Reg. No.												

Question Paper Code	11632

12 JAN 2023

B.E. / B. Tech. - DEGREE EXAMINATIONS, NOV/DEC 2022

Fifth Semester

Civil Engineering

20CEEL510 - GROUND WATER ENGINEERING

(Regulations 2020)

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks, K-Level,CO
1.	What are the factors affecting permeability?	2,K1,CO1
2.	Recall Darcy's law and its application.	2,K1,CO1
3.	State Principles of law of times.	2,K1,CO2
4.	Define specific capacity of well.	2,K1,CO2
5.	List the need of groundwater balance equation.	2,K1,CO3
6.	Construct the governing equation of mathematical model for basin.	2,K2,CO3
7.	Summarize the main factors affecting the groundwater quality.	2,K1,CO4
8.	Compare legislation and regulation.	2,K2,CO4
9.	How do you identify the contamination source inventory?	2,K2,CO5
10.	Recommend the source of protection areas for delineation.	2,K2,CO5

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11.	a)	An unconfined aquifer with a specific yield of 0.20 is used to supply water for the irrigation of farm land. The recharge area of the aquifer is same as the irrigation of farm land. The recharge area of the aquifer is same as the irrigated area. The recharge is limited to 76mm per year. The saturated thickness of the aquifer is 15.2m. How many year will the water supply last if 254 mm of water per year is pumped from the aquifer for irrigation?	13,K1,CO1
		OR	
	b)	Elaborate the GEC norms and its recommendations.	13,K2,CO1
12.	a)	State your own words about partial penetration of wells.	13,K2,CO2
		OR	
	b)	The following data were collected during the pumping test of a	13,K3,CO2

confined aquifer to determine the aquifer parameters. The test well was pumped at the rate of 31.5 lps. The observation well is located at 15.2 m from the main pumping well. Determine T and S of an aquifer by Jacob's technique.

Time (hrs)	0.5	1.0	2.0	4.0	6.0	12.0	24.0	48.0
Draw Down (m)	0.15	0.30	0.46	0.76	0.98	1.31	1.65	1.95

13. a) (i) Rephrase the predictive, interpretive and generic type model. *6,K2,CO3*
(ii) Examine the model conceptualization. *7,K3,CO3*

OR

b) Explain any two models selected to prefer the task. *13,K3,CO3*

14. a) Explain industrial and agricultural sources of groundwater pollution and their effects on water quality with neat flow chart. *13,K2,CO4*

OR

b) Discuss the physical, chemical and biological water quality standards for various purposes. *13,K2,CO4*

15. a) How do you technically determine the impact of an artificial recharge structures? *13,K3,CO5*

OR

b) Explain in details about protection zone delineation. *13,K3,CO5*

PART - C (1 × 15 = 15 Marks)

16. a) Explain the mathematical model for aquifer system. *15,K3,CO6*

OR

b) Explain about (i) Finite Element method. (ii) Finite difference method. *15,K3,C*