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B.E (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012

CIVIL ENGINEERING

Fifth Semester

12

CE 9306 – Hydrology and Water Resources Engineering

(Regulation 2008)

Time : 3 Hours

**Max. Marks 100
(10 x 2 = 20 Marks)**

Part - A

Answer ALL Questions

1. State the forms of precipitation and which do you think is predominant in Tamilnadu.
2. Define Φ index and W index.
3. State the important factors in selecting a site for a stream gauging station.
4. Differentiate between UH and DRH.
5. Calculate the intrinsic permeability in darcys for a soil having coefficient of permeability of 0.51 cm/s and the kinematic viscosity of water is 0.009 cm²/s.
6. Distinguish between specific capacity of a well and specific yield of an aquifer.
7. What do you mean by multipurpose reservoir and state its advantages.
8. What is meant by life of a reservoir in sedimentation and how it is estimated?
9. Write the Ryves empirical formula to estimate the flood.
10. Define agricultural drought.

Part – B

(5 x 16 = 80 marks)

11. 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.
 - 12(a) (i) List the different methods of computing evapotranspiration and explain any two methods in detail (12)
(ii) Explain the different methods used to control the evaporation. (4)
- (OR)**
- 12(b) In a 140 minutes storm the following rates of rainfall were observed in successive 20 minutes intervals: 3.0, 3.0, 9.0, 6.6, 1.2, 1.2, and 0.6 mm / hour. Assuming the Φ - index value as 3.0 mm / hour, determine; (i) Total value of surface runoff (ii) Total rainfall and (iii) The value of w – index for the storm. The area of catchment is 1500 ha.

- 13(a) The drawdown data observed during a pumping test are given below. The well was pumped at $0.033 \text{ m}^3/\text{s}$ for 30 hours. The observation well in which drawdown data was observed is situated at a distance of 30 m from the pumped well. Compute T and S, by Jacob's method.

Elapsed Time (h)	1	2	3	4	5	6	8	10	12	22	32	40
Drawdown(m)	0.2	0.5	0.75	0.98	1.1	1.3	1.6	1.9	2.1	2.9	3.2	3.5

(OR)

- 13(b) (i) Develop an equation relating the steady state discharge from a well in an unconfined aquifer. Draw a neat sketch and state clearly all the assumptions. (10)
(ii) An extensive aquifer is known to have a groundwater flow in $N 30^\circ E$ direction. Three wells A, B and C are drilled to tap this aquifer. The well B is to East of A and the well C is to North of A. The following are the data regarding these wells:

Well	Distance (m)	Ground surface elevation (m above datum)	Water table elevation (m above datum)
A		160.00	157.00
B	AB = 800m	159.00	156.50
C	AC = 2000m	158.00	?

Estimate the elevation of water table at well C when the wells are not pumping. (6)

- 14(a) (i) Describe in detail the estimation of reservoir capacity. (12)
(ii) How dams are classified based on construction materials and give one example for each (4)

(OR)

- 14(b) (i) What is trap efficiency? Explain in detail about the factors affecting trap efficiency. (8)
(ii) State the various methods used to control the sedimentation in reservoirs. (8)

- 15(a) (i) Explain briefly the methods of estimating flood? What are their limitations? (8)
(ii) Annual maximum recorded floods in a river, for a period 1951 to 1966 is given below. Estimate the flood discharge with recurrence interval of (i) 100 years and (ii) 150 years. (8)

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

(OR)

- 15(b) (i) Enlist the different types of drought indices and explain in detail any one of them. (8)
(ii) Write short notes on Rain Water Harvesting and it's significant in rural and urban areas. (8)
