

(3 hours)

[Total Marks-80]

- N.B. (1) Attempt any four questions out of six questions
 (2) Assume any additional data if necessary and state it clearly
 (3) Explain answers with neat sketches wherever necessary

1. a) Explain with neat diagram Thiessen polygon and Isohyetal method of measurement of average rainfall over catchment [10]
 b) Explain hydrological cycle with neat sketch. Describe briefly the man's interference in hydrological cycle. [10]
2. a) Describe with neat sketches non recording type of raingauges used in India for measuring rainfall over catchment area [10]
 b) Explain Infiltration indices used in hydrology in detail. [10]
3. a) Explain various factors to be considered in selecting a site for a stream gauging station. Explain the dilution method of flow measurement [10]
 b) Define term Maximum Flood Discharge (MFD) and explain in detail various methods of estimation of MFD [10]
4. a) Explain various methods used to develop the Rainfall Runoff Relationship. [10]
 b) State the methods of estimation of missing rainfall. The normal annual rainfall at stations E, F G and H in a basin are 90.97, 77.59, 86.28 and 102.01 cm respectively. In the year 1975, the station H was inoperative and the stations E, F and G recorded annual rainfall of 101.11, 82.23 and 89.89 cm respectively. Estimate the rainfall at station H in that year. [10]
5. a) A catchment of 2300 sq.km gave following hydrograph for 6 hour storm. Derive and plot of 6 hour unit hydrograph. [10]

Time (hrs)	0	6	12	18	24	30	36	42	48
Flow (Cumecs)	15	190	305	227	148	94	61	35	15
Base Flow (Cumecs)	15	10	5	7	8	9	11	13	15

- b) With a neat sketch, explain the various components of a flood hydrograph. What is base flow? Also explain any one method of base flow separation. [10]
 6. a) Write basic difference Channel routing and reservoir routing. Describe in details the Muskingum method of channel routing. [10]
 b) Explain the term design flood, standard project flood and probable maximum flood with significance in the design of water resources structures. [10]
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