

24292

B. Tech. 5th Semester (Civil) F. Scheme
Examination, December-2017

HYDROLOGY

Paper-CE-311-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt five questions in all. Question No.1 is compulsory and attempt one question from each section. All questions carry equal marks.

1. Write short note on the following –
 - (a) Forms of precipitations
 - (b) Inglis formula
 - (c) Unconfined aquifers
 - (d) Depression storage
 - (e) Hypsometric curve.

5×4=20

Section-A

2. (a) Define hydrology. What role does hydrology play in the water resource planning. 10
- (b) A small catchment area 130 hectares received a rainfall of 12 cm in 110 minutes due to a storm. At the outlet of the catchment, the stream draining the catchment was dry before the storm and experienced a runoff lasting for 10 hrs. with an

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average discharge of $1.7\text{m}^3/\text{s}$. The stream was dry again after the runoff event. What is the amount of water which was not available to runoff? 10

- 3. (a) Explain different methods to determine mean precipitation over an area and presentation of rainfall data. 10

- (b) Explain a procedure for supplementing the missing rainfall data. 10

Section-B

- 4. (a) Describe the process of infiltration and factors affecting infiltration. 10

- (b) Explain procedure for filling Horton's infiltration equation for experimental data from a green plot. 10

- 5. A reservoir has an average area of 50Km^2 over a year. The normal annual rainfall at the place is 120 cm and the evaporation is 240 cm. Assuming the land flooded by the reservoir has a runoff coefficient of 0.4, estimate the net annual increase or decrease in the stream flow as a result of reservoir 20

Section-C

- 6. The peak of flood hydrograph due to 3-h duration isolated storm in a catchment is $270\text{m}^3/\text{s}$. The total depth of

rainfall is 5.9 cm. Assuming an average infiltration loss of 0.3 cm/h and a constant base flow of $20\text{m}^3/\text{s}$. Estimate the peak of 3-h unit hydrograph. If the area of catchment is 567 km². Calculate base width of 3-h unit hydrograph by assuming it to be triangular in shape. 20

- 7. (a) Explain the stream flow measurement by area velocity method. 10
- (b) Describe the factors affecting the seasonal and annual runoff of a catchment. 10

Section-D

- 8. (a) Derive an equation for the steady state discharge from a well in an unconfined aquifer and depth of water table at two known position from the well. 12

- (b) Define Darcy's law. State all the assumptions involved in this law. 8

- 9. (a) Distinguish between specific capacity of a well and specific yield of an aquifer. 10
- (b) A 30 cm well completely penetrates an unconfined aquifer of saturated depth 40m. After a long period of pumping at a steady state of 1500 lpm, the drawdown in two observation well 25m and 75m from pumping well were found to be 3.5 and 2.0 m respectively. Calculate transmissivity of the aquifer. 10