



# INSTITUTE OF AERONAUTICAL ENGINEERING (Autonomous)

B.Tech VI Semester End Examinations (Regular), November – 2020

Regulation: IARE–R16

## WATER RESOURCES ENGINEERING

Time: 2 Hours

(CE)

Max Marks: 70

Answer any Four Questions from Part A

Answer any Five Questions from Part B

### PART – A

1. Name the methods used for measuring evapotranspiration. [5M]
2. What are the components of unit hydrograph. Write a note on its applications. [5M]
3. List aquifer properties and differentiate between confined and unconfined aquifers with a neat sketch. [5M]
4. What are the functions of irrigation water? Classify the irrigation water based on quality. [5M]
5. How will you justify economically the necessity of lining existing canal. [5M]
6. How can we reduce the water usage in irrigation? Give two examples. [5M]
7. How is runoff estimated using rational and empirical formulas. [5M]
8. Enumerate the methods which are used for determining the yield of dug wells. [5M]

### PART – B

9. Discuss the factors which affect the evaporation from a catchment area? [10M]
10. A 12 hr storm rainfall with the depths 2.0, 2.5, 7.6, 3.8, 10.6, 5.0, 7.0, 10.0, 6.4, 3.8, 1.4, 1.4 in cm. The basin consists of areas  $A_1=20$  hect,  $A_2=40$  hect,  $A_3=60$  hect, having average infiltration indices  $\Phi$  cm/hr as 7.6, 3.8, 1.0. Determine the average depth of hourly rainfall excess over a basin of area 120 hectares. [10M]
11. What do you understand by unit hydrograph and discuss its uses and limitations. [10M]
12. Explain mass flow curve, flow duration curve and hydrograph with a neat sketch. [10M]
13. A well of 0.5 m diameter penetrates fully into a confined aquifer of thickness 20 m and hydraulic conductivity  $8.2 \times 10^{-4}$  m/s. What is the maximum yield expected from this well if the draw down in the well is not to exceed 3 m. The radius of influence may be taken as 260 m. [10M]
14. Explain in details about the construction of wells? With the neat sketch and clearly label the different components of the well. [10M]
15. Discuss the various methods of surface irrigation? Discuss relative advantages and disadvantages? Compare surface irrigation and subsurface irrigation. [10M]
16. Explain i) Water conveyance efficiency ii) Water application efficiency iii) Water use efficiency iv) Water storage efficiency [10M]
17. Write the procedure for the design of irrigation channel in alluvial soils using Kennedy's silt theory. [10M]
18. A channel section has to be designed for the given data. discharge ( $Q$ ) = 30 cumecs, silt factor ( $f$ ) = 1.00, side slope ( $S$ ) = 1/2:1, find the slope of the longitudinal slope using Lacey's theory. [10M]