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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VII**

Branch: Civil Engineering **Duration: 3 hrs.**

Course Code: 22CV7PEGWH / 21CV7PEGWH **Max Marks: 100**

Course: Ground Water Hydrology

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT – I	CO	PO	Marks
1	a)		Explain the vertical distribution of ground water with a neat sketch.	CO1	PO 1	08
	b)		Define an aquifer and explain different types of aquifers with neat sketch	CO1	PO1	06
	c)		Explain Darcy's Law and discuss the validity and limitations.	CO1	PO1	06
			OR			
2	a)		Define permeability, specific yield, specific retention and porosity.	CO1	PO1	08
	b)		In a field test, it is observed that 3 hr 20 min was required for a tracer to travel from one well to another 20 m apart, and the difference in their water surface elevations was 0.5 m. Samples of the aquifer between the wells indicated a porosity of 15%. Determine the permeability of the aquifer, seepage velocity and the Reynolds number for the flow assuming an average grain size of 1 mm and kinematic viscosity of water at 27^{o}C as 0.008 stoke.	CO1	PO1	12
			UNIT – II			
3	a)		Derive an equation for discharge for the steady radial flow into an unconfined aquifer using Dupuit's theory and list the assumptions and limitations involved.	CO2	PO1	10
	b)		A well is located in a 25 m confined aquifer of permeability 30 m/day and storage coefficient of 0.005. If the well is being pumped at the rate of 1750 litres per minute, calculate the drawdown at a distance of 100 m from the well after 20 hrs of pumping. Take W(u) = 3.35.	CO2	PO1	10
			OR			

	4	a)	Explain Theis method to determine aquifer constants S and T for the unsteady radial flow towards a well.	***CO2***	***PO1***	**10**
		b)	Derive an equation for discharge for the unsteady radial flow into a confined aquifer.	***CO2***	***PO1***	**10**
			UNIT - III			
	5	a)	Explain in detail the purpose, and any one appropriate method for the artificial recharge of groundwater.	***CO2***	***PO1***	**10**
		b)	Elaborate on the groundwater pollution emphasizing the sources and potential impacts.	***CO3***	***PO1***	**10**
			OR			
	6	a)	Elaborate on the problem of groundwater salinity and its remediation measures.	***CO3***	***PO1***	**10**
		b)	Comment on the approach of artificially recharging groundwater using effluent from water treatment plant, that is being experimented in many parts of Karnataka. Also, explain various methods that are effective for the waste water recharge.	***CO2***	***PO2***	**10**
			UNIT - IV			
	7	a)	Elaborate on the sources that contribute to the saline water in an aquifer.	***CO3***	***PO1***	**10**
		b)	With a neat sketch, derive the equation to represent the hydrostatic equilibrium between the freshwater and saline waters.	***CO3***	***PO1***	**10**
			OR			
	8	a)	Explain with neat sketch the upconing of the saline water intrusion. Also, explain the remedial measures to control the saline water intrusion.	***CO3***	***PO1***	**10**
		b)	Discuss in detail the shape and structure of freshwater and saline water interface.	***CO3***	***PO1***	**10**
			UNIT - V			
	9	a)	Describe the geophysical exploration for groundwater using remote sensing.	***CO3***	***PO1***	**10**
		b)	Explain the electrical resistivity method used for geophysical exploration and state its advantages.	***CO3***	***PO1***	**10**
			OR			
	10	a)	Describe the methodology, and the challenges involved in using the seismic refraction method for groundwater exploration.	***CO3***	***PO1***	**10**
		b)	Compare the induction logging and sonic logging methods in groundwater exploration.	***CO3***	***PO1***	**10**

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