

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-V(NEW) EXAMINATION – SUMMER 2022

Subject Code: 2150602

Date: 09/06/2022

Subject Name: Hydrology & Water Resources Engineering

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.

MARKS

- Q.1**
- | | | |
|------------|--|-----------|
| (a) | Explain the hydrological cycle with neat sketch. | 03 |
| (b) | Enlist types of dams based on their function. Explain any one in brief | 04 |
| (c) | Discuss the various methods of determining the average depth of rainfall over a catchment. | 07 |

- Q.2**
- | | | |
|------------|--|-----------|
| (a) | List out the various methods used to calculate the average depth of rainfall over a catchment and explain any one with neat sketch. | 03 |
| (b) | Describe the various factors affecting run-off from a basin area. | 04 |
| (c) | The ordinates of flood hydrograph from a 4 hour rainfall are given below. Derive the ordinates of 4 hour unit hydrograph for a catchment area of 640 Km ² . | 07 |

Time (Hours)	0	4	8	12	16	20	24	28	32	36	40
Discharge m ³ /sec	30	68	205	410	330	254	195	133	95	58	30

OR

- (c)** The ordinates of 3 hour unit hydrograph are given below : **07**

Time (Hours)	0	3	6	9	12	15	18	21	24	27	30
Ordinates cumecs	0	10	25	20	16	12	9	7	5	3	0

Find the ordinates of a 6 hour unit hydrograph for the same basin, analytically. Also sketch this unit hydrograph. What is the peak value of discharge in this unit hydrograph ?

- Q.3**
- | | | |
|------------|--|-----------|
| (a) | Give the difference between Specific Yield and Specific Retention for ground water. | 03 |
| (b) | Describe how to obtain the unit hydrograph from a flood hydrograph resulting from a storm of certain duration. | 04 |
| (c) | Design a tube well for the following data: | 07 |

1. Yield required = 0.081 Cumec.
2. Thickness of confined aquifer = 30 m.
3. Radius of circle of influence = 300 m
4. Permeability co-efficient = 60 m/day.
5. Drawdown = 5.1 m.

OR

- Q.3** **(a)** Explain the terms with suitable example: Aquifuge, Aquiclude, Aquitard. **03**

- (b) A 30 Cm diameter will completely penetrates a confined aquifer of permeability of 45 m/day. The length of strainer is 20 m. Under steady state of pumping, the draw down at the well was found to be 3.0 m and radius of influence was 300m. Calculate the discharge. **04**
- (c) Give difference between: (I) Hyetograph and Direct runoff hydrograph, (II) Unit hydrograph and S-Hydrograph. **07**
- Q.4** (a) Explain causes of flood. **03**
- (b) Give difference between Penstocks and Turbines. **04**
- (c) Explain briefly all components of a hydroelectric power plant with neat sketch. **07**
- OR**
- Q.4** (a) Write down the different methods available for Flood estimation and explain any one method. **03**
- (b) Write a short note: Methods for Separation of Base flow. **04**
- (c) Define the following with figure (1) Earthen dam (2) Gravity dam (3) Arch dam (4) Buttress dam (5) Spillway **07**
- Q.5** (a) Give difference between hydrological drought and meteorological drought. **03**
- (b) Write the short note on Levees and Flood walls. **04**
- (c) Explain theoretical probability distribution Gumbel's method. **07**
- OR**
- Q.5** (a) Discuss the factors affecting infiltration. **03**
- (b) Write short note on flood forecasting and warning. **04**
- (c) Describe the Flood routing with neat sketch. **07**
