Roll No._____

JAMIA HAMDARD
DEPARTMENT OF CHEMISTRY
SCHOOL OF CHEMICAL AND LIFE SCIENCES
B.SC. CHEMISTRY (WITH RESEARCH)
SEMESTER II

End-term Examination 2023

Paper Name: Waste Water Treatment
Time: 2hrs

Paper Code: BCH-SEC-201
Max. Marks:45

Note: This paper has 3 sections A, B, and C, Attempt all three sections

Section A: Answer all the questions; **Section B:** Answer any 2 out of 4; **Section C:** Answer all the questions, each question has an internal choice

Abbreviations Used *CO-Course Outcome, CLO- Course Learning Outcome, PO- Program Outcome, PLO- Program learning Outcome, BTL- Bloom Taxonomy Level: BT level 1-Remember; BT level 2- Understand; BT level 3- Apply; BT level 4-Analyze; BT level 5-Evaluate, BT level 6- Create*

SECTION A

Very Short Type Questions (Attempt all) **1X10=10**

Q. No	Question	Marks	BTL-	CLO	PLO
1	What are the different types of Desalination plants, and how do they operate?	1	1	2,3	2,3
2	Discuss the neutralization of pH in water treatment. Briefly explain the importance of controlling pH and provide examples of chemicals used for pH adjustment.	1	1,2	3	1,2,3
3	Explore techniques used for the removal of iron and manganese from water. Briefly explain the mechanisms involved.	1	1,	1,2	2,3
4	Explain the principles and design of fluoridation and de-fluoridation methods. Briefly discuss the importance of managing fluoride levels in drinking water.	1	2	1,3	1,4
5	Briefly explain the concept of municipal wastewater and various wastewater categories (Blackwater, Grey water, yellow water, and brown water).	1.5	1,2	2	2,4
6	Choose one specific industry (e.g., textile, pharmaceutical) and explain the nature of its effluents and the environmental concerns they raise.	1.5	1,2	1,3	2,3
7	Explain the removal of phosphorus and nitrogen from wastewater and the various stages of treatment.	1	2	1,3	1,3
8	Explain the stages of sewage and effluent treatment.	1	3	2	3
9	Describe the determination of key parameters, including a) MLSS, b) MLVSS, in sewage.	1	1,3	3	2,3
10	Discuss sludge disposal methods and the recycling of sewage.	1	2,3	2,3	3,5

(PTO)

SECTION B

Long type Questions (Attempt any two out of four) *7.5X2=15*

Q. No	Question	Marks	BTL-	CLO	PLO
1	Explain the principles and significance of the Activated Sludge process in the biological treatment of wastewater. Include the key stages involved and highlight any modifications that can enhance its efficiency.	6.5	3,4	3-4	2,6,7
2	"Explain the bacteriology of sewage and its significance in sewage treatment. How does it influence the selection of treatment methods?"	6.5	4,5	2-3	2-5
3	Explore the different methods of sewage treatment, focusing on aerobic oxidation plants. Provide examples of their applications	6.5	1,2	1-3	3-5
4	Compare and contrast the different types of disinfection methods for water treatment. Analyze the factors that influence the effectiveness of disinfectants and discuss the chemistry behind chlorination. Provide examples of situations where specific disinfection methods might be preferred over others.	6.5	3,4	2-4	2-6

SECTION C

Short-type Questions. (Attempt all questions, each question has an internal choice) **4x5=20**

Q. No	Question	Marks	BTL-	CLO	PLO
1	Briefly explain the methods used for the chemical and physical examination of water quality. Provide examples of parameters examined in each category. Or Discuss the details and calculations involved in the Reverse Osmosis method for water treatment. How does it differ from Desalination plants in terms of operation and application?	3	3,4	3-4	3-5
2	Explain the coagulation theory in water treatment. How is the optimum dose of coagulant determined, and what are the design criteria involved? Or Explain the treatment concept and types of the Ultra-Filtration process in water treatment. Provide examples of situations where Ultra-Filtration is particularly effective.	3	4,5	2-3	3-4
3	Define the term "hardness of scale" in water treatment. Discuss its impact and methods to mitigate scale formation. Or Explore techniques used for the removal of grit in sewage treatment. Discuss their effectiveness and significance in the overall treatment process.	3	4,5	2-5	4-7

4	Explain the key components and design considerations involved in a system of sewerage. Highlight the importance of an efficient sewerage system in urban areas and discuss any challenges associated with its implementation. Or Discuss the stages of primary treatment for wastewater and sewage. Explain the screening, grit removal, and oil and grease removal techniques.	3	3,4	2-4	4-5
5	Differentiate between industrial and agricultural effluents. Provide examples of each and discuss their treatment requirements. Or Explore the advantages and disadvantages of the Batch Process in sewage treatment. How does it differ from continuous treatment processes?	3	3,4	3	4,5,7

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