

B.E. CIVIL ENGG. 4th YEAR 1st SEMESTER EXAMINATION, 2018
(1st /2nd Semester / Repeat/ Supplementary / Annual / Biannual)

SUBJECT: ENVIRONMENTAL POLLUTION & CONTROL
(Name in full)

Time: ~~Two hours~~/~~Three hours~~/~~Four hours~~/~~Six hours~~Full Marks: 100
(60 marks for this part)

Use a separate Answer-Script for each part

No. of Question	Part- I	Marks
<u>Answer Question-1 and 2 and any two from the rest</u>		
Q.1) a)	Fill in the blanks with appropriate word(s) i. Water stress indicator is defined as the ratio between water withdrawal and ii. Use map is prepared on the basis of of a water body. iii. One sone is equal to phon of sound. iv. 'Dissipative Muffler' is the synonym of v. In method of solid waste collection, no collection days need to be specified. vi. The material passing through 4 mm sieve is called compost.	6*1=6
b)	State whether the under-mentioned statements are True or False with necessary justifications: i. Boron is a critical water quality parameter for B-grade water use. ii. Frequency describes the quality of noise. iii. Liner arrangement is required in the containers for storing putrescible portion of municipal solid waste.	3*2=6
Q.2) a)	What do you mean by "Thermal Stratification of Lakes"? Discuss with the help of necessary figures the combined effect of thermal stratification and eutrophication on DO level of any water body.	2+6=8
b)	State the characteristics features of a typical eutrophic lake.	5
c)	What do you mean by acoustic impedance? Establish the relationship between acoustic impedance and velocity of sound.	2+6=8
d)	Describe different activities involved in the "Stationary Container System" of solid waste collection with the help of a neat schematic diagram.	7

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No. of Question	Part- I	Ma ⁱⁿ																						
Q.3)	<p>A township discharges 5.6MGD of raw sewage, containing 7.35mg/L of phosphorous and 17 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 5921 l/sec. ii) Mean nitrogen content= 0.21mg/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 30,472 acres and a mean depth of 10m. Developments around the lake contribute an estimated 1792 Kg of phosphorous and 11,768Kg 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>c) Nitrogen and phosphorous loadings from lake, river, sewage and in total.</p> <p>d) Determine respective % removal of nitrogen and phosphorous in the sewage treatment plant.</p>	6+4 15 10																						
Q.4)	<p>Traffic Noise Data was collected for an important traffic intersection and are furnished below:</p> <table border="1" data-bbox="451 1176 1347 1270"> <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>71</td> <td>76</td> <td>74</td> <td>79</td> <td>70</td> <td>73</td> <td>72</td> <td>69</td> <td>81</td> <td>80</td> </tr> </tbody> </table> <p>Compute i) Equivalent Sound Level (Leq) ii) L₅₀ and L₉₀ values</p>	Time (sec)	10	25	45	50	75	90	100	130	140	150	Sound Level (dBA)	71	76	74	79	70	73	72	69	81	80	4+3+3 =10
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Q.5) a)	<p>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'.</p>	3+3																						
b)	<p>A municipal solid waste sample was subjected to ultimate analysis yielding a chemical formula of C₄₄₉H₂₀₄₉O₉₁₂N₁₆S. 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%.</p>	4																						

Bachelor of Civil Engineering Examination 2018

(4th Year 1st semester)

Environmental Pollution and Control

Time: Three Hours

Full Marks: 100

Use separate answer script for each part

(60 marks for Part I and 40 marks for Part II)

Part-II

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.**

- a) Name the followings:
- (i) Four criteria air pollutants (CAPs) which are included in NAAQS in 2009.
 - (ii) Two adiabatic lapse rates with values.
 - (iii) Four Greenhouse Gases (GHGs).
 - (iv) Four plume patterns.
 - (v) Four air pollutants which are generally monitored by a Respirable Dust Sampler
- b) Answer the followings in one or two words:
- (i) What is to minimize to control NO_x emissions?
 - (ii) Which fraction of SO₂ may be minimized at source?
 - (iii) Which one is more harmful, 'ambiguity' or 'eclipsing' (in AQI calculation)?
 - (iv) Name the control equipment which may control both gaseous as well as particulate pollutants.
 - (v) Name the control equipment where centrifugal force is used to separate particulates from air stream.
- c) Give two examples for each of the following groups of criteria air pollutants:
- (i) hematotoxins (ii) symbiotic (iii) metallic (iv) organic (v) secondary gaseous
- 10+5+5=20

Bachelor of Civil Engineering Examination 2018

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Environmental Pollution and Control

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Full M

(60 marks for Part I and 40 marks for Part II)

2. a) Give examples of:
- (i) Treatment of solid waste produces gaseous waste
 - (ii) Treatment of gaseous waste produces solid waste
- b) Which one is most preferred among reuse, recycle and recovery and why?
- c) Write the equation of formation of the most abundant CAP.
- d) Write the equation of natural destruction of tropospheric ozone.
- e) Write the name of main two precursor CAPs for formation of acids causing Acid Rain. **10**
3. a) Write the name of the GHG, whose Global Warming Potential is unity and why is it so?
- b) What is the albedo of earth? Comment on the value.
- c) What are the main two windows within the combined absorption spectra of the atmosphere?
- d) What is the normal stratospheric ozone concentration in DU? What is the formula of H-1011?
- e) Why is photochemical smog so named? **10**

Bachelor of Civil Engineering Examination 2018(4th Year 1st semester)**Environmental Pollution and Control**

Time: Three Hours

Full Marks: 100

(60 marks for Part I and 40 marks for Part II)

- a) Which is presently, the most prominent air pollutant with worst sub-index in AQI calculation by Indian method?
- b) How many air pollutants are considered in Indian AQI method?
- c) What may be the maximum value of AQI in Indian AQI Method?
- d) What may be the stability condition for zero environmental lapse rate?
- e) What is calm condition?
- f) What do you understand by 'NW' wind?
- g) What is the environmental lapse rate called when neutral stability condition prevails?
- h) What is greenbelt?
- i) What is the basic difference between 'rain out' & 'wash out'?
- j) How a secondary air pollutant may be controlled?