**Printed Pages:02** **Sub Code: KCE078**

**Paper Id:** | | **Roll no** | | | | | | | | | | |

**B.TECH.**

**(SEM VII) THEORY EXAMINATION 2023-24**

**IRRIGATION AND WATER RESOURCE 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) Describe Probable Maximum Precipitation (PMP).
b) Define water budget equation.
c) What is the assumption made in unit hydrograph?
d) Define trickle irrigation system.
e) Explain Lacey's silt factor.
f) Define Canal regulation works.
g) Define silting and scouring in canals.
h) Define the objectives of Diversion Headwork
i) Explain Specific Capacity of Well.
j) Define Specific yield.

**SECTION B**

**2. Attempt any *three* of the following:** **10 x3 = 30**

| | |
|---|---|
| a. | Write a short note on 'synthetic Unit Hydrograph. How will you derive the synthetic unit hydrograph from a number of unit hydrograph? Illustrate the method with suitable example in a tabular form |
| b. | Define following terms:<br>i. Depth area duration curve<br>ii. Probable Maximum Precipitation<br>iii. Evapotranspiration<br>iv. Φ-index |
| c. | What is the problem of water logging? What are the p Poor Effec logging? Describe some suitable remedial measures against water logg brief. |
| d. | Using Lacey's theory, design an trapezoidal irrigation channel (side slope, 1H: 2V) carrying discharge of 40 $m^3$/sec. Take silt factor as 1.0. |
| e. | Write short notes on:<br>i. Well shrouding and well development<br>ii. Types of open wells<br>iii. Infiltration galleries<br>iv. Hydraulic conductivity |

**SECTION C**

**3. Attempt any *one* part of the following:** **10 x1 = 10**

(a) The rainfall rates of successive 30- minutes intervals up to 4 hours are given

below. If the surface runoff is 3.6 cm . Determine φ and W index.

| Time (minutes) | 0 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 |
|---|---|---|---|---|---|---|---|---|---|
| Rainfall intensity (cm/h) | 0 | 1.3 | 2.8 | 4.1 | 3.9 | 2.8 | 2.0 | 1.8 | 0.9 |

(b) Give various flood discharge formulae for Indian catchments.

**4. Attempt any *one* part of the following: 10 x1 = 10**

(a) Write assumptions of unit hydrograph theory. Also write the use of unit hydrograph theory.

(b) A water course has a culturable commanded area of 1200 hectares. The intensity of irrigation for crop A is 49% and for crop B is 35%, both the crops being Rabi crops. Crop A has a kor period of 20 days and crop B has kor period of 15 days. Calculate the discharge of the water course if the kor depth for crop A is 10 cm and for B it is 16 cm.

**5. Attempt any *one* part of the following: 10 x1 = 10**

(a) Design an irrigation canal to carry discharge of 14 cumecs. Assume D=0. 025 m and B/D= 5.7

(b) What do you understand by canal breaches? Write reasons for canal breaches.

**6. Attempt any *one* part of the following: 10 x1 = 10**

(a) With neat sketches explain flow of ground water to drains.

(b) Define sensitivity and setting of an outlet. Find the relation between sensitivity and Flexibility of an out let.

**7. Attempt any *one* part of the following: 10 x1 = 10**

(a) A tube well of 30 cm diameter penetrates fully in an artesian aquifer. The strainer length is 15 m, Calculate the yield from the well water drawdown of 3 m.The aquifer consists of sand effective size of 0.2 mm having coefficient of permeability equal to 50m/day. Assume radius of drawdown equal to 150 m.

(b) Distinguish clearly between a shallow well and a deep well. How does a deep well differ from a tube well in confined aquifer.