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B TECH
(SEM-VII) THEORY EXAMINATION, 2018-19
ENGINEERING HYDROLOGY

Time: 3Hours   *Max. Marks: 100*

Note: Attempt all Sections. Assume missing data, if any.

SECTION A

1: Attempt all parts of the following: 10 x 2 = 20

- a)   What do you understand by precipitation?
- b)   What is meant by hydrological cycle?
- c)   Explain Thiessen polygon method of determining of average rainfall over a basin catchment area).
- d)   What is the purpose of Water Budget Equation in Hydrology?
- e)   What do you mean by hydrologic reservoir routing?
- f)   Distinguish between infiltration capacity and infiltration rate.
- g)   Write short notes about flood routing.
- h)   Explain factor affecting runoff hydrograph.
- i)   Describe well losses.
- j)   Explain specific capacity in tube well.

SECTION B

2: Attempt any three parts of the following :   10x3=30

a) Analysis of a 30 year data at a point on a river of gives mean discharge as 1200 cumec and standard deviation 650 cumec. For what value of discharge would you design a structure at the point so as to provide 95% assurance that the structural would not fail in the next 50 years. Assume Yn=0.53625, Sn=1.11238.

b) A catchment has five rain-gauge stations. In a year, the annual rainfall recorded by the gauges   is 78.8 cm, 90.2 cm, 98.6 cm, 102.4 cm and 70.4 cm. For a 6% error in the estimation of the mean rainfall, determine the additional number of gauges needed.

c) What is meant by hydrological cycle? How can the parameters of the cycle be written in an equation form? Draw a neat diagram to illustrate your answer.

d) What do you mean by design flood? What are the factors affecting the flood hydrograph? Explain the procedure of using a unit hydrograph to develop the flood hydrograph due to a storm in a catchment.

e) Write down in details selection of suitable site for a tube well. And also explain advantages and disadvantages of well irrigation over canal irrigation.

3: Attempt any one part of the following: 10X1=10
  a) Explain both type of rain gauge:
      A: Automatic rain- gauge.
      B: Non-automatic rain-gauge.
  b) What is an intensity–duration curve and how will you proceed to derive such a curve for a given frequency at a Rain gauge station from the available data of worst storms of different durations kept for a sufficient number of cycles.

4: Attempt any one parts of the following: 10X1=10
  a) Explain the factors that affect the runoff from a catchment Area. How will you estimate the amount of runoff? A 4-hour storm in a basin producing 10 cm of runoff results the following flows in the stream:

Time (hour)	0	2	4	6	8	12	16	20
Flow (cumec)	0.0	2.44	8.10	13.50	11.34	6.75	2.70	0.0

Calculate the peak flow and the time of its occurrence of the flood created by an 8-hour storm in the basin which Produces 5 cm of runoff during first 4-hours and 7.5 cm Runoff during the second 4-hours. Assume base flow is Negligible.

  b) What is meant by evapo-transpiration? Also explain measurement of evapotranspiration.

5: Attempt any one parts of the following: 10X1=10
  a) Explain in details of hydrograph with neat sketch. Also explain theory of unit hydrograph and limitation of unit hydrograph.
  b) What is run-off? What are the factors that affect the run-off from a catchment area? Describe the methods of computing run-off from a catchment area.

6: Attempt any one parts of the following: 10X1=10
  a) From the analysis of available data on annual flood peaks of a stream for a period of 40 years, the 50 year and 100 year floods have been estimated to be 878 cumec and 970 cumec. Using Gumbel's method, estimate the 200 year flood for the stream.
  b) A one-day rainfall of 100 mm at a station was found to have a return period of 50 years. Determine the probability. That a one-day rainfall of this or larger magnitude will occur At least once in 20 successive years.

7: Attempt any one parts of the following: 10X1=10
  a) What are the differences between confined and unconfined Aquifers for the determination of discharge with steady flow Condition? A well penetrates into an unconfined aquifer having a saturated depth of 100 m. The discharge isn250 liters per minute at 12 m draw down. Assuming Equilibrium flow conditions and a homogeneous aquifer, Estimate the discharge at 18 m draw down. The distance from the well where the draw down influences are not appreciable may be taken equal for both cases.
  b) Write short notes on any **four** of the following:
       (i) Well losses
       (ii) Specific capacity and specific yield of an aquifer
       (iii) Rain water harvesting
       (iv) Aquifer and aquiclude
       v) Radius of influence and cone of depression.