

B.E. Civil Engineering (4th Year, 1st Semester) Supplementary 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
	<p><u>Answer Question-1 and 2 and any <i>two</i> from the rest</u></p>	
Q.1) a)	<p>Fill in the blanks with appropriate word(s)</p> <p>a) is a subjective characteristics of sound.</p> <p>b) One sone is equal to phon of sound.</p> <p>c) ‘Destructive Interference’ is the method followed in</p> <p>d) In method collection of solid waste is carried out during designated collection days.</p> <p>e) The method of chemical characterization carried out based on some surrogate parameters is called.....</p> <p>f) method of solid waste collection is followed for the sources where solid waste generation rate is significantly high.</p>	6*1=6
b)	<p>State whether the under-mentioned statements are True or False with necessary justifications:</p> <p>a) The instrument used for measurement of sound is called sound pressure level meter.</p> <p>b) Liner arrangement is required in the containers for storing putrescible portion of municipal solid waste.</p> <p>c) Heavy constructions are not recommended over sanitary landfill sites</p>	3*2=6
Q.2) a)	<p>Establish the expression for addition of sound intensity levels.</p>	6
b)	<p>Describe different activities involved in the “Stationary Container</p>	5
c)	<p>System” of solid waste collection with the help of a neat schematic diagram.</p>	3
d)	<p>What do you mean by “Proximate Analysis” of solid waste?</p>	4
	<p>Write a short note on “Ambient Noise Standards as prescribed by CPCB”.</p>	4

Form A: Paper –Setting Blank

Ref No. – Ex/CE/PC/B/T/411/2024(S)

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No. of Question	Part-I	Marks																						
Q.3)	<p>Traffic Noise Data was collected for an important traffic intersection and are furnished below:</p> <table border="1"> <thead> <tr> <th>Time (sec)</th> <th>10</th> <th>25</th> <th>45</th> <th>50</th> <th>75</th> <th>90</th> <th>100</th> <th>130</th> <th>140</th> <th>150</th> </tr> </thead> <tbody> <tr> <td>Sound Level (dBA)</td> <td>74</td> <td>71</td> <td>76</td> <td>78</td> <td>72</td> <td>75</td> <td>73</td> <td>70</td> <td>81</td> <td>80</td> </tr> </tbody> </table> <p>Compute i) Equivalent Sound Level (L_{eq}) ii) L_{50} and L_{90} values</p>	Time (sec)	10	25	45	50	75	90	100	130	140	150	Sound Level (dBA)	74	71	76	78	72	75	73	70	81	80	(4+3+3)
Time (sec)	10	25	45	50	75	90	100	130	140	150														
Sound Level (dBA)	74	71	76	78	72	75	73	70	81	80														
Q.4) a)	Classify municipal solid waste based on their physical composition.	4																						
b)	State the reasons behind turning of contents in aerobic composting process. Discuss on the criteria likely to be satisfied for the 'Windrow Method of Composting'.	(2+4)																						
Q.5) a)	Discuss in brief with the help of a neat sketch on the essential components of a typical sanitary landfill.	5																						
b)	A municipal solid waste sample was subjected to ultimate analysis yielding a chemical formula of $C_{449}H_{2049}O_{912}N_{15}S$. 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=57%.	5																						

BE Civil Engineering 4th Year 1st Semester Supplementary 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

1 (CO1). Answer very briefly:

- (a) Please write the followings only in order to describe hierarchy of waste management
(i) Reduction (ii) Release (iii) Recycle (iv) Reuse
- (b) 'Source Apportionment Study is an integral part of mitigation plan of NO_x'-explain
- (c) Correlate NH₃ concentration in ambient air with ambient secondary particulate concentration.
- (d) Mention reasons of exclusion of four criteria air pollutants (CAPs) to calculate Air Quality Index (AQI).
- (e) What is the structural formula of the CAP, which is a hydrocarbon with fewer number of hydrogen atoms than carbon atoms? **10**

2(CO2). Answer very briefly:

- (a) Why are the chapters on the Greenhouse Effect and Ozone Depletion often placed consecutively in text books?
- (b) The stratospheric ozone concentration over a location is 100 Dobson Unit. Does this indicate ozone depletion in that area? Please explain
- (c) Define acid rain based on bicarbonate acidity only.
- (d) Why is photochemical smog called vehicular smog?
- (e) When does most prominent plume pattern take place? **10**

BE Civil Engineering 4th Year 1st Semester Supplementary 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 gaseous waste produces solid and liquid waste respectively..
- b) Which one is least preferred among reuse, recycle and recovery and why?
- c) Write the equations of natural destruction of the main photochemical oxidant?
- d) What is unique about annual National Ambient Air Quality Standard (NAAQS) of SO₂ and NO₂?
- e) Mention the correlation between best available technologies (BAT) and air quality 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) Classify waste minimization.
- b) Define dose of a CAP.
- c) Why is NO regarded as a CAP)?
- d) Write very brief history of NAAQS in India.
- e) Why is high volume sampler so named?
- (ii) Mention five steps **you** may take to better air quality of your city/town. 10 + 5 = 15

BE Civil Engineering 4th Year 1st Semester Supplementary 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

5(CO2). Answer the followings:

- a) 'The term "Greenhouse Effect" is a misnomer.'- explain.
- b) What is the difference between the numbering systems of CFCs and Halons?
- c) Mention basic steps to control photochemical smog
- d) What is the anhydride of sulfuric acid? Hence, mention the steps to control the acid.
- e) Describe 'lofting' plume pattern with a sketch 3 x 5 = 15

Or

6(CO2). Answer the followings

- a) Mention the three factors which may affect Global warming Potential of a greenhouse gas.
- b) Write the equations of formation of stratospheric ozone with all details.
- c) Describe the effect of acid rain on forest and aquatic ecosystems
- d) Why is vehicular smog so named? (Give necessary equations to support your answer)
- e) What may be the mixing height during unstable condition? 3 x 5 = 15