GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (NEW) - EXAMINATION - SUMMER 2016

Subject Code:2150602

Date:06/05/2016

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.
- Q.1 (a) Describe non-automatic and automatic rain gauges. Explain the merits and 07 demerits of each.
 - (b) A thunder storm of 6hour duration produces the following flood hydrograph. 07 Derive the ordinates of unit hydrograph for a catchment area of 2845 km². Also sketch the resulting unit hydrograph.

Date	July 3				July 4				July 5	
Time	6	12	6	12	6 am	12	6	12	6	12
(hour)	am	noon	pm	mid		noon	pm	mid	am	noon
				night				night		
Discharge (m ³ /sec)	100	400	1500	3500	5100	3000	1500	900	400	100

Q.2 (a) A recording rain gauge was installed on a basin having catchment area of 35 km². 07 The mass curve of rainfall is recorded during a storm is given below.

Time from	0	2	4	6	8	10	12	14
start of storm								
(hours)								
Accumulated	0	8	18	59	68	83	89	95
rainfall								
(mm)								

If the volume of measured runoff due to storm is $1.4 \times 10^6 \text{ m}^3$, estimate the ϕ -index of the basin.

(b) Define the following with figure (1) Earthen dam (2) Gravity dam (3) Arch dam 07
 (4) Buttress dam (5) Spillway

OR

07

- (b) Describe in detail the factors affecting infiltration.
- Q.3 (a) Define unit hydrograph and its uses. Clearly explain the assumption made in the 07 derivation of unit hydrograph.
 - (b) Define the following (1) Aquifer (2) Aquiclude (3) Aquifuge (4) Specific yield (5) 07
 Specific retention (6) Storage coefficient (7) Transmissibility coefficient

OR

- Q.3 (a) Explain Darcy's law with its limitations. Describe the procedure of proving it 07 experimentally.
 - (b) Describe in brief (1) Reservoir sedimentation (2) Reservoir capacity 07
- Q.4 (a) Describe the various components of a typical hydropower plant with a neat sketch. 07 Also discuss the function of each component.

(b) Describe the situations under which the following dams are constructed (1) 07 Gravity dam (2) earthen dam (3) Arch dam. Also describe any two major reservoirs of India.

OR

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07
