

**B.E. CIVIL ENGG. 4<sup>th</sup> YEAR 1<sup>st</sup> SEMESTER SUPPLEMENTARY EXAMINATION, 2018**  
(1<sup>st</sup> /-2<sup>nd</sup> 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
Q.1) a)	<p align="center"><u>Answer Question-1 and 2 and any two from the rest</u></p> <p>Fill in the blanks with appropriate word(s)</p> <p>i. As per UNEP, a country having per capita water availability between 500 and 1000 m<sup>3</sup>/year is termed as .....</p> <p>ii. The water of ..... lake can be safely used for drinking purpose.</p> <p>iii. .... is a subjective characteristics of sound.</p> <p>iv. 'Destructive Interference' is methodology followed in .....</p> <p>v. .... method of solid waste collection is followed for the sources where solid waste generation rate is significantly high.</p> <p>vi. The ratio of as-compacted density to the as-discarded density of a solid waste sample is called .....</p>	6*1=6
b)	<p>State whether the under-mentioned statements are True or False with necessary justifications:</p> <p>i. SAR is a critical water quality parameter for B-grade water use.</p> <p>ii. Intensity describes the strength of a noise field.</p> <p>iii. Heavy constructions are not recommended over sanitary landfill sites</p>	3*2=6
Q.2) a)	<p>Draw a typical DO sag curve in the context of stream sanitation and show the points of particular significance? Deduce the necessary expression for estimation of Critical time period (<math>t_c</math>) in the context of stream sanitation.</p>	3+6=9
b)	<p>Explain the cases that may arise on superimposing "Use Map" over "Quality Map".</p>	6
c)	<p>Establish the expression for addition of sound power levels (<math>L_w</math>).</p>	5
d)	<p>Describe different activities involved in the "Hauled Container System" of solid waste collection with the help of a neat schematic diagram.</p>	8

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No. of Question	Part- <del>I</del>	Marks																		
Q.3)	A medium-sized township discharges 15600 cum/day of untreated sewage into an adjacent river whose minimum flow rate is 3.2 cum/sec. Given: i) Temperature of sewage as well as river water= 24°C ii) BOD <sub>5</sub> at 20°C of raw sewage= 215 mg/L iii) BOD <sub>5</sub> at 20°C of river water= 1.0 mg/L iv) Initial DO deficit at the point of discharge of sewage= 1.87mg/L v) K <sub>1</sub> =0.23/day ; K <sub>2</sub> =1.15/day both at 20°C vi) C <sub>s</sub> at 24°C= 8.58 mg/L. Find out critical time period and maximum DO deficit graphically.	10																		
Q.4)	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: <table border="1" data-bbox="320 869 1380 1041" style="margin: 10px auto;"> <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>74</td> <td>67</td> <td>72</td> <td>77</td> <td>78</td> <td>71</td> <td>79</td> <td>75</td> </tr> </tbody> </table>	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	4+3+3 =10
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Sound Pressure Level dB(A)	74	67	72	77	78	71	79	75												
Q.5) a)	i. What are the total sound pressure level (L <sub>PT</sub> ) and total sound level (L <sub>PAT</sub> ) generated by the machine? ii. What will be the root mean square pressure (p <sub>rms</sub> ) generated at the given distance? iii. What are the corresponding total sound power and intensity levels?  Discuss in brief on the design considerations of aerobic composting process.	4																		
b)	A municipal solid waste sample was subjected to ultimate analysis yielding a chemical formula of C <sub>427</sub> H <sub>2011</sub> O <sub>901</sub> N <sub>14</sub> 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%.	(3+3)																		

## Bachelor of Civil Engineering Supplementary Examination 2018

(4<sup>th</sup> 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. Any relevant data may be assumed, if needed.

1. a) Name the followings:
- (i) Four criteria air pollutants (CAPs) which were included in NAAQS (India) in 1994.
  - (ii) the Adiabatic Lapse Rates with values around 6°C/KM and 10°C/KM respectively.
  - (iii) Four gaseous CAPs.
  - (iv) Two probable plume patterns during radiation inversion.
  - (v) Three CAPs which can be monitored by a Respirable Dust Sampler.
- b) Answer the followings:
- (i) With the help of an equation explain why it is difficult to control NO<sub>x</sub> emissions at source?
  - (ii) Which fraction of SO<sub>2</sub> cannot be minimized by pulverization of coal and why?
  - (iii) Explain 'eclipsing' (in AQI calculation) with an example.
  - (iv) Mention one advantage & one disadvantage of wet scrubbers.
  - (v) Name the control equipment where (i) centrifugal force and (ii) gravitational force is used to clean air stream.

10+10=20

**Bachelor of Civil Engineering Supplementary Examination 2018**

(4<sup>th</sup> Year 1st semester)

**Environmental Pollution and Control**

Time: Three Hours

Full Marks: 100

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

2. a) Give examples of:
- (i) Treatment of liquid waste produces gaseous waste
  - (ii) Treatment of gaseous waste produces solid waste
- b) Compare very briefly reuse, recycle and recovery.
- c) Write the equation of formation of CO.
- d) Write the equation of natural destruction of stratospheric ozone.
- e) Write the name of main two precursors for formation of photochemical smog. **10**
3. a) Write the name of the ODS, whose Ozone Depleting Potential is unity and why is it so?
- b) What is the value of Global albedo? Compare it with albedo of earth.
- c) What are the main two windows within the combined absorption spectra of the atmosphere?
- d) Define Dobson Unit.
- e) Why is vehicular smog so named? **10**

**Bachelor of Civil Engineering Supplementary Examination 2018**(4<sup>th</sup> Year 1st semester)**Environmental Pollution and Control**

Time: Three Hours

Full Marks: 100

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

4. a) What is the main use of AQI values?
- b) Why nickel and arsenic are not considered in Indian AQI calculation?
- c) What is the significance of 100 AQI value?
- d) As super-adiabatic is to unstable condition, what is to neutral condition?
- e) Define calm condition.
- f) What do you understand by 'NNW' wind?
- g) What is windrose?
- h) What is greenbelt?
- i) What is the basic difference between 'rain out' & 'wash out'?
- j) How a secondary air pollutant may be controlled?

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