

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2017

Subject Code: 2150602

Date: 03/11/2017

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 unit hydrograph and its applications. **03**
- (b) Write various methods to estimate average depth of precipitation in a catchment. Explain any one method in detail with figure. **04**
- (c) Define the following with figure **07**
(1) Infiltration index (2) Specific yield (3) Flow duration curve (4) Confined aquifer

- Q.2**
- (a) Discuss the factors affecting infiltration. **03**
- (b) Give the name of automatic rain gauges and explain any one in detail with figure. **04**
- (c) A storm of 10 cm precipitation produced a direct runoff of 5.8 cm. the duration of rainfall was 16 hours and its distribution is given below. Estimate the infiltration index of the storm. **07**

Time from start (hour)	0	2	4	6	8	10	12	14	16
Cumulative rainfall (cm)	0	0.4	1.3	2.8	5.1	6.9	8.5	9.5	10.0

OR

- (c) The ordinates of storm hydrograph of a river draining a catchment area of 770 km² due to 6-hour isolated storm. Derive the ordinates of a 6-h unit hydrograph for the catchment. **07**

Time from start (hour)	0	6	12	18	24	30	36	42	48
Discharge (m ³ /s)	40	65	215	360	400	350	270	205	145

Time from start (hour)	54	60	66	72
Discharge (m ³ /s)	100	70	50	42

- Q.3**
- (a) Explain the rational method to estimate peak discharge. **03**
- (b) Describe stage-discharge curve with figure. **04**
- (c) Explain the factors affecting hydrograph in detail. **07**

OR

- Q.3**
- (a) Describe the methods of base flow separation. **03**
- (b) Explain with figure various zones of storage in a reservoir. **04**

	(c)	Explain reservoir sedimentation with figure and describe various methods of reducing reservoir sedimentation.	07
Q.4	(a)	Discuss the factors affecting the site selection of a dam.	03
	(b)	Describe flood management in brief.	04
	(c)	Write a short note on (1) Low head (2) Medium head (3) High head hydropower plant	07
		OR	
Q.4	(a)	Write a brief note on flood routing.	03
	(b)	Discuss the methods of flood estimation.	04
	(c)	Describe various flood control measures.	07
Q.5	(a)	Explain Darcy's law with figure.	03
	(b)	Describe various causes of drought.	04
	(c)	A 30cm diameter well completely penetrates a confined aquifer of permeability 45 m/day. The length of the strainer is 20m. Under steady state of pumping, the drawdown at the well was found to be 3.0m and the radius of the influence was 300m. Calculate the discharge.	07
		OR	
Q.5	(a)	Write a brief note on flood damage analysis.	03
	(b)	During the recuperation test of a 4.0m 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 the specific capacity per unit well area.	04
	(c)	Describe various measures of water conservation and augmentation.	07
