Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2020

Course Code: CE309
Course Name: WATER RESOURCES ENGINEERING

Max. Marks: 100 Duration: 3 Hours

Instructions: ***Graph sheet will be supplied on request***

PART A

Answer any two full questions, each carries 15 marks. Marks

1 a) Explain the different forms of precipitation. (5)

b) Explain the working of a Siphon type raingauge with a neat sketch. (5)

c) The normal annual rainfall at stations A, B, C and D in a basin are 809.7, 675.9, 762.8 and 920.1 mm respectively. In the year 2000, the station D was inoperative and the stations A, B and C recorded annual precipitations of 911.1, 723.3 and 798.9 mm respectively. Estimate the rainfall of station D in the year 2000 by normal ratio method. (5)

2 a) A six hour storm produced rainfall intensities 7, 18, 25, 12, 10 and 3 mm/hr in successive one hour intervals over a basin of 800 km^2. The resulting runoff observed to be 2640 ha.m. Determine the ϕ-index of the storm. (8)

b) Explain the use of double ring infiltrometer for measurement of infiltration. How will you fit Horton's model. (7)

3 a) Define Unit hydrograph. Enlist the assumptions of Unit hydrograph theory. (5)

b) The peak flood hydrograph due to a 3-hr duration isolated storm in a catchment is 270 m^3/sec. Total depth of rainfall is 5.9 cm. Assuming an average infiltration loss of 0.3 cm/hour and a constant baseflow of 20 m^3/sec estimate the peak of 3-hr unit hydrograph of this catchment. If the area of the catchment is 567 km^2, determine the base width of 3-hr unit hydrograph assuming it to be triangular in shape. (10)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Differentiate (i) lift irrigation and flow irrigation (ii) perennial irrigation and inundation irrigation (6)

b) The following data pertains to the healthy growth of a crop (i) Field capacity of (9)

soil=29 % (ii) Permanent wilting point = 11 % (iii) Dry density of soil= 1300 kg/m^3 (iv) Effective depth of root zone =70 cm (v) Daily consumptive use=12 mm. For healthy growth of crop the moisture content must not fall below 25 % of water holding capacity between Field capacity and Permanent wilting point. How long the crop will survive without irrigation?

5 a) Enlist the factors affecting selection of site for stream gauging station. (5)

b) Explain (i) stage-discharge curve (ii) current meter rating curve and its calibration (10)

6 a) Explain meandering and meander parameters. (7)

b) Explain the features of different types of groynes with relevant sketches. (8)

PART C

Answer any two full questions, each carries 20 marks.

7 a) What are Flow duration curves? Explain its uses and characteristics. (6)

b) The average annual discharge of a river for 11 years is given below (14)

Year	1960	61	62	63	64	65	66	67	68	69	70
Discharge (m^3/sec)	1750	2650	3010	2240	2630	3200	1000	950	1200	4150	3500

Determine the storage capacity required to meet a demand of 2000 cumec throughout the year by mass curve method.

8 a) Explain reservoir sedimentation and methods for controlling it. (10)

b) Explain the procedure for determination of useful life of reservoirs. (10)

9 a) Define (i) storativity (ii) transmissibility (4)

b) State Darcy's law and comment on its validity. (4)

c) A 40 cm diameter well fully penetrates an unconfined aquifer whose bottom is 80 m below the undisturbed groundwater table. When pumped at a steady rate of 1.5 m^3/min, the drawdowns in two observation wells at radial distances of 5 m and 15 m are respectively, 4 m and 2m. Determine the drawdown in the well (12)

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