

B.Tech III Year I Semester (R13) Regular & Supplementary Examinations November/December 2016

WATER RESOURCES ENGINEERING – I

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Classify hydrology, based on its applicability and mention one application under each one.
 - A catchment has an area of 150 ha and a runoff/rainfall ratio of 0.40. If due to a 10 cm rainfall over the catchment a stream flow at the catchment outlet lasts for 10 hours. What is the average stream flow during the above period?
 - What are the limitations of unit hydrograph?
 - What is interference among wells? How yield from wells will be influenced due to interference among them?
 - List various types of irrigation methods in practice.
 - Enumerate reasons to follow crop rotation.
 - What silt theories are commonly followed in design of canals?
 - What are the causes of water logging?
 - Enumerate causes of failure of hydraulic structures on pervious foundations.
 - What is canal escape?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 Describe the hydrological cycle with neat sketch. Discuss various engineering applications and failures of hydrology.

OR

- 3 Determine the net runoff and total rainfall and W-index for the following data when ϕ index = 3 cm/hr.

Time of rainfall (min.)	30	30	30	30	30
Rainfall rate (cm/hr)	2.0	2.5	12.0	8.0	2.0

UNIT – II

- 4 Given below are observed flows from a storm of 6-h duration on a stream with a catchment area of 500 km².

Time (h)	0	6	12	18	24	30	36	42	48	54	60	66	72
Observed Flow (m ³ /s)	0	100	250	200	150	100	70	50	35	25	15	5	0

Assuming the base flow to be zero, derive the ordinates of a 6-h unit hydrograph.

OR

- 5 Derive an expression for discharge from a well full penetrating in an unconfined aquifer.

UNIT – III

- 6 Enumerate the functions of irrigation water. Also enlist methods to improve duty.

OR

- 7 The base period, intensity of irrigation and duty of various crops under a canal system are given in the table below. Find the reservoir capacities if the canal losses are 25% and reservoir losses are 15%.

Crop	Base period (days)	Duty at the field (hectare/cumecs)	Area under the crop (hectares)
Wheat	120	1800	4800
Sugarcane	360	800	5600
Cotton	200	1400	2400
Maize	120	900	3200
Rice	120	1000	1400

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Contd. in page 2

UNIT – IV

8 What is the necessity of canal lining? Describe various types of linings used for canal.

OR

9 A channel section has to be designed for the following data:

Discharge (Q) = 30 m³/s

Silt factor (f) = 1.00

Side slope = 1/2:1

Find also the longitudinal bed slope.

UNIT – V

10 Draw a neat layout of diversion headwork and indicate the function of each component.

OR

11 Design a submerged pipe outlet for the following data:

Discharge through outlet = 0.10 m³/s

F.S.L. of distributing canal = 100.00 m

F.S.L. of water course = 99.90 m

Full supply depth of distributing canal = 1.1 m

Assume an average value of coefficient of discharge as 0.7.
