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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS; APRIL / MAY 2014

Civil Engineering

Fifth Semester

CE 9306 Hydrology and Water Resources Engineering

(Regulation 2008)

Time : 3 Hours

Answer ALL Questions

Max. Marks 100

PART - A (10 x 2 = 20 Marks)

1. Write the general water balance equation considering all the hydrologic parameters.
2. What is available water in soil evaporation?
3. State the purpose of deriving synthetic unit hydrograph?
4. What you mean by linear response in hydrology?
5. Define specific yield.
6. Describe aquifuge and aquitard.
7. State the factors influence the silting of reservoirs.
8. What is RUSLE?
9. Enlist the different flood frequency analysis formula.
10. Name few RWH structures installed in your campus?

Part – B (5 x 16 = 80 marks)

11. (i) Enlist the different types of drought indices and explain in detail any one of them. (6)
 (ii) The observed annual flood values in a river, for a period 1951 to 1966 is given below. Estimate the flood discharge with recurrence interval of 50 years and 100 years using frequency analysis method. (10)

Year	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1966
Flood m ³ /s	2947	3521	2399	4124	2947	5060	3757	4290	5050	6900	4366	3380	7826	3873	1971

12. a) (i) Explain the analytical methods of evaporation estimation. (8)
 (ii) Draw the ISI Pan and mark its parts. (8)
 (OR)
- b) Data on two meteorologically homogeneous catchments 1 and 2 are given below. A 3-h unit hydrograph was developed for catchment 1 and which has a peak value of discharge as 60m³/s and time to peak from the beginning of excess rainfall as 12 h. It is required to develop a unit hydrograph for catchment 2, using Snyder's method. Catchment 1: L = 40km; L_c = 20 km; A = 200 km² Catchment 2: L = 60 km; L_c = 30 km; A = 450 km².

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13. a) The ordinates of a 6-h unit hydrograph are given.

Time (h)	0	6	12	18	24	30
6-h UH ordinate (m ³ /s)	0	250	600	800	700	600
Time (h)	36	42	48	54	60	66
6-h UH ordinate (m ³ /s)	450	320	200	100	50	0

A storm had three successive 6-h intervals of rainfall magnitude of 3, 5 and 4 cm respectively. Assuming a ϕ index of 0.20 cm/h and a base flow of 30m³/s, determine the ordinate of resulting hydrograph.

(OR)

- b) A 9-h unit hydrograph for a basin has the following ordinates. Using the S-curve method, determine the 3-h unit hydrograph ordinates.

Time (h)	0	3	6	9	12	15	18	21	24	27	30
9-h UH ordinate (m ³ /s)	0	12	75	132	180	210	183	156	135	144	96
Time (h)	33	36	39	42	45	48	51	54	57	60	
9-h UH ordinate (m ³ /s)	87	66	54	42	33	24	18	12	6	0	

14. a) The drawdown data observed during a pumping test are given below. The well was pumped at 1800 lpm. The observation well in which drawdown data was observed is situated at a distance of 50 m from the pumped well. Compute Transmissibility and Storage coefficient by Jacob's method.

Time (min)	1.5	3	4.5	6	10	20	40	100
drawdown (m)	0.15	0.6	1	1.4	2.4	3.7	5.1	6.9

(OR)

- b) (i) A fully penetrating well of 45 cm diameter is installed in a confined aquifer having coefficient of transmissibility of 400 m²/day and storage constant of 0.0045. Determine the rate at which the water has to be pumped to keep the drawdown within 12 m in 2 days. (10)
(ii) Explain water level fluctuation method and rainfall infiltration factor method. (6)

15. a) (i) Explain the methods available to determine the trap efficiency. (8)
(ii) Enlist the multipurpose reservoir projects in India and state its significance. (8)

(OR)

- b) (i) Explain the mass curve method to estimate the storage capacity of reservoir. (10)
(ii) Explain the process of soil erosion and its causes. (6)