UPES
UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, July 2020

Program: B.Tech (Civil Engineering)   **Semester: VIth**
Course Name: Environmental Engineering I   **Max. Marks: 100**
Course Code: CIVL 3009   **Attempt Duration: 3 Hrs.**
No. of page/s: 02

Instructions: All questions are compulsory to attempt. The exam to be submitted within 24 hrs from the scheduled time and no submission shall be entertained after 24 hrs.

S. No.	SECTION A	Marks	CO
Q 1	Explain how ratio method can be used for population forecasting.	04	CO1
Q 2	State the working principle of turbidity rod for measurement of turbidity in field conditions.	04	CO2
Q 3	Correlate the hardness and alkalinity quality parameters for a water sample.	04	CO2
Q 4	Draw the sequential schematic sketch of the water treatment processes generally adopted in water treatment plant along with their key points.	04	CO3
Q 5	Enumerate the minor methods of water disinfection.	04	CO4
	SECTION B		
Q 1	Which type of intake structures are generally constructed in reservoirs (as a source for water supply) and why. Also explain the same with key points.	10	CO1
Q 2	Design a suitable rectangular sedimentation tank (fitted with manual sludge removal arrangements) for a water treatment having average daily demand estimated as 12 MLD. Assume suitable data and figures wherever needed according to design guidelines	10	CO3
Q 3	Explain the various types of chlorination processes generally used for water disinfection purpose.	10	CO4
Q 4	Analyze the different chemical quality parameters of water along with their critical points and prescribed permissible limits OR Discuss the multiple tube fermentation technique performed for determination of coliform's bacteria concentration in raw water sample.	10	CO2

	SECTION-C		
Q 1	A rectangular sedimentation tank following coagulation-flocculation is to treat a flow of $1900m^3$/day with a detention time of 5 hrs. The suspended solids concentration of the water reduced from 230 mg/l to 6 mg/l by coagulation flocculation. The alum dose used for the purpose is 1 kg/day. The settled sludge has a moisture content of 83% and specific gravity of 1.20. Calculate the volume of sludge produced per day from the tank.	**20**	**CO3**
	OR		
	Design a coagulation-cum-sedimentation tank with continuous flow for a population of 1,00,000 persons with a daily per capita water allowance of 135 litres. Assume suitable data wherever necessary in accordance with design guidelines	**20**	**CO3**
Q 2	A town is having a population of 155000 and daily water demand of 130 lpcd. Design a rapid sand filter for the above town requirement with details of under drainage system and back water washing including wash water gutter arrangement. Assume suitable data and figures wherever needed according to design guidelines	**20**	**CO3**