

B.E. CIVIL ENGG. 4th YEAR 1st SEMESTER EXAMINATION, 2019
(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)	<p>Fill in the blanks with appropriate word(s)</p> <p>i) The water of lake can only be used for recreational pursuit.</p> <p>ii) Quality map is prepared on the basis of of a water body.</p> <p>iii) One son is equal to phon of sound.</p> <p>iv) 'Destructive Interference' is the method followed in</p> <p>v) In method collection of solid waste is carried out during designated collection days.</p> <p>vi) The method of chemical characterization carried out based on some surrogate parameters is called.....</p>	6*1=6
b)	<p>State whether the under-mentioned statements are True or False with necessary justifications:</p> <p>i) Electrical Conductivity is a critical water quality parameter for B-grade water use.</p> <p>ii) Loudness is a subjective characteristic of sound.</p> <p>iii) Stationary Container System is recommended for collection of solid waste from the places where the generation rate is enormously high.</p>	3*2=6
Q.2) a)	Discuss the possible cases that may arise on superimposing 'Use Map' over 'Quality Map'.	8
b)	What do you mean by critical time period (t_c) in the context of stream sanitation? Deduce the necessary expression for critical time period (t_c) .	2+6=8
c)	Establish the pertinent expression for addition of sound power levels	5
d)	Describe different activities involved in the " Hauled Container System " of solid waste collection with the help of a neat schematic diagram.	7

B.E. CIVIL ENGG. 4th YEAR 1st SEMESTER EXAMINATION, 2019
(1st /2nd Semester / Repeat/ Supplementary / Annual /-Biannual)

SUBJECT: ENVIRONMENTAL POLLUTION & CONTROL

Full Marks: 100
(60 marks for this part)

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

No. of Question	Part-I	Marks																		
Q.3)	<p>A medium-sized township discharges $11.5 * 10^4$ cum/day of sewage into an adjacent river whose minimum flow rate is $56 * 10^4$ cum/day. Given: i) Temperature of sewage as well as river water = 26°C ii) BOD_5 at 20°C of raw sewage = 214 mg/L iii) BOD_5 at 20°C of river water = 1.75 mg/L iv) DO of raw sewage = 0.5 mg/L v) DO of the river water = 5.6 mg/L vi) Minimum DO to be maintained = 3.0 mg/L vii) $K_1=0.23/\text{day}$; $K_2=1.15/\text{day}$ both at 20°C viii) C_s at $24^\circ\text{C}= 8.35 \text{ mg/L}$. Find out the degree of sewage treatment required to satisfy river water quality criteria.</p>	10																		
Q.4)	<p>The noise spectrum of an electrical saw machine was analyzed at a distance of 4.7 ft from the machine. The results obtained are furnished below:</p> <table border="1" data-bbox="304 913 1369 1093"> <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>77</td> <td>68</td> <td>71</td> <td>73</td> <td>75</td> <td>70</td> <td>79</td> <td>74</td> </tr> </tbody> </table>	Centre Band Frequency (Hz)	63	125	250	500	1000	2000	4000	8000	Sound Pressure Level dB(A)	77	68	71	73	75	70	79	74	4+3+3 =10
Centre Band Frequency (Hz)	63	125	250	500	1000	2000	4000	8000												
Sound Pressure Level dB(A)	77	68	71	73	75	70	79	74												
Q.5) a)	<p>a) What are the total sound pressure level (L_{PT}) and total sound level (L_{PAT}) generated by the machine?</p>	6																		
b)	<p>b) What will be the root mean square pressure (p_{rms}) generated at the given distance?</p> <p>c) What are the corresponding total sound power and intensity levels?</p> <p>Discuss in brief with the help of a neat sketch on the essential components of a typical sanitary landfill.</p> <p>A municipal solid waste sample was subjected to ultimate analysis yielding a chemical formula of $\text{C}_{449}\text{H}_{2049}\text{O}_{912}\text{N}_{15}\text{S}$. 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%.</p>	4																		

Bachelor of Civil Engineering Examination 2019(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

1. Answer very briefly:
- (a) Why there should be more stringent indoor air quality standards than ambient standards?
 - (b) 'Source Apportionment Study should be an integral part for mitigation plan for pollutants like NO_x (than CO)' - explain.
 - (c) What is the probable size range of Sulfate Aerosols? Why this range is significant?
 - (d) Name four air pollutants which are generally monitored by a Respirable Dust Sampler.
 - (e) Name the pollutants included in current NAAQS which are not chosen for Indian AQI calculation. **10**
2. Answer very briefly:
- (a) Write formula of two natural greenhouse gas (GHG) and two synthetic GHG.
 - (b) Write the equation of destruction of 'bad' ozone.
 - (c) Name the anhydrides of two acids which are generally responsible for acid rain.
 - (d) Mention the equations related with control of precursors of photochemical smog.
 - (e) Why dry adiabatic lapse rate (DALR) is more than saturated adiabatic lapse rate (SALR)? **10**

Bachelor of Civil Engineering Examination 2019(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)

Part II

3. a) Give examples of:
- (i) Treatment of liquid waste produces gaseous waste
 - (ii) Treatment of gaseous waste produces liquid waste
- b) Which one is least preferred among reuse, recycle and recovery and why?
- c) Write the equations of formation of the photochemically dissociable criteria air pollutant.
- d) Write about the changes made in latest NAAQS related with land-use pattern.
- e) Correlate Emission Standards and Best Available Technologies (BATs). 10

Or

4. a) In a monitoring work with High-volume (respirable dust) Sampler, following data are found:
- (i) initial weight of pot=25.549gm; final weight of pot=25.652gm
 - (ii) initial weight of filter paper=1.258gm; final weight of filter paper=1.342gm
 - (iii) initial flow rate=1.10 m³/min; final flow rate=1.00 m³/min: sampling period=4 hour
- Calculate SPM and RPM concentrations.
- b) With examples show the common problems related with old AQI methods. How are those problems averted with current Indian AQI method? 6+4=10

Bachelor of Civil Engineering Examination 2019

(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)

Part II

5. a) Mention the factors on which Global Warming Potential (GWP) depends.
- b) (i) Write the code number of CHClF_2 (ii) Write the formula of H-1201
- c) Define acid rain.
- d) Why is Photochemical Smog also called Los Angeles Smog?
- e) Mention the limitation of using HCFC & HFC as alternatives of CFC.

10

Or

6. Following data are given to draw the temperature profile:

Height (m)	0	100	200	300	400	500	600	700
Temp.(°C)	27	25	23	22	21	21	22	23

(i) Calculate the corresponding mixing height.

(ii) Calculate the mixing height when a flue gas is emitted at 29°C. Effective stack height is 100m. What may be the probable plume pattern?

10