

R16

Code No: 138CU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, July - 2023

INDUSTRIAL WASTE WATER TREATMENT

(Civil Engineering)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) Write down waste water characteristics. [2]
- b) Write down treatment objectives. [3]
- c) Explain Sutro weir. [2]
- d) Draw Parshall flume and write down its use. [3]
- e) What do you understand by a contact bed? [2]
- f) Draw a neat sketch of magnetite filter. [3]
- g) Elaborate the importance of F/M ratio. [2]
- h) Write down activated sludge process efficiency. [3]
- i) Write down the effect of temperature on digestion period. [2]
- j) List out various stages of anaerobic digestion. [3]

PART – B

(50 Marks)

2. What do you understand by unit operations and processes? What is its importance in water and wastewater treatment? Elaborate various types of unit operations used for wastewater treatment. [10]

OR

3. Give an elaborate list of important operations which constitute the physical unit operations and chemical and biological unit processes employed in water and wastewater treatment. [10]
4. What do you understand by preliminary treatment of wastewater? Enumerate various unit operations falling under this. Also, draw flow diagrams for the possible arrangements of various units falling under preliminary treatment. [10]

OR

- 5.a) What do you understand by grit chambers? Why it is necessary to provide a grit chamber? Explain the configuration of a grit chamber with the help of neat sketches.
- b) Write a detailed note on various design parameters, such as settling velocity, overflow rate, detention time etc. [5+5]

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- 6.a) What do you understand by secondary treatment (or biological treatment) of wastewater? Enumerate various treatment techniques used for biological treatment.
- b) Differentiate clearly between attached growth processes and suspended growth processes. List various treatment techniques falling under each such process. [5+5]

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- 7.a) State advantages and disadvantages of conventional trickling filter.
- b) What do you understand by (i) recirculation, (ii) two stage high rate trickling filters. [5+5]

8. Design a conventional activated sludge plant to treat settled domestic sewage with diffused air aeration system, for the following data:

a) Population	...	1,20,000
b) Per capita sewage contribution	...	160 lpcd
c) Settled sewage 5 day BOD	...	200 mg/l
d) Effluent BOD required	...	15 mg/l
e) F/M	...	0.2
f) MLSS	...	3000 mg/l

Assume any other data required.

[10]

OR

- 9.a) Explain, with the help of a flow diagram, the essentials of activated sludge process.
- b) Explain in brief various methods used for aeration in the activated sludge process. [5+5]

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10. Explain, with the help of a flow chart, various processes involved in sludge treatment and disposal. [10]

OR

- 11.a) Explain in brief the characteristics of sludge produced in various treatment processes.
- b) The moisture content of a sludge is reduced from 95% to 85%. Show that its volume is reduced to one-third of the volume during this process. [5+5]

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