Ref. No.: Ex/CE/5/T/503/2024(S)

BACHELOR OF ENGINEERING (CIVIL ENGINEERING)
FIFTH YEAR
FIRST SEMESTER SUPPLEMENTARY EXAM 2024
Subject: ENVIRONMENTAL POLLUTION & CONTROL

Time : Three hours | Full Marks : 100

(50 Marks for each Part)

Use separate answer script for each Part

Part - I
(50)

2	(a) Define adiabatic lapse rate and environmental lapse rate. (b) With a sketch, define conditional stability, absolutely stable and absolutely unstable conditions of atmosphere. (c) With a sketch, describe 'Subsidence' and 'Radiation' Inversions. (d) Draw the plume pattern which may be least harmful to ground level receptors.	[4] [4] [5] [2]
3	(a) Give examples of Force-field settlers for control of air pollutants. (b) Derive the expression for diameter of particle which can be removed by gravitational settling chambers at an efficiency of 100% using Stoke's equation. (c) Calculate the minimum size of particle that will be removed with 100% efficiency from a settling chamber under the following conditions Horizontal flow velocity of air = 0.7m/s Viscosity of air 2.6×10^{-5} kg/m.s at 60 deg C Specific gravity of particle 1.2 Length of settling chamber= 6.0 m Height of settling chamber= 1.5 m Correction factor = 1.0	[3] [7] [5]
4	(a) What is the cause of acid rain? What is the maximum pH value of acid rain? Give an example of the effect of acid rain on aquatic life. (b) Differentiate between Primary and Secondary Standards. (c) Describe 'Rainout' and 'Washout'. (d) Name one Primary air pollutant which causes Photochemical Smog.	[4] [5] [4] [2]

Ref. No.: Ex/CE/5/T/503/2024(S)

BACHELOR OF ENGINEERING (CIVIL ENGINEERING)
FIFTH YEAR
FIRST SEMESTER SUPPLEMENTARY EXAM 2024
Subject: ENVIRONMENTAL POLLUTION & CONTROL
Part - I
(50)

Use a separate Answer-Script for each part

Question No.	Answer Question No. 1 and any *Two* from the rest	Marks
1	(a) Give example of a primary air pollutant and one of its control option. (b) What are the characteristics of air pollutant to be 'criteria'? (c) Name the air pollutants included in the revised NAAQS list and give reason for their inclusion. (d) Give an example of 'pollution prevention' step to minimise lead pollution. (e) Give example of two greenhouse gases. (f) Name and draw the plume pattern caused by 'Stable' atmospheric condition. (g) Why is saturated adiabatic lapse rate is less than the dry one? (h) What is the full form of NAAQS? (i) Differentiate between the tropospheric and stratospheric ozone. (j) Why is CO regarded as criteria pollutant, but CO_2 is not regarded so?	[2x10]

Ref No. –**Ex/CE/5/T/503/2024 (S)**

B.E.(C.E.) 5th YEAR EXAMINATION, 2024

(1st Semester Supplementary)

SUBJECT: Environmental Pollution and Control

Full Marks 100

Time: Three hours

Use a separate Answer-Script for each part

No. of Questions	Part II (50 Marks)	Marks

Answer Question Number 1 is Compulsory and any two from the rest. Answer should be brief and to the point. All the notations have their usual meaning. Assume relevant data if not provided. All the relevant drawings should be in pencil.

Q1. a) **Fill the Blanks:** 1×10

i. As per Noise Standard (2000) of MoEF for the maximum standard of noise level in day time in residential area is _____

ii. Full form of YIMBY is_____

iii. Numerically 1 Sone sound is equal to _____Phone sound.

iv. Unit of self purification factor _____

v. Thermal treatment of organic solid waste under absence of oxygen is known as_____

vi. The point of pollution discharge in a stream body is known as _____

vii. Boron is the most important parameter for _____of grade of water use.

viii. For collection or transfer of solid waste where the whole container used for waste storing is transferred to disposal site is known as _____

ix. Reference intensity used for determining sound intensity level is_____

x. For a particular water stretch the water use which demands most superior quality of water is known as_____

b) **Write true and false with proper justification. <u>No marks will be given if justification will not be written.</u>** 2×5

i. Loudness is subjective parameter of sound.

ii. Overturning is common phenomena for stream in winter and summer.

iii. For municipal solid waste of Delhi composting is the best method.

iv. Open dumping is superior method for coastal area than engineered landfill.

v. There is only one inflection point in oxygen sag curve of stream.

Q 2.a) A city of 2×10^5 people deposits $0.2m^3/s$ of sewage having a BOD_5 of 28 mg/L and DO 1.8 mg/L into a river that has a flow rate of $0.5m^3/s$ and a flow speed of 0.2 m/s. Just at the 8

Ref No. –Ex/CE/5/T/503/2024 (S)

B.E.(C.E.) 5th YEAR EXAMINATION, 2024

(1st Semester Supplementary)

SUBJECT: Environmental Pollution and Control

Full Marks 100

Time: Three hours

Use a separate Answer-Script for each part

No. of Questions	Part II (50 Marks)	Marks

upstream of the release point, the river has a BOD_5 of 3.6 mg/L and DO 7.6 mg/L. The saturation value of DO is 8.5 mg/L. The deoxygenetion coefficient is 0.61/day and the reaeration coefficient is 0.76/day. Assume complete instantaneous mixing of the sewage and river. Find the distance of the critical point from the point of mixing.

Q2. b) Superimposing the use based map and quality based map for a stretch of river it was obtained that the existing quality of the stretch is same to the water quality demanded by the respective DBU. What strategic measures you will have to adopt for the situation? 2

c) Write a short note on vertical stratification of lake based on biological organisms. 5

Q 3.a) Establish the relation between sound power level and sound intensity level. What is the function of weighting network in sound level meter? For a class of 1 hour 80 dBA sound pressure level was measured for first 15 minutes and 60 dBA was measured for last 45 minutes. Determine the equivalent sound pressure level for the class room for the sampling time. 3+3 +4

b) Mention the measuring unit: sound power; frequency and sound pressure level. What is root mean square of pressure? 3+2

Q4.a) Define followings: Field capacity of solid waste, Leachate, haul container collection system, Aerobic composting method, engineered landfill 2×5

b) Estimate the energy content of a 100 kg solid waste sample on an ash free dry basis with moisture content 21% and ash content 5% having the following composition: 5

Component	% by weight	Energy content (kJ/kg)
Food waste	15	4650
Paper	45	16750
Cardboard	10	16300
Plastics	10	32600
Garden trimmings	10	6500
Wood	5	18600
Tin cans	5	700