

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS- 2025

B.Tech 5th Semester (CE)

COURSE CODE (CREDITS): 18B11CE512 (3)

MAX. MARKS: 25

COURSE NAME: Sewage Treatment and Disposal

COURSE INSTRUCTORS: Dr. Rishi Rana Kalia

MAX. TIME: 1 Hour 30 Min

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks																																				
Q1	The average sewage flow from a city is 23×10^4 l/d. if the average 5 day BOD is 613 ppm, compute the total daily 5 day oxygen demand in kg, and the population equivalent of sewage. Assume per capita BOD of sewage per day as 96 g	CO-3	2 Marks																																				
Q2	List and describe four key laboratory tests that help in determining the characteristics of sewage	CO-2 & 3	4 Marks																																				
Q3	The flow to an activated sludge process plant is 20 MLD, with an influent BOD = 220 mg/L and effluent BOD = 30 mg/L. Find the percentage BOD removal. Also calculate the BOD load applied (kg/day).	CO- 4	5 Marks																																				
Q4	Calculate the COD of a wastewater containing 516 mg/L of acetic acid. Further, using a reaction rate constant of 0.1 per day, determine the ultimate BOD and the 5-day BOD.	CO-3	4 Marks																																				
Q5	A BOD test is performed on 25 ml of waste water through the standard BOD bottles at different times, which gave following results. Compute the value of rate constant, value of BOD₅ and Ultimate BOD. <table border="1"> <thead> <tr> <th>Bottle No.</th><th>Initial DO (mg/l)</th><th>Incubation time (days)</th><th>Final DO (mg/l)</th></tr> </thead> <tbody> <tr><td>1</td><td>10.1</td><td>0.5</td><td>4.57</td></tr> <tr><td>2</td><td>10.1</td><td>1.0</td><td>7.6</td></tr> <tr><td>3</td><td>10.1</td><td>2.0</td><td>1.6</td></tr> <tr><td>4</td><td>10.1</td><td>2.5</td><td>5.5</td></tr> <tr><td>5</td><td>10.1</td><td>3.0</td><td>6.4</td></tr> <tr><td>6</td><td>10.1</td><td>3.5</td><td>3.6</td></tr> <tr><td>7</td><td>10.1</td><td>4.5</td><td>4.6</td></tr> <tr><td>8</td><td>10.1</td><td>5.0</td><td>6.3</td></tr> </tbody> </table>	Bottle No.	Initial DO (mg/l)	Incubation time (days)	Final DO (mg/l)	1	10.1	0.5	4.57	2	10.1	1.0	7.6	3	10.1	2.0	1.6	4	10.1	2.5	5.5	5	10.1	3.0	6.4	6	10.1	3.5	3.6	7	10.1	4.5	4.6	8	10.1	5.0	6.3	CO-4	7 Marks
Bottle No.	Initial DO (mg/l)	Incubation time (days)	Final DO (mg/l)																																				
1	10.1	0.5	4.57																																				
2	10.1	1.0	7.6																																				
3	10.1	2.0	1.6																																				
4	10.1	2.5	5.5																																				
5	10.1	3.0	6.4																																				
6	10.1	3.5	3.6																																				
7	10.1	4.5	4.6																																				
8	10.1	5.0	6.3																																				
Q6	A wastewater sample has a reported 5-day BOD of 650 mg/L at a standard incubation temperature of 20 °C. Given that the first-order reaction rate constant (k) is 0.23 day ⁻¹ at 20 °C, determine the oxygen demand exerted after 8 days if the BOD test were instead conducted at 15 °C. Assume the effect of temperature on the reaction rate constant follows the conventional Arrhenius-type relationship	CO-3	3 Marks																																				