R16

Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year I Semester Regular Examinations November/December 2018
WATER RESOURCES ENGINEERING - I
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 **a** Define Hydrology. Discuss the various practical applications of hydrology.   7M
  b Describe the principle of working of a weighing bucket type recording rain gauge.   5M

OR

2 **a** Explain the following methods of determining the average rainfall over a catchment
      (i) Thiessen – mean method and
      (ii) Isohyetal method.   7M
  b With neat sketches explain the 'mass cause of rainfall' and 'hyetograph'.   5M

UNIT-II

3 **a** What is evaporation? Discuss the factors affecting evaporation.   7M
  b What is runoff? List the various climate and physiographic factors affecting runoff. 5M

OR

4 **a** Given the ordinates of a 4-h unit hydrograph as below derive the ordinates of a 12- h
      unit hydrograph for the same catchment.

Time (h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinate of 4-h UH(m^3/s)	0	20	80	130	150	130	90	52	27	15	5	0

                                                                                               7M
  b What are the assumptions involve in the unit hydrograph theory? What are the
      limitations of unit hydrograph?   5M

UNIT-III

5 **a** Derive an expression for the steady state discharge of a well in an unconfined
      aquifer.   7M
  b Distinguish between (i) specific yield and specific retention and (ii) Transmissibility
      and storage co-efficient.   5M

OR

6 **a** During a recuperation test conducted on an open well in a region, the water level in
      the well was depressed by 3 m and it was observed to rise by 1.75 m in 75 minutes.
      (i) What is the specific yield of open wells in that region? (b) What could be the
      yield from a well of 5 m diameter under a depression head of 2.5 m? (c) What
      should be the diameter of the well to give a yield of 12 lit/s under a depression head
      of 2 m?   7M
  b A well of 0.5 m diameter penetrates fully into a confined aquifer of thickness 20 m
      and hydraulic conductivity 8.2×10^{-4} m/s. What is the maximum yield expected
      from this well if the drawdown in the well is not to exceed 3 m. The radius of
      influence may be taken as 260 m.   5M

<div align="center">

UNIT-IV

</div>

7   **a**   Discuss in brief the flooding methods of Irrigation.   7M

     b   Explain the term 'duty'. How can duty be improved?   5M

<div align="center">

OR

</div>

8   **a**   The base period, intensity of irrigation and duty of water for various crops under a canal system are given in the Table below. Determine the reservoir capacity if the culturable commanded area is 40,000 hectares, canal losses are 20% and reservoir losses are 10%.

Crop	Base Period (days)	Duty of water at the field (hectares/m^3/sec)	Intensity of Irrigation (percentage)
Wheat	120	1800	20
Sugarcane	360	1700	20
Cotton	180	1400	10
Rice	120	800	15
Vegetables	120	700	15

     7M

     b   Define the terms: Kor watering, outlet factor, capacity factor, time factor and crop ratio.   5M

<div align="center">

UNIT-V

</div>

9   **a**   How are irrigation canals classified? Explain.   7M

     b   Derive an expression for the silt transporting capacity of a channel according to Kennedy's theory.   5M

<div align="center">

OR

</div>

10   **a**   Design a channel section for the following data: Discharge $Q = 10$ m^3/sec, silt factor $f = 1.0$, side slope = ½(H): 1 (V). Also determine the bed-slope of the channel.   7M

     b   Compare Kennedy's and Lacey's theories for the design of irrigation channel in alluvial soil.   5M

<div align="center">

*** END ***

</div>