USN

10CV55

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020

Hydrology & Irrigation Engineering

Time: 3 hrs. Max. Marks:100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

PART – A

1 a. Define hydrology and explain the practical applications of hydrology. **(06 Marks)**

b. Explain how the consistency of rainfall record is verified using a double mass curve. **(06 Marks)**

c. The average annual rainfall in at 8 existing rain gauge stations are 105, 79, 70, 80, 85, 72, 92 and 66 cm respectively. Determine the adequate number of rain gauges required for the catchment. If the average depth of rain fall over the basin is to be estimated within 10% error. **(08 Marks)**

2 a. Define evaporation and evapotranspiration. List out the factors affecting the evaporation. **(06 Marks)**

b. Mention the different methods of measuring the rate of infiltration and describe double ring infiltrometer with neat sketch. **(07 Marks)**

c. Rain fall intensities of a 6-hr storm are 8, 16, 26, 14, 12 and 6 mm/hr in successive one hour interval over a basin of 800 sq.km. The resulting run off is observed to be 2640 ha-m. Determine the ϕ-index for the basin. **(07 Marks)**

3 a. Define unit hydrograph. Give the steps to derive unit hydrograph from an isolated storm. **(06 Marks)**

b. Explain the methods of base flow separation with neat sketch. **(06 Marks)**

c. The following are the ordinates of a 3-hr unit hydrograph. Derive the 6-hr unit hydrograph and plot the same. **(08 Marks)**

Time (hr)	0	3	6	9	12	15	18	21	24
Ordinate of 3-hr unit hydrograph	0	1.5	4.5	8.6	12	9.4	4.6	2.3	0.8

4 a. Define flood. Explain factors affecting flood. **(06 Marks)**

b. Explain Muskingham method of flood routing. **(06 Marks)**

c. What are the different methods of estimating peak flood for catchments? Explain any one of them. **(08 Marks)**

PART – B

5 a. Define irrigation. List the advantages and disadvantages of irrigation. **(08 Marks)**

b. Explain the necessity of irrigation. **(04 Marks)**

c. Explain the surface irrigation methods of water application to the crops with neat sketches. **(08 Marks)**

6 a. Explain the soil moisture zones with neat sketch. **(08 Marks)**

b. Define : (i) Saturation capacity
(ii) Field capacity.
(iii) Permanent wilting point. **(06 Marks)**

c. Discuss in brief: (i) Alluvial soil (ii) Black soil (iii) Red soil **(06 Marks)**

7 a. Define Duty and Delta and establish a relation between them. **(06 Marks)**

b. Explain the terms : (i) Base period (ii) Crop period (iii) Crop season. **(06 Marks)**

c. Wheat is to be grown in a field having a field capacity equal to 27% and permanent wilting point is 13%. Find the storage capacity in 80 cm depth of the soil, if the dry unit weight of the soil is 14.72 kN/m^3. If irrigation water is to be supplied when the average soil moisture falls to 18%, find the water depth required to be supplied to the field, if the field application efficiency is 80%. What is the amount of water needed at the canal outlet, if the water lost in water courses and field channels is 15% of the outlet discharge. **(08 Marks)**

8 a. Explain design procedure of canals by Lacey's theory. **(06 Marks)**

b. Compare the design procedure between Kennedy's and Lacey's theory. **(06 Marks)**

c. Design an irrigation canal to carry a discharge of 14 cumecs. Assume N = 0.0225, m = 1 and B/D = 5.7 **(08 Marks)**

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