Ref. No.: Ex/FTBE/PC/B/T/421/2024(S)

B.E. FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING
FOURTH YEAR SECOND SEMESTER SUPPLEMENTARY EXAM 2024

WASTE TREATMENT ENGINEERING

Time: 3 hrs **Full Marks: 100**

(Use separate Answer script for each Part)

Part – I (50 Marks)

Group-A

Answer any one question **1×10 = 10**

1. What are the different steps of industrial waste treatment processes? Briefly describe different sedimentation processes. 4+6 = 10
2. Write short note on anaerobic digestion of waste water. What is the basic composition of biogas? 7+3 = 10

Group-B

Answer any two questions **2×20 = 40**

3. What are the different types of sedimentation tanks? Write the working principle of activated sludge process with schematic diagram. Define hydraulic residence time, biomass residence time, overflow rate. 4+(6+4)+6 = 20
4. Write short note on RBC with its applications. Briefly describe design criteria of RBC. (5+3)+ 12 = 20
5. Derive the expression for free settling velocity. Write working principle of trickling filter with schematic diagram. Define different types of yield coefficients. 7+(6+4)+3 = 20
6. Write short note on UASB with schematic diagram. What are the purpose of special waste treatment processes? Write short note on tertiary waste treatment process. (6+4)+4+6 = 20

[Turn over

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B.E. FOOD TECHNOLOGY AND BIO-CHEMICAL ENGINEERING FOURTH YEAR SECOND SEMESTER SUPPLEMENTARY EXAM– 2024

Subject : Waste Treatment Engineering

Time: 3hr **Full Marks: 100**

Part II (Total Marks 50)

Instructions : Use Separate Answer scripts for each part

Answer any **five** questions from the following: 5x10=50

1. BODu is generally lower than COD-Justify. What is the role of acclimation of seed? How it is done? How presence of algae in waste water affect BOD test? 3+2+2+3=10

2. What do you mean by nitrification? Deduce a combined relationship of oxygen demand process. 2+8=10

3. What are the major components of waste water? What is volatile suspended solid? How it is estimated? 5+2+3=10

4. Find an expression of particle settling velocity. Deduce the expression of growth yield for a single bacterial species in a batch culture. 4+6=10

5. Deduce a relationship between BOD_5 and BODu. What is nitrification? How it contributes to the oxygen demand? What do you mean by Volatile Suspended Solids? 5+2+2+1=10

6. Write a short note on the measurement of any **two**: 5+5=10

i. BOD
ii. COD
iii. ThOD