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B. TECH.
(SEM VII) THEORY EXAMINATION 2017-18
WATER RESOURCES ENGINEERING

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

Note: 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. What is meant by 'Duty' and 'Delta' of canal water?.
c. Define Intensity of Irrigation.
d. Differentiate between "Alluvial" and "Non-alluvial" canals
e. Explain Lacey's silt factor
f. Write short note on safety ladders for large canals.
g. Define Leaching
h. Write a short note on Syphon aqueduct?
i. What is meant by a "Cross-Drainage Works"?
j. Explain Specific retention of a soil.

SECTION B

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

a. What is run-off? What are the factors that affect the run-off from a catchment area? Describe the methods of computing run-off from a catchment area.
b. Describe an expression for the yield of tube-wells for the case of an un-confinedaquifer. A 30 cm well fully penetrates an un-confined aquifer of 25 m depth. When a discharge of 2100 liters/minute was being pumped for a long time, observationwells at radial distances of 30 m and 90 m indicated draw down of 5 m and 4 m respectively. Estimate the coefficient of permeability and transmissibility of the aquifer.
c. Write a short note on 'Synthetic Unit Hydrograph'. How will you derive the synthetic unit hydrograph from a number of unit hydrograph ? Illustrate the methodwith suitable example in a tabular form.
d. 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.
e. Design an irrigation channel to carry 40 cumecs of discharge, with B/D, i.e. base width to depth ratio as 2.5. The critical velocity ratio is 1.0. Assume a suitable value of Kutter'srugosity coefficient and use Kennedy's method.

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SECTION C

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

(a) Explain with the help of a diagram the concept of hydrologic cycle. What are the different components of hydrologic system? Describe in brief with suitable examples.
Describe the salient features of probabilistic maximum precipitation curves.
(b) A basin has the shape in the form of a regular pentagon with each side of the length of 2 km. The five rain – gauges located at the corners recorded the rainfall as 60, 81, 73, 59 and 45 mm respectively. Compute the average depth

of rainfall over the basin by arithmetic mean method and Theissen Polygon method. Sketch few isohytes also

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

(a) The Hourly distribution of a 2-hour Unit Hydrograph is given below. Derive a 6-hours Unit hydrograph ordinates

Time(Hours)	**0 1 2 3 4 5 6 7 8**
Discharge(Cumec)	**0 1.0 2.7 5.0 8.0 9.8 9.0 7.56.**3
Time(Hours)	**9 10 11 12 13 14 15**
Discharge(Cumec)	**5.0 4.0 2.9 2.1 1.3 0.50**

(b) Distinguishbetweenflowirrigationandliftirrigation. The base period,dutiesatthe fieldandareatobe irrigatedforvariouscropsunderareservoirare givenbelow

Crop	**BasePeriod (days)**	**Dutyatfield (hectares/cumec)**	**Area (hectares)**
Wheat	120	1800	2400
Rice	110	1000	3010
Sugarcane	360	900	4890
Vegetables	130	750	1650

Findthe capacityofthereservoirinhectaresmeterifthe conveyanceloss andreservoirloss are 26%and10% respectively.

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) Designaconcrete linedchanneltotriangularsectionto carryadischarge of45 cumecsatslope of1in10km. Thesideslopesof thechannelare1.25:1and Manning's coefficient'N'maybetakenas0.018.

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

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

(b) 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.

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

(a) Write short notes on :
(i) Well shrouding and well development
(ii) Types of open wells
(iii) Infiltration galleries
(iv) Non-artesian and artesian wells.

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