Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2023

Subject Code:3160610 Date:04-07-2023

Subject Name:Water Resources Engineering and Hydrology

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

MARKS

Q.1 **(a)** What are applications of hydrology? **03**

(b) Differentiate between hyetograph and hydrograph **04**

(c) State Dalton's law of evaporation. Also Discuss various factors affecting rate of evaporation. **07**

Q.2 **(a)** Give essential requirements of spillway. **03**

(b) Explain procedure of separating base flow in a given hydrograph. **04**

(c) Discuss various methods to determine rate of runoff. **07**

OR

(c) An artesian tube well has a diameter of 30 cm. A thickness of aquifer is 40 meter and its permeability is 45 m/day. Find the yield of tube well under a drawdown of 3 meter at a well face. Use radius of influence as recommended by Sichardt. **07**

Q.3 **(a)** State Darcy's low of flow of water through soil along with assumptions made in its derivation. **03**

(b) How infiltration capacity of soil can be measured in field? **04**

(c) The ordinates of storm hydrograph for a drainage basin in response to a 6-hour storm are observed as follow: **07**

Time (Hour)	0	3	6	9	12	15	18	21
Ordinate (cumec)	15	35	65	105	150	175	195	155

Time (Hour)	24	27	30	33	36	39	42	45
Ordinate (cumec)	140	115	85	65	45	30	25	15

Consider total rainfall of 9.5 cm during storm, average rate of infiltration loss is 0.75 cm/hour and constant baseflow of 15 cumec. Derive ordinates of 6-hour unit hydrograph and area of basin.

OR

Q.3 **(a)** What are adverse effects of flood? **03**

(b) Write a short note on Thiessen's polygon method of calculating average rainfall over area. **04**

(c) Discuss various structural measures to mitigate flood disaster. **07**

Q.4	**(a)**	Explain need for conservation of water.	**03**
	(b)	Discuss briefly various purposes to plan water resources development projects in India.	**04**
	(c)	Define reservoir routing. Describe Modified Pul's & Goodrich method for reservoir routing.	**07**
		OR	
Q.4	**(a)**	Give requirements of water resources planning.	**03**
	(b)	Define following parameters of ground water hydrology. (1) Specific capacity of well (2) Specific retention (3) Co-efficient of transmissibility (4) Well losses	**04**
	(c)	Describe briefly reservoir losses. Also gives measures are adopted to reduce evaporation losses from reservoir.	**07**
Q.5	**(a)**	Write a brief note on gravity dam.	**03**
	(b)	Classify hydroelectric power plants based on storage characteristics in detail.	**04**
	(c)	Discuss various water conservation measures.	**07**
		OR	
Q.5	**(a)**	Write a brief note on flow duration curve.	**03**
	(b)	Describe briefly various effects of drought.	**04**
	(c)	Write various steps involved in planning of water resources development projects.	**07**

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