Ref No: –Ex/CE/PC/H/T/423/2022

B.E.C.E. 4th Year EXAMINATION, 2022
(2nd Semester)
SUBJECT: ADVANCED ENVIRONMENTAL ENGINEERING (HONS.)

Full Marks 70

Time: Four hours

Use a separate Answer-Script for each part

No. of Questions	Part I(42 Marks for This Part)	Marks

Answer all the questions. Assume any data if not provided. All the drawings should be in pencil.

Q1. **Differentiate between** 2×6

(i) Bulk solution transport and pore diffusion transport with reference to adsorption

(ii) PFR and CSTR

(iii) Zone of active decomposition and zone of recovery

(iv) Dispersion number and dispersion coefficient

(iv) Axial flow and radial flow agitator

(v) Point of confluence and critical point

Q2. (a) A city discharges 16×10^4 cum/day of sewage into an adjacent river whose minimum flow rate is 65×10^4 cum/day. Find out the degree of treatment of sewage required to satisfy river water quality for propagation of wild life and fisheries. Given 8+2

Parameters	River water	Sewage
Flow Rate (Cum/day)	16×10^4	65×10^4
Temperature (°C)	24	24
BOD_5 at 20°C (mg/L)	1.7	209
DO (mg/L)	5.6	0.6
K1 at 20°C (/day)	0.23	
K2 at 20°C(/day)	1.15	
Cs (mg/L) at 24°C	8.35	

(b) Write two limitations of Streeter Phelp's Equation.

Q3. Define mass transfer zone with respect to column adsorption. Determine the Freundlich's isotherm equation for the batch adsorption study graphically. 2+8

Carbon Dose (mg/L)	0	5	10	25	50	100	150	200
Residual Concentration of Adsorbate (mg/L)	25.9	17.4	13.2	10.2	3.6	2.5	2.1	1.4

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Q4.a) Determine the reaction order and rate of reaction graphically for the experimental data obtained from a batch reactor. 8+2

Time (s)	N_2O_5 (mol/L)
0	1.46
423	1.09
753	0.89
1116	0.72
1582	0.54
1986	0.43
2343	0.35

b) Define half life of a pollutant related to 1st order reaction.

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B.E. CIVIL ENGINEERING FOURTH YEAR SECOND SEMESTER EXAM 2022

SUB: ADVANCE ENVIRONMENTAL ENGINEERING (HONS.)

Time: 4 hours | Full Marks: 70

Use separate answer scripts for each part

Part-II

Full Marks: 28

1. What are the sources of Bio-Medical Wastes? [3]

2. Answer *any five*: [5 x 5 = 25]

a) Write down about the hazard due to improper disposal of E-waste.

b) Briefly discuss about the methods of E-waste estimation.

c) How Bio-Medical Waste can be disposed?

d) How Bio-Medical Waste can be transported and stored?

e) Write a short note on the classification of E-waste.

f) What are the different types of Bio-Medical waste and what are the different treatment & disposal options used for them?