MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
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MANIPAL INSTITUTE OF TECHNOLOGY
***THIRD SEMESTER B.TECH (CIVIL ENGINEERING)
END SEMESTER EXAMINATION, NOV 2022
WATER SUPPLY ENGINEERING (CIE 2155)

TIME: 3 HRS.   **MAX. MARKS: 50**

Note: 1. Answer all questions.
      2. Any missing data may be suitably assumed.

Q.NO	QUESTION	MARKS	CO	BL
1A	The population data of a town are given below. Estimate the expected population in the year 2030 and 2040 by geometric increase method. 	Year	1980	1990	2000	2010	2020
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Population	94,000	1,10,000	1,45,000	2,40,000	2,50,000		4	CO1	4
1B	Differentiate between i) Wet intake and dry intake structures. ii) Gravity and pressure conduits	3	CO1	2
1C	Explain the significance of e-coli and chlorides analysis in water used for domestic purposes	3	CO2	2
2A	Design a circular sedimentation tank working for water treatment to supply 3.2 million litres of water to the town. The detention period in each of the tank is 4 hrs and depth of the water in the tank is 3m. Also, determine the dimensions of a rectangular sedimentation tank for same quantity and calculate its overflow rate in $m^3/day/m^2$.	4	CO3	4
2B	Describe the purposes of screening and aerators in water treatment plant.	3	CO3	2
2C	Determine the quantity of alum required in order to treat 10 million liter of water/ day at treatment plant, where 9 ppm of alum dose is required. Also determine amount of CO_2 gas which will be released per	3	CO3	3

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	litre of water treated. (molecular weight: Al -27, S-32, O-16, H-1, C-12). $$Al_2(SO_4)_3.18H_2O + 3Ca(HCO_3)_2 \rightarrow 3CaSO_4 + 2Al(OH)_3 \downarrow + 6CO_2 \uparrow$$ Al. hydroxide ppt.			
3A	Enumerate the differences between slow sand and rapid sand filters.	4	CO4	2
3B	Describe the process of i) Disinfection using chlorine ii) Defluoridation by Nalgonda technique.	3	CO4	2
3C	Explain with a neat sketch the Electrodialysis method used for desalination of water.	3	CO4	2
4A	Describe briefly the method of removing permanent hardness by demineralization and regeneration process with chemical equations.	4	CO4	2
4B	Explain super chlorination, double chlorination and dechlorination process of disinfection.	3	CO4	3
4C	Differentiate between i) Intermittent and continuous water supply ii) Pumped and gravity distribution system	3	CO5	2
5A	Explain breakdown storage, balancing storage and the functions of distribution reservoir.	4	CO5	2
5B	Explain the features, advantages and disadvantages of radial system of water distribution system with neat sketch and mention its suitability.	4	CO5	2
5C	Explain the working of Baylis Turbidity meter.	2	CO2	2