III B. Tech II Semester Supplementary Examinations, November- 2019
WATER RESOURCES ENGINEERING – I
(Civil Engineering)

Time: 3 hours   Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part- A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A   (22 Marks)

1. a) Write a short note on Depth Area duration curves. [3M]
   b) Briefly explain the methods of reducing evaporation from water surfaces. [4M]
   c) Write short notes on flow mass curve and flow duration curve. [3M]
   d) Mention important causes and effects of floods. [4M]
   e) With a neat sketch explain various types of aquifers. [4M]
   f) Explain the concept of IUH. What are its advantages? [4M]

PART –B   (48 Marks)

2. a) Draw hydrologic cycle and explain various processes involved in hydrologic cycle. [4M]
   b) Explain various methods for computation of average rainfall over a basin. State the advantages and disadvantages of each method. [7M]
   c) A catchment has five rain gauge stations. In a year, the annual rainfall recorded by the gauges are 80 cm, 90 cm, 105 cm and 75 cm. For an 8% error in the estimation of the mean rainfall, determine the additional number of gauges needed. [5M]

3. a) Explain various factors affecting evaporation from a water body. [5M]
   b) With a neat sketch explain ISI standard pan evaporimeter. [5M]
   c) A 6 h storm produced rainfall intensities of 8, 20, 16, 18, 10 and 5 mm/h in successive one hour intervals over a basin of 800 sq.km. The resulting runoff is observed to be 2500 hectare-meters. Determine ϕ index for the basin. [6M]

4. a) What is runoff? Explain various factors affecting runoff. [8M]
   b) The ordinates of a unit hydrograph of 6 hr unit duration for a catchment of 311 sq.km are given below. Compute the ordinates of 9 hr. unit hydrograph for the same catchment. [8M]

Time, hr	0	3	6	9	12	15	18	21	24	27	30	33	36	39	42
Ordinates of 6hr UH, m^3/s	0	9	20	35	49	43	35	28	22	17	12	9	6	3	0

5. a) Describe the Muskingum method of routing an inflow hydrograph through a channel reach. [8M]
   b) Explain various non-structural methods of flood control and management. [8M]

6　a)　Derive Dupit's equation for determining the yield from a well penetrating an unconfined [8M]
　　　aquifer. What are the basic assumptions of the theory?

　　b)　During a recuperation test conducted on an open well in a region, the water level in the [8M]
　　　well was depressed by 3 m and it was observed to rise by 1.8 m in 75 minutes. (i) What
　　　is the specific yield of open wells in that region? (ii) What could be the yield from a well
　　　of 5 m diameter under a depression head of 3.5 m? (iii) What should be the diameter of
　　　the well to give a yield of 15 lit/s under a depression head of 2.5 m?

7　a)　Explain the basic principles involved in the development of IUH by Nash's conceptual [8M]
　　　model.

　　b)　Describe Chow-Kulandaiswamy's General Hydrologic System model. [8M]

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