Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 150602 **Date: 16-05-2013**

Subject Name: Hydrology and Water Resources Engineering

Time: 10.30 am - 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.**

Q.1 (a) Discuss factors consider while selecting suitable site for a reservoir. **07**

(b) Explain functional requirements of water resources projects. **07**

Q.2 (a) Explain cyclonic, convective and orographic precipitation. **07**

(b) Explain flood control measures. **07**

OR

(b) Explain theoretical probability distribution Gumbelôs method. **07**

Q.3 (a) Explain how you can obtain the unit hydrograph from a flood hydrograph resulting from a storm of certain duration. **07**

(b) An unconfined aquifer has a thickness of 30 m. A fully penetrating 20 cm diameter well in this aquifer is pumped at a rate of 35 lit/s. The drawdown measured in two observation wells located at distances of 10 m and 100 m from the well are 7.5 m and 0.5 m respectively. Determine the average hydraulic conductivity of the aquifer. At what distance from the well the drawdown is insignificant. **07**

OR

Q.3 (a) Drive an expression for discharge from a well in confined aquifer. The well fully penetrates it. **07**

(b) Ordinate of 8 hour unit hydrograph for a drainage basin are given in tabular below **07**

Time in Hour	Ordinate of 8 hr unit hydrograph	Time in Hour	Ordinate of 8 hr unit hydrograph
0	0.0	48	57.0
4	5.5	52	42.0
8	13.5	56	31.0
12	26.5	60	32.0
16	45.0	64	14.0
20	82.0	68	9.5
24	162.0	72	6.6
28	240.0	76	4.0
32	231.0	80	2.0
36	165.0	84	1.0
40	112.0	88	0.0
44	79.0		

Obtain a 24 hour hydrograph by tabular method.

Q.4 (a) Discuss factors affecting infiltration. **07**

(b) Thiessen polygons constructed for a network of 10 raingauges in river basin yielded thiessen weights of 0.10, 0.16, 0.12, 0.11, 0.09, 0.08, 0.07, 0.11, 0.06 and 0.10. If the rainfalls recorded at these gauges during a cyclonic storm are 132, 114, 162, 138, 207, 156, 135, 158, 168 and 150 mm respectively determine the average depth of rainfall by thiessen mean and arithmetic mean methods. Also determine the volume of surface runoff at the basin outlet if 35% of the rainfall is lost as infiltration. Take the area of the basin as 5800 km^2 and express your answer in million cubic metres. **07**

OR

Q.4 (a) Explain how will you find out missing rainfall data? **07**

(b) On the basin of isopluvial map, the 50 year 24 hr maximum rainfall at Ahmedabad is found to be 16 cm, Determine the probability of 24 hr rainfall of magnitude equal to or greater than 16 cm occurring at Ahmedabad. (a) at least once in 10 successive years, (b) two times in 10 successive years and (c) once in 10 successive years. **07**

Q.5 (a) Discuss drought contingency planning. **07**

(b) Explain ñrunoff enhancementò. **07**

OR

Q.5 (a) Explain in brief (i) Penstocks (ii) Turbines (iii) Surge tank (iv) Intake structure **07**

(b) The lowest portion of the capacity-elevation curve of a proposed irrigation reservoir ,drainage 20 km^2 of catchment, is represented by the following data **07**

Elevation in metre	Capacity in ha.m
RL 600	24.2
602	26.2
604	30.3
606	36.8

The rate of silting for the catchment has been assessed to be 300 m^3/km^2 /year. Assuming the life of reservoir to be 50 years (a) Compute the date storage and the lowest sill level if the main canal is 6 km long with a bed slope of 1 in 1000, and canal bed level at the tail end is at RL 594.5 m . The FSD of the canal at the head is 80 cm .The crop water requirement is assessed as 250 ha.m .

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