



R22 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous, Accredited by NAAC with 'A+' Grade)

Subject code: 4E5AA

B.Tech V Semester Regular Examinations, December 2024

**WATER RESOURCES ENGINEERING-I
(CIVIL ENGINEERING)**

Maximum Marks: 60

Date: 23.12.2024

Duration: 3 hours

- Note:**
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A			CO	Bloom Tx level
All the following questions carry equal marks (10x1M=10 Marks)				
1		Write any four factors affecting evapotranspiration?	1	L1
2		What are the losses of precipitation?	1	L1
3		Distinguish between surface and sub surface run off	2	L2
4		Define Instantaneous unit hydrograph.	2	L1
5		What are Dupit's assumptions?	3	L1
6		State Darcy's law.	3	L1
7		Write the soil, water and plant relationship.	4	L1
8		What are the two important standards for irrigation water?	4	L1
9		What are the merits of Lacey's theory?	5	L1
10		Why are linings provided to canals for what type of canals lining is provided?	5	L1
Part-B				Bloom Tx level
Answer All the following questions. (5X10M=50Marks)				
11	a	Define hydrologic cycle. Explain descriptive representation of hydrologic cycle and various processes involved in hydrologic cycle with neat sketch [5M]	1	L2
	b	Describe various types and forms of precipitation. [5M]	1	L2
OR				
12	a	Discuss various methods available for measurement of infiltration [5M]	1	L2
	b	Distinguish between Φ -index and W-index [5M]	1	L2
13	a	Define S- curve Hydrograph and explain how it is derived? [5M]	2	L4
	b	Define hydrograph. List the assumptions involved in the unit hydrograph theory [5M]	2	L2
OR				
14	a	Discuss with neat sketches of various methods to determine unit hydrograph of different duration from unit hydrograph of some unit duration [5M]	2	L2

	b	Table below gives ordinates of 6-hr unit hydrograph. Derive the ordinates of S-hydrograph [5M]																						
		<table><tr><td>Time(Hrs)</td><td>0</td><td>3</td><td>6</td><td>9</td><td>12</td><td>15</td><td>18</td><td>21</td><td>24</td></tr><tr><td>Ordinates of 6-Hr UH (m^3/sec)</td><td>0</td><td>10</td><td>20</td><td>30</td><td>40</td><td>30</td><td>20</td><td>10</td><td>0</td></tr></table>	Time(Hrs)	0	3	6	9	12	15	18	21	24	Ordinates of 6-Hr UH (m^3/sec)	0	10	20	30	40	30	20	10	0	2	L4
Time(Hrs)	0	3	6	9	12	15	18	21	24															
Ordinates of 6-Hr UH (m^3/sec)	0	10	20	30	40	30	20	10	0															
15	a	Compute an expression for discharge from a well full penetrating in an unconfined aquifer [5M]	3	L3																				
	b	Calculate the discharge in m^3/day from a tube well under the following conditions of an unconfined aquifer: Diameter of the well = 50 cm; Drawdown at the well = 10 m; length of strains = 25 m; Radius of influence of the well = 250 m; coefficient of permeability = 0.01 cm/s. [5M]	3	L3																				
		OR																						
16	a	Distinguish between (i) confined aquifer and unconfined aquifer (ii) groundwater and perched groundwater [5M]	3	L2																				
	b	During a recuperation test, an open well was depressed by pumping by 2.5m and it recuperated 1.8m in 80 minutes. Find i) yield from a well of 4m diameter under a depression head of 3m, ii) the diameter of the well to yield 8 litres/sec under a depression head of 2m. [5M]	3	L3																				
17	a	Describe the advantageous and disadvantageous of irrigation [5M]	4	L2																				
	b	Derive the relationship between duty, delta and base period. [5M]	4	L4																				
		OR																						
18	a	Define Consumptive use of water? List out various methods used for the assessment of consumptive use of water? Explain any one method in detail for the estimation of consumptive use [5M]	4	L2																				
	b	In a certain area paddy crop requires 14 cm of depth of water at an interval of 10 days for a base period of 110 days; Whereas wheat crop requires 9.0 cm of depth of water after 35 days with a base period of 140 days. Determine the delta of paddy crop and duty of wheat crop of that area. [5M]	4	L3																				
19	a	How does the balancing depth of cutting affect the stability of canal banks? [5M]	5	L3																				
	b	Why is Lacey's conception is superior to that of Kennedy's? [5M]	5	L3																				
		OR																						
20	a	Design a channel section by Kennedy's theory with following data: Discharge $Q = 2828$ cumecs Kutter's $N = 0.0225$ Critical velocity ratio ' m ' = 1 Side slope = 1/2 : 1 $B/D = 7.6$ Find also the bed slope of the channel? [5M]	5	L6																				
	b	Explain Lacey's theory and list the equations used for designing irrigation canals. [5M]	5	L2																				