

(3 Hours)

[Total marks: 80]

Note:

- 1) Question No. 1 is compulsory.
- 2) Attempt any **Three** questions out of remaining **Five** questions.
- 3) Assume suitable data wherever necessary.
- 4) Draw neat and clean sketches wherever necessary.

Q. 1 Explain the following:

(20)

- a) Double mass curve of rainfall
- b) Infiltration indices
- c) Recurrence interval and return period
- d) Limitations of Dupuit's theory

Q.2 a) Explain with neat sketch the method of separation of base flow from a streamflow hydrograph.

(10)

b) A 6-hour unit hydrograph for a basin has the following ordinates. The ordinates are starting at zero hour and readings were taken at every 6 hour intervals as follows:

Time (Hour)	0	6	12	18	24	30	36	42	48	54	60	66
UHO (m ³ /s)	0	20	60	150	120	60	66	50	32	22	10	0

Compute ordinates of 12-hour S hydrograph using S-curve hydrograph.

(10)

Q. 3 (a) Explain different methods of determining the average rainfall over a catchment due to a storm.

(10)

(b) The design storm of watershed has the depths of rainfall of 4.9 and 3.9 cm. for the consecutive 1-hour period. The 1-hour unit hydrograph can be approximated by a triangle of base 6-hour with a peak of 50 cumecs occurring after 2 hours from the beginning. Compute the flood hydrograph assuming an average loss rate 9mm/hour, and constant baseflow of 10 cumecs. What is the area of watershed and its runoff coefficient?

(10)

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Q. 4 a) Explain the slope-area method of measurement of flood discharge in a stream. (10)

b). A bridge has an expected life of 25 years and is designed for a flood magnitude of return period 100 years. What is the risk of hydrologic design? If 10% risk is acceptable what return period will have to be adopted? (10)

Q.5a) Explain the method of determining the aquifer constant T of a confined aquifer by pumping out test method. (10)

b) A 30 cm well completely penetrates an unconfined aquifer of saturated depth 40m. After a long period of pumping at steady rate of 500lpm, the drawdown in two observation wells 25 and 75 m from the pumping well were found to be 3.5 and 2 m respectively. Determine the transmissivity of the aquifer. What is the drawdown at the pumping well? (10)

Q. 6) Write short notes on: (20)

i) Flood routing

ii) Flood control by Reservoirs

iii) Synthetic hydrograph

iv) Jacob's method to determine Formation constants
