Ref No. – **Ex/CE/PC/B/T/411/2024**

B.E. Civil Engineering (4th Year, 1st Semester) Examination, 2024
(1st / ~~2nd~~ Semester / ~~Repeat~~ / ~~Supplementary~~ / ~~Annual~~ / ~~Biannual~~)

SUBJECT: ENVIRONMENTAL ENGINEERING - III

Full Marks: 100

Time: ~~Two hours~~/Three hours/~~Four hours~~/ ~~Six hours~~ (50 marks for each part)

Use a separate Answer-Script for each part

No. of Question	Part-I	Marks
	Answer Question-1 and 2 and any *two* from the rest	
Q.1) a)	**Fill in the blanks with appropriate word(s)** i) In India, the ambient noise standard is prescribed for the parameter ..... ii) The component of sound level meter essential for producing a readout that closely resembles human response is called ..... iii) The unit of **sound intensity** is ..... iv) In ..... method collection of solid waste no such **designated collection days** need to be specified. v) The quantity of water that a solid waste sample can hold freely against the action of gravity is called..... vi) The method of chemical characterization carried out based on **true chemical content** of the solid waste is called.....	6*1=6
b)	**State whether the under-mentioned statements are True or False with necessary justifications:** i) **Exhaust mufflers** are also called diffusers. ii) **Heavy constructions** are not recommended over sanitary landfill sites. iii) **Incineration** is generally recommended for disposal of solid waste having high calorific value.	3*2=6
Q.2) a)	Establish the relationships among **sound pressure, intensity** and **power levels**.	6
b)	Describe different activities involved in the **"Hauled Container System"** of solid waste collection with the help of a neat schematic diagram.	5
c)	What do you mean by **"Ultimate Analysis"** of solid waste?	3
d)	Write a short note on **"Ambient Noise Standards as prescribed by CPCB".**	4

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No. of Question	Part-I	Marks
Q.3)	The noise spectrum of an electrical saw machine was analyzed at a distance of **4.5 ft** from the machine. The results obtained are furnished below:	**(4+3+3)**

Centre Band Frequency (Hz)	63	125	250	500	1000	2000	4000	8000
Sound Pressure Level dB(A)	74	67	72	77	78	71	79	75

i. What are the **total sound pressure level (L_{PT}) and total sound level (L_{PAT})** generated by the machine?
ii. What will be the **root mean square pressure (p_{rms})** generated at the given distance?
iii. What are the corresponding **total sound power** and **intensity levels**?

Q.4) a)	Classify municipal solid waste based on their **physical composition.**	**4**
b)	Describe with the help of a neat sketch all essential components of a **typical engineered landfill system.**	**6**
Q.5) a)	Discuss in brief on the design considerations of **aerobic composting process.**	**5**
b)	A municipal solid waste sample was subjected to ultimate analysis yielding a chemical formula of $C_{427}H_{2011}O_{901}N_{14}S$. Calculate the higher and lower heat of combustion of the solid waste sample. Given i) moisture content of the solid waste sample=**21%**, flammable fraction=**51%.**	**5**

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Environmental Engineering III

Time: Three Hours | Full Marks: 100

Use separate answer script for each part

(50 marks for Part I and **50 marks for Part II**)

Part-II

1 (CO1). Answer very briefly:

(a) Please write the followings only in order to describe hierarchy of waste management
(i) Recovery (ii) Release (iii) Recycle (iv) Reuse

(b) 'Source Apportionment Study may not be an integral part of mitigation plan of CO"-explain

(c) Mention the correlation between SO_2 concentration in ambient air and visibility?

(d) Mention two reasons behind selection of pollutants to calculate Air Quality Index(AQI).

(e) What is the role of air quality monitoring in air quality management? **10**

2(CO2). Answer very briefly:

(a) Write formulae of one chemical responsible for closing main window of the absorption spectra of atmosphere and its one alternative (with less ozone depleting potential).

(b) 'Global Warming Potential (GWP) of CO_2 is 1'-explain

(c) Define acid rain.

(d) Mention specific control measures of vehicular smog.

(e) When does fanning type plume behavior take place? **10**

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BE Civil Engineering 4th Year 1st Semester Examination 2024

Environmental Engineering III

Time: Three Hours | Full Marks: 100

Use separate answer script for each part

(50 marks for Part I and **50 marks for Part II**)

Part II

3(CO1) (i) Answer the followings

a) Give two examples of 'treatment of solid waste produces gaseous waste'.

b) Which one is most preferred among reuse, recycle and reduction and why?

c) Define averaging time in National Ambient Air Quality Standard (NAAQS) with examples.

d) What is unique about Indian ambient air quality standards of SO_2 and NO_2?

e) Comment about frequent changes of emission standards.

(ii) Mention five steps you may take to better air quality of your city/town. 10 + 5 = **15**

Or

4(CO1). (i) Answer the followings.

a) Give one example each for two types of Waste Minimization.

b) Correlate concentration, dose and exposure time of an air pollutant

c) Why is CO regarded as a Criteria Air Pollutant (CAP)?

d) Comment about the 1998 revision of NAAQS.

e) Define 'high volume' for high volume sampler.

(ii) Mention five steps you may take to better air quality of your city/town. 10 + 5 = **15**

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Environmental Engineering III

Time: Three Hours Full Marks: 100

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(50 marks for Part I and **50 marks for Part II**)

Part II

5(CO2). Answer the followings:

a) What are the differences between Natural and Enhanced Greenhouse Effect?

b) With an example explain the Code Numbers of CFC, HCFC and HFCs

c) Mention basic steps to control acid rain.

d) Classify "Smog"

e) Describe fumigating plume pattern with a sketch 3 x 5 =**15**

Or

6(CO2). Answer the followings

a) Mention the factors which may affect GWP and compare GWPs of CO_2 and CFCs.

b) Write the equations of formation of stratospheric ozone and destruction of tropospheric ozone.

c) Describe the effect of acid rain on forest and aquatic ecosystems

d) Why is photochemical smog so named? (Give necessary equations to support your answer)

e) With a sketch define mixing height 3 x 5 = **15**