

Master of Engineering Examination 2017(1st semester)**Environmental Pollution & Management**

Time: Three Hours

Full Marks: 100

Use separate Answer-Scripts for each part

Part-1Answer **Question No. 1** and any **Two** from the rest. Answers **Question No. 1** first.

1. Answer the followings in one or two words:

- a) What type of Waste Minimization (WM) is Environmental Impact Assessment (EIA)?
 - b) Give one example of treatment, where, treatment of gaseous waste produces liquid waste.
 - c) Name a criteria air pollutant (CAP) which is only mentioned in Indian NAAQS in 2009.
 - d) What is a *secondary aerosol*?
 - e) Name a *coloured* gaseous secondary CAP.
 - f) Name a CAP which is most probable to be *recycled*.
 - g) Define PM_{10} .
 - h) Define '*high volume*' with respect to *high volume sampler*.
 - i) Why is it difficult to remove *organic* sulphur from coal?
 - j) Name the most predominant *photochemical oxidant*.
 - k) Name a CAP which is a Greenhouse Gas (GHG).
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Part-1

1. (Continued)

- l) Name an *organic* GHG.
- m) Which standard is *not* correlated with BAT?
- n) Name a *PAH* which is a CAP.
- o) Name the main *constituents* of 'classical smog'.
- p) Name a CAP which is a *metalloid*.
- q) What is '*NNE*' wind?
- r) What may be the lapse rate within an *isothermal* layer?
- s) What is a *secondary* air quality standard?
- t) Define '*annual*' average' of a CAP.

1X20=20

- 2. a) Draw global energy balance sketch and show the balances in atmosphere and earth's surface.
- c) Draw the combined absorption spectra of atmosphere and define enhanced greenhouse effect from

8+7=1

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Part-1

a) Write the following equations:

(i) formation of bad ozone (ii) natural destruction of good ozone (iii) natural destruction of bad ozone

(iv) formation of most abundant CAP (v) formation of only photolytically dissociable CAP

b) Write the chemical formula of following (i) H-1201 (ii) HFC-134 (iii) HCFC-22

c) Write the complete code number of followings (i) $C_2FH_3Cl_2$ (ii) CF_2HCl

10+3+2=15

a) Define wind rose with a sketch.

b) Define conditional stability with a sketch

c) Draw the plume pattern when both radiation and subsidence inversion may exist.

d) Describe the operation of a cyclone separator with a sketch

4+4+3+4=15

5C/6/2

Marks:

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~~(Semester / Repeat / Supplementary / Annual / Distance)~~
SUBJECT: ENVIRONMENTAL POLLUTION & MANAGEMENT

(Name in full)

Full Marks: 1

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-II	Mark
<u>Answer Question-1 and any two from the rest</u>		
Q.1) a)	What do you mean by "Thermal Stratification" of any water body? Describe with the help of a neat sketch the effect of "Thermal Stratification" on Dissolved Oxygen level of an oligotrophic and eutrophic lake during different seasons.	(2+6)
b)	Discuss on the common noise descriptors used for describing the extent of noise pollution in the sphere of community noise.	7
c)	Establish the relationship between different sound levels (L_i , L_p and L_w).	5
Q.2) a)	Differentiate an "Eutrophic Lake" from an "Oligotrophic Lake"?	5
b)	<p>A township discharges 5.5MGD of raw sewage, containing 7.5mg/L of phosphorous and 18 mg/L of nitrogen, into an adjacent river that enters a lake short distance downstream.. For river it is given: i) average flow rate is 5976 l/sec. ii) Mean nitrogen content= 0.2mg/L iii) Mean phosphorous content= 0.03mg/L.</p> <p>The lake is used as a municipal water source and has a surface area of 31,350 acres and a mean depth of 10m. Developments around the lake contribute an estimated 1842 Kg of phosphorous and 11,298Kg of nitrogen annually.</p> <p>Given for 10m depth, permissible loading for nitrogen= 1.5gm/m²/year and permissible loading for phosphorous= 0.1gm/m²/year. Estimate the followings:</p> <p>i. Nitrogen and phosphorous loadings from lake, river, sewage and in total. ii. Determine respective % removal of nitrogen and phosphorous in the sewage treatment plant.</p>	(6+4)

(1st / 2nd Semester / Repeat / Supplementary / Annual / Biannual)

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(Name in full)

Time: Two hours/Three hours/Four hours/Six hours-

Full Marks: 100
(50 marks for each part)

No. of Question	Part-II	Marks																										
Q.3) a)	What do you mean by "Acoustic Impedance"? Establish the relationship between the "Acoustic Impedance" and "Velocity of Propagation of Sound".	(3+4)																										
b)	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:	(3+2+3)																										
	<table border="1"> <thead> <tr> <th>Centre Band Frequency (Hz)</th> <th>63</th> <th>125</th> <th>250</th> <th>500</th> <th>1000</th> <th>2000</th> <th>4000</th> <th>8000</th> </tr> </thead> <tbody> <tr> <td>Sound Pressure Level dB(A)</td> <td>71</td> <td>67</td> <td>74</td> <td>78</td> <td>76</td> <td>72</td> <td>77</td> <td>73</td> </tr> </tbody> </table>	Centre Band Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Sound Pressure Level dB(A)	71	67	74	78	76	72	77	73									
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	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)	Describe with the help of a neat sketch different components of inner ear and their respective functions.	6																										
b)	Derive the necessary expression for "Addition of Sound Power Levels".	3																										
c)	Vehicular Noise Data was collected for an important traffic intersection and are furnished below:	(3+3)																										
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	Compute i) Equivalent Sound Level (L_{eq})																											
	ii) Traffic Noise Index (TNI)																											