

Bachelor of Civil Engineering Supplementary Examination 2017(4th Year 1st semester)**Environmental Pollution and Control**

Time: Three Hours

Full Marks: 100

Use separate answer script for each part

(50 marks for each part)

Part-1

Answer **Question No. 1** and any Two from the rest. Answers should be brief. Any relevant data may be assumed, if needed. **Answer Question No. 1 first.**

1.
 - a) Mention two primary and two secondary gaseous criteria air pollutants (CAPs).
 - b) Define 'NE' wind. c) Write the full form of (i) EGR (ii) PUC (iii) PCV (iv) ODP.
 - d) What is source apportionment study? e) Define PM₁₀. f) Define GWP.
 - g) Define secondary aerosols. h) Define AQI.
 - i) What is the common reason of inclusion of benzene, benzo-a-pyrene, nickel and arsenic in National Ambient Air Quality Standards (NAAQS)?
 - j) Write three lines about indoor air quality standards. 2x10=20

 2.
 - i) Draw the global energy balance sketch and show the balances in space, atmosphere and ground surface.
 - ii) Draw the combined absorption spectra and define natural and enhanced greenhouse effect 8+7=15
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3. a) In a particulate matter (PM) monitoring study by a respirable dust sampler followings are found:
- | | | |
|------|--|---------------------------|
| i) | Average flow rate | = 1.3 m ³ /min |
| ii) | Initial dry weight of filter paper | = 8.112 g |
| iii) | Initial dry weight of the pot below hopper | = 23.224 g |
| iv) | Final dry weight of filter paper | = 8.304 g |
| v) | Final dry weight of the pot below hopper | = 23.403 g |
| vi) | Sampling period | = 4 hour |
- Calculate SPM and RPM concentrations.
- b) Specific coal consumption of a 175 MW power plant is 0.7 kg/KWh. Using the equipment based general effluent standard (CPCB) formula $H=14(Q)^{0.3}$, calculate minimum stack height. Sulphur content of coal may be taken as 0.4 percent. Notations in the formulae have usual meanings.
- c) NAAQS (24 hourly) for SO₂ is 80 µg/m³, express it in ppm. 6+5+4=
4. a) With the help of a sketch define super-adiabatic, sub-adiabatic and adiabatic environmental lapse rates. Hence define unstable, stable and neutral conditions
- b) Draw all probable plume patterns along with relevant lapse rates during inversion conditions. 7+8=

B.C.E 4th YEAR 1st SEMESTER SUPPLEMENTARY EXAMINATION, 2017
 (1st /2nd Semester / Repeat/ Supplementary / Annual /Biannual)

SUBJECT: ENVIRONMENTAL POLLUTION & CONTROL
 (Name in full)

Full Marks: 100
 (50 marks for each part)

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

Use a separate Answer-Script for each part

No. of Question	Part-II	Marks
<u>Answer Question-1 and 2 and any two from the rest</u>		
Q.1) a)	<p>Fill in the blanks with appropriate word(s)</p> <ul style="list-style-type: none"> i. D grade water use corresponds to..... ii. The uppermost region of a thermally stratified lake is called iii. Loudness of sound is expressed in terms of iv. Reactive Expansion Chamber is used for the purpose of attenuating noise in v. is the method of chemical characterization of solid wastes based on some surrogate parameters. vi. Non-recyclable, non-putrescible portions of municipal solid wastes are suitably disposed by the method of 	6*1=6
b)	<p>State whether the under-mentioned statements are True or False with necessary justifications:</p> <ul style="list-style-type: none"> i) Dissolved Oxygen (DO) is a critical water quality parameter for E-grade water use. ii) Absorptive silencers are also called dissipative mufflers. iii) Stationary Container System is recommended for collection of solid waste from the places where the generation rate is enormously high. 	3*2=6
Q.2) a)	<p>What do you mean by “Critical Point” in the context of stream sanitation? Deduce the necessary expression for estimation of critical time period (t_c) in the context of stream sanitation.</p>	2+5=7
b)	<p>Establish the relationship between different sound levels.</p>	6
c)	<p>Describe different activities involved in the “Hauled Container System” of solid waste collection with the help of a neat schematic diagram.</p>	7

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No. of Question	Part-II	Marks																						
Q.3)	<p>A medium-sized township discharges 19×10^4 cum/day of sewage into an adjacent river whose minimum flow rate is 54×10^4 cum/day. Given: i) Temperature of sewage as well as river water = 24°C ii) BOD_5 at 20°C of raw sewage = 214 mg/L iii) BOD_5 at 20°C of river water = 2.0 mg/L iv) DO of raw sewage = 0.5 mg/L v) DO after mixing = 85% of C_s vi) Minimum DO to be maintained = 4.5 mg/L vii) $K_1=0.23/\text{day}$; $K_2=1.15/\text{day}$ both at 20°C viii) C_s at $24^\circ\text{C}= 8.58 \text{ mg/L}$. Find out the degree of sewage treatment required to satisfy river water quality criteria.</p>	9																						
Q.4)	<p>Traffic Noise Data was collected for an important traffic intersection and are furnished below:</p> <table border="1" data-bbox="324 929 1364 1097"> <thead> <tr> <th>Time (sec)</th> <th>10</th> <th>15</th> <th>35</th> <th>50</th> <th>75</th> <th>80</th> <th>100</th> <th>125</th> <th>135</th> <th>150</th> </tr> </thead> <tbody> <tr> <th>Sound Level (dBA)</th> <td>71</td> <td>78</td> <td>75</td> <td>72</td> <td>70</td> <td>77</td> <td>73</td> <td>80</td> <td>84</td> <td>82</td> </tr> </tbody> </table> <p>Compute i) Equivalent Sound Level (L_{eq}) ii) L_{50} and L_{90} values</p>	Time (sec)	10	15	35	50	75	80	100	125	135	150	Sound Level (dBA)	71	78	75	72	70	77	73	80	84	82	3+3+3 =9
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Q.5) a)	<p>What do you mean by “Proximate Analysis” of a solid waste and what are the parameters resorted to in this type of analysis?</p>	(2+2)																						
b)	<p>Define the term “Heating Values” of a solid waste and what are the different types of the “Heating Values”?</p>	(2+3)																						