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Code No: 115AC

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech III Year I Semester Examinations, November/December - 2016

WATER RESOURCES ENGINEERING-I

(Common to CE, CEE)

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

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART - A

(25 Marks)

1.a) What are the factors affecting infiltration? [2]
b) What are the factors affecting run-off? [3]
c) What do you mean by a unit hydrograph? [2]
d) What do you understand by infiltration index [3]
e) What are the different types of wells? [2]
f) What is meant by specific capacity of a well? [3]
g) What do you understand by crop rotation? [2]
h) Define consumptive use? [3]
i) What do you understand by balancing depth? [2]
j) What are the drawbacks in the Kennedy's silt theory? [3]

PART - B

(50 Marks)

2. What is Hydrologic cycle? Describe with equation that is used to quantify water going through various individual paths of the cycle. Give a neat diagram too. [10]

OR

3.a) If you are performing a rainfall analysis, how would you determine if a rain gauge had a consistent recording history? How will you correct the data if the data is inconsistent?
b) Discuss the various factors affecting evapotranspiration. [5+5]

4. Explain the method by which maximum runoff can be estimated from a catchment. Describe the method of computing the ordinates of a unit–hydrograph from the data of a flood hydrograph. [10]

OR

5. Explain briefly what a unit hydrograph and a distribution graph is? 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 (Φindex) 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 m^3/sec and the hour when it is expected. [10]

6. Derive an expression for the steady state discharge of well fully penetrating into a confined aquifer. [10]

OR

7. In a certain alluvial basin of 110 km^2, 100 Mm^3 of ground water was pumped in a year and the ground water table dropped by 4 m during the year. Assuming no replenishment, estimate the specific yield of the aquifer. If the specific retention is 12%, what is the porosity of the soil? [10]

8. Define duty, delta and base period. Derive the relationship between them. Also suggest the steps to be taken to improve the duty. State any two practical applications of duty of water. [10]

OR

9. The discharge available from a tube well is 120 m^3/hour. Assume 3200 hours of working for a tube-well in a year; estimate the culturable area that this tube-well can command. The intensity of irrigation is 50% and the average depth of Rabi and Kharif crops is 48cm. [10]

10. a) Explain, in brief measurement and estimation of stream flow.
b) What are the various considerations that are made for the alignment of an irrigation canal? [5+5]

OR

11. Using Lacey's theory, design an irrigation channel for the following data:
Discharge Q = 48 cumecs
Silt factor f = 1
Side slopes = ½:1. [10]

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