Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 08

M.Tech (Civil Engg) (2016 onwards) (Sem.–1)

HYDROLOGICAL PROCESSES

Subject Code : MTCE-202

M.Code : 74238

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

1. a) Explain the assumptions and limitations of Unit hydrograph theory.

   b) Given the following 2-hr unit hydrograph, use S-hydrograph procedure to construct a 3-hr unit hydrograph.

Time (hr)	0	1	2	3	4	5	6
Q (cumecs)	0	200	575	400	175	120	0

2. a) Given an initial infiltration capacity of 7 cm/h and a time constant k of 0.29 h, -1

   Derive an infiltration vs. time curve if the ultimate infiltration capacity is 1.35 cm/h. For the first 10 hours estimate the total volume of water infiltrated in cm over the watershed.

   b) Differentiate between :

   i) Drainage divide and groundwater divide

   ii) Catchment and watershed

   iii) Valley storage and bank storage

   iv) Overland flow and interflow

3. a) Explain the nature of groundwater flow. State and explain the law governing the flow with limitations.

   b) In an area of 100 ha, the water table dropped by 4 m due to continuous groundwater pumping. If the porosity of the aquifer soil is 25% and the specific retention is 10%, determine :

   i) Specific yield of the aquifer

   ii) The decrease in the groundwater storage

4. What are the methods of estimation of maximum flood discharge? Compare the various formulae for maximum flood discharge estimation.

5. a) Differentiate between deterministic, probabilistic and stochastic process in estimation of maximum annual flood.

   b) Starting from the basic continuity and energy equation, develop a methodology for computation of flood routing.

6. a) Explain clearly I. S. D. curves method for reservoir flood routing. Discuss the factors to be considered in choosing the routing period.

   b) Differentiate between stream flow routing and reservoir flood routing.

7. Explain the following terms :

   a) Flow duration curves

   b) Mass curves

   c) Economic storage

   d) Pondage

8. Discuss the classification of mathematical models in hydrology by taking examples from each model.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.