

Bachelor of Engineering (Civil Engineering) Supplementary Examination 2018 (Old)

(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. Any relevant data may be assumed, if needed.

1. a) Why should there be more stringent indoor air quality standard?
- b) Compare reuse and recovery.
- c) What should be the main criteria to minimize NO_x before its generation?
- d) 'Source apportionment study should be an integral part for mitigation of pollutants like NO_x'-explain.
- e) Define PM₁₀.
- f) Comment about the ODP of HCFC.
- g) What is the size range of sulphate aerosols?
- h) Write the equation of natural destruction of bad ozone.
- i) Name the pollutants of NAAQS which are not chosen for AQI calculation.
- j) What do you understand by 'NNW' wind and why?

2x10=20

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2. a) Particulate matter (PM) concentrations in ambient air are to be measured using a high volume sampler with respirable dust attachment. The filter used for this purpose had an initial dry weight of 9.787 g. The initial air flow rate through the filter was set at $1.5\text{m}^3/\text{min}$. Sampling was continued for 4 hours. The airflow after 4 hours was measured to be $1.4\text{m}^3/\text{min}$. The dry weight of the filter paper after 4 hour sampling was 9.992 g. Initial and final weights of the pot are 25.123g and 25.324g respectively. Assuming a linear decline in the air flow rate during sampling, what are SPM & PM_{10} concentrations?
- b) Show the conversion of ppm to $\mu\text{g}/\text{m}^3$ at standard temperature and pressure. 10+5=15
3. a) Draw the ultraviolet portion global energy balance sketch (excess drawing may not be appreciated). Now, find the ratio of albedo of earth's surface to global albedo.
- b) Draw the combined absorption spectra of the atmosphere to show the two main windows and describe their significance.
- c) Write the chemical formula of followings (i) H-1201 (ii) HFC-134
- d) Write the complete code number of followings (i) $\text{C}_2\text{FH}_3\text{Cl}_2$ (ii) CF_2HCl 5+6+2+2=15

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- 4.
- a) 'Lapse rate in troposphere is favourable.'-explain with a sketch. When is it unfavourable in troposphere and why?
 - b) Define 'windrose' with a sketch.
 - c) Why are concentrations of pollutants generally more during winter season?
 - d) There is a ground level inversion. Draw the plume patterns in the following cases:
 - (i) Inversion height is more than the stack height
 - (ii) Stack height is more than the inversion level.

5+3+3+4=15

RefNo. -Ex/CE/5/T/404/2018(S)(Old)

B.E.C.E. (EVENING) 4TH YEAR EXAMINATION, 2018
(1st Semester Supplementary (Old))
SUBJECT: Environmental Pollution & Control

Time: Three hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	Part II	Marks
	Answer question no.1 (compulsory) and any three from the rest. Assume relevant data if necessary.	
Q1. a)	Write Short Note (Any Two):	5×2
	i. Stationary container system of solid waste collection	
	ii. Weighting Network in sound level meter	
	iii. Thermal stratification and overturning of lake	
b)	Answer all the questions briefly in one or two sentences	2×5
	i. Name two limiting nutrients responsible for eutrophication.	
	ii. According to UNEP classification of countries based on per capita water availability when will you classify a country as water stressed and water scared country?	
	iii. What do you mean by fusing point of ash?	
	iv. What is equivalent sound pressure level?	
	v. According to CPCB when will you consider a surface water suitable for organized bathing (Write the parameters and their corresponding values)?	
Q2.a)	Define and explain the following terms with units of expression: Sound power, sound power level and sound intensity.	2×3
b)	Find out the sound pressure level in Decibel, if the sound pressure level measured was $8 \times 10^{-2} \text{ N/m}^2$. What is the unit of loudness of sound?	3+1
Q 3. a)	A municipal wastewater treatment plant discharges $18,925 \text{ m}^3/\text{d}$ of treated waste water to a stream. The waste water has a BOD_5 of 30 mg/L with deoxygenation constant of 0.23 d^{-1} . The temperature of the waste water is 27°C and DO is 2 mg/L . The stream just above the point of waste water discharge flows at $0.65 \text{ m}^3/\text{s}$, has a BOD_5 of 5 mg/L and is 90% saturated with oxygen at 23°C . After mixing, the stream and wastewater flows at a velocity 0.5 m/s and reaeration constant is 0.45 d^{-1} . What is the oxygen level of the stream after 2 days? At 23°C , $C_s = 8.56 \text{ mg/L}$ and at 24°C , $C_s = 8.4 \text{ mg/L}$.	8
b)	Write the name of two physical processes responsible for self-purification of river.	2

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No. of Questions	Part II	Marks
Q 4.	Identify physical and chemical characteristics of solid waste: specific gravity, permeability, calorific value and moisture content. Which type of solid waste you will recommend to dispose in landfill? What are the two major environmental consequences of landfilling operation of solid waste? After ultimate analysis it was obtained carbon content of a solid waste is 35%, H content is 25%, O content is 20%, N content is 12% and S content is 8%. Determine the high heating value of the solid waste. Name one quantification method of solid waste.	2×3+3+1
Q 5.	What do you mean by zone of active decomposition in case of oxygen sag curve? How do you calculate the center band frequency for an octave band? What two important parameters you should consider for suggesting thermal treatment for solid? With a neat labeled sketch explain the different biological zones of a lake.	2×3+4