Fifth Semester B.E. Degree Examination, Dec.2016/Jan.2017
Hydrology and Irrigation Engineering

Time: 3 hrs.   Max. Marks:100

Note: *Answer FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1 a. Explain Horton's qualitative representation of hydrologic cycle, with a neat sketch. **(08 Marks)**
   b. Explain with a neat sketch, Simon's rain gauge. **(06 Marks)**
   c. A precipitation station X was inoperative for some time during which a storm occurred. At three stations A, B and C surrounding station X, the total precipitation recorded during this storm are 75mm, 58mm and 47mm respectively. The normal annual precipitation amounts at X, A, B and C are respectively 757mm, 826mm, 618mm and 482mm. Estimate the storm precipitation at X. **(06 Marks)**

2 a. Describe the method of determining infiltration capacity using a double ring infiltrometer. **(06 Marks)**
   b. Enlist the factors affecting evapotranspiration. **(06 Marks)**
   c. The total observed runoff volume during a 6hr-storm with a uniform intensity of 1.50 cm/hr is $21.6 \times 10^6 \text{m}^3$. If the area of the basin is 350km^2, find the average infiltration rate for the basin. **(08 Marks)**

3 a. Explain a typical single peaked hydrograph components with a neat sketch. **(06 Marks)**
   b. What are the assumptions made in unit hydrograph theory? **(06 Marks)**
   c. Find the ordinates of a flood hydrograph resulting from a storm with rainfalls of 2.50, 6.85 and 3.75cm each during successive 3 hours. The ordinates of a 3 hour UHG are given below.

Time (hours)	3	6	9	12	15	18	21	24	3	6	9	12	15	18	21	24
UHG ordinates (cumec)	0	115	370	510	395	315	252	231	172	127	96	64	43	25	12	0

Assume an initial loss of 5mm, infiltration index, $\phi = 2.5$mm/hr, Base flow = 12 cumec. **(08 Marks)**

4 a. What is flood? What are the factors that affect flood? **(06 Marks)**
   b. List out various methods for estimation of design flood. Explain rational method of flood estimation. **(06 Marks)**
   c. Explain Muskingum's routing method for hydrologic channel routing. **(08 Marks)**

PART – B

5 a. What are the advantages and disadvantages of irrigation? **(08 Marks)**
   b. Enlist the various factors affecting the choice of method of irrigation. **(04 Marks)**
   c. List out the advantages of sprinkler irrigation and drip irrigation. **(08 Marks)**

6 a. Write a note on soil classification. **(06 Marks)**
   b. What are the different techniques to be adopted to maintain soil fertility? **(06 Marks)**
   c. Write a note on India soils. **(08 Marks)**

7 a. What are the different methods adopted to improve duty of water? (06 Marks)
   b. Write a note on assessment of irrigation water. (06 Marks)
   c. After how many days will you supply water to soil (clay loam in order to ensure efficient irrigation of the given crop, if
       i)   Field capacity of soil = 27%
       ii)   Permanent wilting point = 14%
       iii) Density of soil = 15kN/m^3
       iv)   Effective depth of root zone = 75mm
       v)   Daily consumptive use of water for a given crop = 11mm. (08 Marks)

8 a. Write a note on canal classification. (06 Marks)
   b. What are the considerations made during alignment of canals? (06 Marks)
   c. Design a trapezoidal canal by Kennedy's theory with side slope 1:1 in alluvial soil to carry a discharge of 30 m^3/sec in bed slope of 1 in 5000. Rugosity coefficient of Kutter is 0.0225, CVR = 1. (08 Marks)

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