PVP 19

Code: 19CE3602

III B.Tech - II Semester – Regular Examinations – JUNE 2022

WATER RESOURCES ENGINEERING
(CIVIL ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
4. All parts of Question paper must be answered in one place.

PART – A

1. a) Draw non recoding type rain gauge and its components.
   b) What do you understand unit hydrograph?
   c) Differentiate between specific yield and specific retention.
   d) Define Duty & Delta?
   e) Write short note on regime channel.

PART – B

UNIT – I

2. a) Explain the methods to calculate average rainfall over a basin. 6 M
   b) Estimate the daily evaporation from a large reservoir from the following data.
   Water surface temperature = 28°C, Air temperature =30°C, Atmospheric pressure = 766 mm of mercury, RH = 42%, Wind speed at 0.5 m above ground level = 7.5 m/s. 6 M

OR

3. a) Discuss any two automatic rain gauge stations with help of neat diagram. 6 M

b) The rainfall rates for successive 30-minutes intervals upto 4 hr are given below. If the surface runoff is 3.7 cm, determine Φ and W indices.

Time (min)	0	30	60	90	120	150	180	210	240
Rainfall intensity (cm/h)	0	1.4	3.9	4.1	3.8	2.8	2.0	1.8	0.9

6 M

UNIT – II

4. a) Derive Unit Hydrograph from complex storms. 6 M

b) The following direct run-off hydrograph resulted from three successive 6 hours periods of rainfall having run-off estimated as 2, 4 and 3 cm respectively:
Derive and plot a 6 hour unit hydrograph for the basin having area of 103 sq.km.

Time (hr)	**0**	**3**	**6**	**9**	**12**	**15**	**18**	**21**	**24**	**27**	**30**	**33**	**36**
Flow(cumec)	**0**	**23**	**76**	**80**	**182**	**143**	**174**	**85**	**52.5**	**25**	**9**	**6**	**0**

6 M

OR

5. a) What are the methods of computing run-off from a catchment area? Explain. 6 M

b) The ordinates of a 4 h UH of a basin of area 302 km^2 measured at 1 h intervals 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 3 h UH for the basin using the S – Curve technique. 6 M

UNIT-III

6. a) Differentiate between confined and unconfined aquifers with a neat sketch. 4 M

   b) The discharge from a fully penetrating well operating under steady state in a confined aquifer of 40 m thickness is 2150 litres/minute. The drawdowns observed at two observations wells located at 15 m and 150 m from the well are 3.2 m and 0.28 m respectively. Determine the transmissibility and the permeability of the aquifer. 8 M

OR

7. a) Derive an expression for discharge from a well in unconfined aquifer. 6 M

   b) Discuss different types of wells in detail. 6 M

UNIT – IV

8. a) Define irrigation. What is the necessity and importance of irrigation? 6 M

   b) What are soil moisture constants? Explain in detail. 6 M

OR

9. a) What do you understand Duty and Delta? Explain the factors affecting Duty. 6 M

   b) After how many days will you supply water to soil (clay loam) in order to ensure efficient irrigation of the given crop, if

   Field capacity of soil = 27%

   Permanent wilting point = 14%

   Dry density of soil = 15 kN/m^3

   Effective depth of root zone = 75 cm

Daily consumptive use of water for the given crop = 11 mm. 6 M

UNIT – V

10. Design an irrigation canal to carry a discharge of 16 cumecs.
    Assume N = 0.0225, m = 1.05 and B/D = 5.7.
    Assume suitable data if necessary. 12 M

OR

11. a) Classify irrigation canals? Explain the classification based on the discharge and its relative importance. 6 M
    b) Explain Lacey's silt theory. 6 M