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Printed Pages: 02
Paper Id: 108739

Subject Code: NCE702/ECE702
Roll No.

B TECH

(SEM-VII) THEORY EXAMINATION 2018-19

WATER RESOURCES ENGINEERING

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data, then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. What is meant by Border flooding?
b. Define Intensity of Irrigation.
c. Explain Lacey's silt factor.
d. Define Leaching.
e. What is meant by a "Cross-Drainage Works"?
f. Define Time factor and Capacity factor.
g. Explain Base period and Crop period.
h. Write a short note on Canal siphon?
i. Write any two advantage of lining of canals.
j. What are the causes of flooding?

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. What is the problem of water logging? What are the poor effects of water logging? Describe some suitable remedial measures against water logging in brief.

b. What is the concept of Unit Hydrograph? Explain the various assumptions involved in the theory of unit hydrograph. In the following table the rainfall data at every 2-hours interval are given. Construct the ordinate of unit hydrograph. Assume the area of the basin = 25 km^2.

Hour	00 02 04 06 08 10 12 14
Total Discharge (Cumec)	6 8 10 16 28 42 60 80
Hour	16 18 20 22 24 26 28 30
Total Discharge (Cumec)	110 100 90 80 68 56 45 35
Hour	32 34 36 38 40 42 44
Total Discharge (Cumec)	26 18 11 9 8 7 6

c. List the various direct methods of measurement of consumptive use of water.

d. How will you derive the synthetic unit hydrograph from a number of unit hydrograph? Illustrate the method with suitable example in a tabular form.

e. What is an outlet? Write down the requirements that an outlet should fulfill. Distinguish clearly between non-modular and semi-modular outlets with suitable examples.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) What are the different components of hydrologic system? Describe in brief with suitable examples.

(b) Design an irrigation channel in alluvial soil according to Lacey's silt theory, with the given following data :

Full supply discharge: 1.5 cumecs
Lacey's silt factor: 1.0
Channel side slope: ½:1

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4. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) Distinguish between flow irrigation and lift irrigation. The base period, duties at the field and area to be irrigated for various crops under a reservoir are given below

Crop	Base Period (days)	Duty at field (hectares/cumec)	Area (hectares)
Wheat	120	1800	2400
Rice	150	1000	3010
Sugarcane	360	900	4890
Vegetables	130	750	1650

Find the capacity of the reservoir in hectares meter if the conveyance loss and reservoir loss are 26% and 10% respectively.

(b) What do you understand by consumptive use of water? What are the factors affecting consumptive use of water?

5. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) What is meant by water-logging? What are its ill effects? Describe some anti-water-logging measures with suitable sketches.

(b) Design a concrete lined channel to carry a discharge of 350 cumecs at a slope of 1 in 5000. The side slopes of the channel may be taken as 1.5:1. The value of n for lining is 0.014. Assume limiting velocity in the channel as 2m/sec.

6. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) What are "modules"? What are the requirements of a good module? Describe briefly with neat sketches the important types of modules and their suitabilities for a particular project.

(b) Describe 'canal regulation works'. What are the different types of canal regulation works provided? What are the functions of a canal fall?

7. **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) Derive an expression for the confined aquifer. How can the expression be used to evaluate the aquifer permeability?

(b) What is meant by tube wells? What are their types? Describe the widely used type of tube well with neat sketch. What are the approximate values of the average yield and depth of such a tube well?

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