Code No: R1622355 **R16** SET - 1

II B. Tech II Semester Supplementary Examinations, November - 2018
SURFACE WATER HYDROLOGY
(Agricultural 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 **FOUR** Questions from **Part-B**

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PART –A

1. a) What is meant by probable maximum precipitation (PMP) over a basin?
   b) Distinguish between overflow and interflow.
   c) Give three empirical formulae applicable to particular regions in India.
   d) Define a hydrograph.
   e) Write the applications of S-curve.
   f) Distinguish between Hydraulic and hydrologic method of flood routing.

PART –B

2. a) Describe the hydrologic cycle. Explain briefly humankind's interference in various parts of this cycle.
   b) Describe the different methods of recording of rainfall.

3. a) List and explain different runoff characteristics.
   b) The rate of rainfall for the successive 30 min period of a 3-hour storm are : 1.6, 3.6, 5.0, 2.8, 2.2, 1.0 cm/hr. The corresponding surface runoff is estimated to be 3.6 cm. Establish the ϕ-index. Also determine the w-index.

4. a) Discuss the various factors, which affect the runoff from a basin.
   b) What equipment will you use for making velocity measurements in a stream? Explain.

5. a) A steady 6-hour rainfall with intensity of 4 cm/hr produces a peak discharge of 560 cumec. The average storm loss can be assumed as 1cm/hr and base flow 20 cumec. What is the peak discharge of the unit hydrograph and its duration? On the same basin, determine the peak discharge from a 6-hour rainfall at an intensity of 3.5 cm/hr assuming an average loss rate of 1.5 cm/hr and base flow of 15 cumec.
   b) Explain the use of the unit hydrograph in the construction of the flood hydrograph resulting from two or more periods of rainfall.
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6. a) What is an instantaneous unity hydrograph? Explain.
   b) Storm rainfalls of 3,7.5 and 5.5 cm occur during the three successive hours over a 30 km^2 area. The loss rate can be assumed as 1.5 cm/hr on an average. The distribution percentages for successive hours are 5,20,40,20,10 and 5. Determine the stream flows for successive hours assuming a constant base flow of 20 cumec, state its peak and when it is expected.

7. a) Describe the Muskingum method of routing an inflow hydrograph through a channel reach. Assume the values of the coefficients K and x for the reach are known.
   b) A small reservoir has the following storage elevation relationship.

Elevation(m)	55.00	58.00	60.00	61.00	62.00	63.00
Storage($10^3 m^3$)	250	650	1000	1250	1500	1800

A spillway provided with its crest at 60.00 m elevation has the discharge relationship $Q=15\ H^{3/2}$,where H= head of water over the spillway crest. When the reservoir elevation is at 58.00 m a flood as given below enters the reservoir. Route the flood and determine the maximum reservoir elevation, peak outflow and attenuation of the flood peak.