Code No: **R31014** **R10** **Set No. 1**

III B.Tech I Semester Supplementary Examinations, November - 2015
WATER RESOURCES ENGINEERING-I
(Civil Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) Define and explain the following terms: [8]
(i) Catchment area (ii) Runoff and surface runoff (iii) Hydrograph of a storm (iv) Yield of a drainage basin (v) Average annual rainfall.
b) Explain the working of recording rain gauge with a neat sketch. [7]

2 a) What do you understand by evapo-transpiration? How is it determined? [7]
b) In a certain river basin there are four rain gauge stations, with their normal annual precipitations amounting to 800,520,440 and 400 mm, respectively. Determine the optimum number of rain gauges in the catchment, if it is desired to limit the error in the mean value of rainfall in the catchment to 12%. [8]

3 a) Explain the method of determining direct run-off from a given storm hydrograph. [7]
b) What is a current-meter and what are its types? Discuss how can it be used to determine the discharge, (i) in a shallow river, (ii) in a wider river. What formulas are used for computing discharge measurements? [8]

4 a) What is meant by 'Design Flood', and what is its importance? [7]
b) Explain briefly what a unit hydrograph and a distribution graph is? [8]
Starting from 12 noon, storm rainfalls of 2.5, 7.5 and 5.0 cm occur during three successive hours over a 25 square kilometer area. The storm loss rate (Φ_{index}) is 1.25 cm per hour. The percentages of distribution graph for successive hours are 5,20,40,10 and 5. Estimate the value of peak discharge in cubic metres per second and the hour when it is expected.

5 a) Define the following terms : [8]
Aquifer, Aquiclude, specific yield, piezometric surface, water table, perched aquifer
b) Design an open well in fine sand to give a discharge of 0.005 cumecs when worked under a depression head of 3 metre. Take the value of the specific yield for fine sand as 0.5m3/hour per square metre of area, under unit depression head. [7]

6 a) Discuss in brief various methods of surface irrigation. [7]
b) What is water logging? What are its ill-effects? [8]

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7 a) Name any two methods used for estimating consumptive use of water for a particular crop at a particular place. Explain in details the one which is most widely used in your region and the reason for preferring that particular method. [8]

b) A reservoir with a live storage capacity of 300 million cubic metres is able to irrigate an ayacut of 40,000 hectares with fillings each year. The crop season is 120 days. What is the duty? [7]

8 a) Explain the procedure of designing a channel with Kennedy's theory. [7]

b) Using Lacey's theory, design an irrigation channel for the following data : [8]
Discharge Q = 48 cumecs
Silt factor f = 1
Side slopes = ½ :1.

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