Code No: 115AC

**R13**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech III Year I Semester Examinations, May - 2018**

**WATER RESOURCES ENGINEERING-I**

**(Civil Engineering)**

**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) | List the factors that affect the runoff from catchment area. | [2] |
| b) | Describe various types of precipitation. | [3] |
| c) | What is effective rainfall? | [2] |
| d) | Write down the assumptions of unit hydrograph. | [3] |
| e) | Define aquiclude. | [2] |
| f) | Draw the divisions of sub-surface water. | [3] |
| g) | List the importance of irrigation. | [2] |
| h) | What are the ill effects of irrigation? | [3] |
| i) | How do you classify the canal, based on the functions of the canal? | [2] |
| j) | What are the disadvantages of canal lining? | [3] |

**PART - B**

**(50 Marks)**

2.a) Explain tipping bucket type rain gauge with a neat sketch.
b) Describe the factors affecting infiltration. [5+5]

**OR**

3.a) Explain any one method of estimation of evaporation in detail.
b) Describe any two methods of computing average rainfall over the basin. [5+5]

4.a) What is unit hydrograph? How do you construct it?
b) Describe the two methods of separating base flow from the total runoff. [5+5]

**OR**

5. The ordinates of a 4h unit hydrograph of a basin area 300km$^2$ measured at 1h internals are 6,36,66,91,106,93,79,68,58,49,41,34,27,23,17,13,9,6,3 and 1.5 m$^3$/s respectively. Obtain the ordinates of a 3h unit hydrograph for the basin using the S-curve technique. [10]

6.a) Explain the types of aquifer.
b) How do you determine the yield of the open well from recuperation test? [5+5]

**OR**

7. Explain in detail the types of tube wells along with their construction details. [10]

8. Explain in detail the factors affecting duty. [10]

**OR**

9. After how many days will you supply water to soil in order to ensure efficient irrigation of the given crop, if
   a) Field capacity of soil = 27%
   b) Permanent wilting point = 14%
   c) Dry density of soil = 15kN/$m^3$
   d) Effective depth of root zone =75 cm
   e) Daily consumptive use of water for the given crop =11mm. [10]

10. Design a regime channel for a discharge of 35 $m^3/s$ with silt factor of 0.9 by Lacey's theory, taking side slopes as 1H:2V. [10]

**OR**

11.a) Explain the balancing depth of cutting
   b) Explain the flood frequency analysis method. [5+5]

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