is $470 \text{ m}^3/\text{s}$. The average depth of rainfall is 8 cms. Assume an infiltration loss of 0.25 cm/hour and a constant base flow of $15 \text{ m}^3/\text{sec}$. Estimate the peak discharge of 6-hour unit for this catchment. **07**
- Q.3**
- (a) Explain with a neat sketch, occurrence of ground water at various location below the earth surface. **03**
- (b) Explain Darcy's law and what are its limitation? **04**
- (c) During the recuperation test of a 4.0 m open well a recuperation of the depression head from 2.5 m to 1.25 m was found to take place in 90 minutes. Determine specific capacity per unit well area. Also determine yield of well for safe drawdown of 2.5 m. **07**
- OR**
- Q.3**
- (a) Define (i) porosity (ii) specific retention (iii) specific yield **03**
- (b) Distinguish between permeability and transmissibility of soil **04**
- (c) Design an open well in fine sand to give a discharge of 0.03 cumec when worked under a depression head of 2.5 m. **07**
- Q.4**
- (a) Define (i) safe yield (ii) secondary yield (iii) design yield. **03**
- (b) Explain measure to reduce evaporation losses from reservoir. **04**
- (c) Explain with neat sketch storage zones of reservoir **07**

OR

- Q.4** (a) Define (i) Trap efficiency (ii) Density currents (iii) capacity- inflow ratio **03**
(b) Discuss in details factors affecting selection of dam type? **04**
(c) What are the various causes for the reservoir sedimentation and how would you reduce the rate of sedimentation? **07**

- Q.5** (a) Define flood routing. What are the uses of flood routing? **03**
(b) Explain roof top water harvesting method **04**
(c) Explain various causes of flood **07**

OR

- Q.5** (a) What is artificial ground water recharge explain any two methods **03**
(b) Give the functional requirements of a multi – purpose projects **04**
(c) Explain drought and causes of drought **07**
