KUMARAGURU
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M.E DEGREE EXAMINATIONS: DEC 2022

(Regulation 2018)

Second Semester

ENVIRONMENTAL ENGINEERING

P18EEI2201: Air and Noise Pollution Control

COURSE OUTCOMES

CO1: Categorize the various sources, types and nature of air pollutants and their effects on living and non-living beings

CO2: Monitor the air quality standards and different sampling techniques

CO3: Determine the principle involved in the pollutant removal and their control measures

CO4: Understand the sources and effects of indoor and outdoor noise pollution

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A) Traffic smog is likely to occur in regions where vehicle mileage is   CO1   [K$_2$] considerable and there is low incidence of sunlight.

    Reason (R): Traffic smog is caused by the reaction of oxides of nitrogen and some of

    the hydrocarbons in the presence of bright sunlight.

a)	Both A and R are Individually true and R is the correct explanation of A	b)	Both A and R are Individually true but R is not the correct explanation of A
c)	A is true but R is false	d)	A is false but R is true

2. What is a "tetroon" in the field of meteorology?   CO2   [K$_1$]

a)	A tool used to study wind patterns	b)	A tool used to study temperature deviations
c)	A tool used to study pressure variations	d)	A tool used to study humidity

3. Which of the following are responsible for the formation of photochemical smog?   CO1   [K$_2$]

    1. Light intensity

    2. Ratio of hydrocarbons to nitric oxide

    3. CO_2

    4. Hydrocarbon reactivity

a)	1,2&4	b)	1,2&3
c)	2,3&4	d)	2&4

4. Matching type item with multiple choice code   CO1   [K_1]

List I	List II
A. Sulfur dioxide	i. Damage ozone layer
B. Carbon dioxide	ii. Reduces oxygen carrying capacity of blood
C. Carbon Monoxide	iii. Acid rain
D. Chlorofluorocarbons	iv. Greenhouse gas

	A	B	C	D
a)	ii	i	iii	iv
b)	iii	iv	ii	i
c)	ii	iv	iii	i
d)	iii	i	ii	iv

5. Assertion: Activated alumina is used as a catalyst for removing gaseous pollutant from the ambient air.   CO2   [K_2]

Reason: The concentration of hydrocarbon emitted from automobiles is 300-1000mg/1.

a) Both A and R are Individually true and R is the correct explanation of A
b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

6. 10 decibels increase in sound level will increase the loudness of sound by: CO4   [K_1]

a) 2 times
b) 5 times
c) 10 times
d) 100 times

7. Electrostatic precipitator is most useful in which one of the following industries?   CO3   [K_1]

a) Tannery
b) Thermal power generation
c) Hydroelectric power generation
d) Textile factory

8. Assertion (A): Wet scrubber removes particulates from a gaseous stream.   CO3   [K_2]

Reason (R): In the wet scrubber, water droplets come into contact with the particulates.

a) Both A and R are Individually true and R is the correct explanation of A
b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

9. Radon gas from kitchen counter top may cause   CO4   [K_1]

a) Dried skin
b) Asthma
c) Carcinogen diseases
d) Lung cancer

10. Consider the following statements: CO4 [K$_2$]

1. Noise pollution can be reduced using double glass window panes

2. Glass absorbs the noise

3. Air trapped in the double glass system acts as an insulator and reduces the noise

4. The noise totally reflects back due to the two layers of glass

Which of these statements are correct?

a)   1,2,3and 4   b)   1,2 and 3

c)   1 and 3 only   d)   2 and 4 only

PART B (10 x 2 = 20 Marks)

11. Indicate the sources of the following trace elements in the atmosphere: Manganese, Arsenic, Zinc and Chromium.   CO1 [K$_2$]

12. Differentiate primary and secondary air pollutants with suitable example.   CO1 [K$_2$]

13. Calculate the AQI from 24 hours data   CO1 [K$_3$]

a. PM10-50 µg/m3

b. SO2 60 µg/m3

c. N$_2$O-200 µg/m3

d. Lead = 0.8 µg/m3

14. List the dispersion characteristics of stack plumes.   CO2 [K$_2$]

15. What are the assumptions involved in Gaussian Dispersion model?   CO2 [K$_2$]

16. Calculate the lapse rate on plume for the following data and comment your result.   CO2 [K$_3$]

Z (m)	T('C)
10	5.11
202	1.09

17. List the various types of particulate scrubbers.   CO3 [K$_2$]

18. Differentiate adsorption and absorption.   CO3 [K$_2$]

19. Define Sick Building Syndrome (SBS)   CO4 [K$_2$]

20. List the various ill effects of noise pollution.   CO4 [K$_2$]

PART C (10 x 5 = 50 Marks)

21. Write down the functions of central pollution control board for the prevention and control of air pollution under the air pollution act.   CO1 [K$_2$]

22. Determine the effective height of a stack, with the following given data: Physical stack is 180 m tall with 0.95 m inside diameter Wind velocity is 2.75 m/sec Air temperature is 20'C Barometric pressure is 1000 millibars Stack gas velocity is 11.12 m/sec Stack gas temperature is 160 °C — CO2 [K$_3$]

23. Explain the sampling procedure of gaseous pollutant in ambient air. — CO2 [K$_3$]

24. A factory emits 20 g/s of SO2 at a height H (including plume rise) with a wind speed of CO2 [K] 3 m/s at a distance of 1 km downstream, o, and o, are 30 m and 20 m. What is the SO concentration at the centerline of the plume and at a point 60 m to the side and 20 m below the centerline? — CO2 [K$_3$]

25. Explain the control process of air pollution by combustion process. — CO3 [K$_2$]

26. Enlist and explain the factors considered in the selection of air pollution control equipment. — CO3 [K$_2$]

27. Explain how the Air Containing Units contribute to indoor air pollution? — CO4 [K$_2$]

28. Name the various sources of noise, and their typical noise levels — CO4 [K$_2$]

29. Explain the various measures to be taken for controlling the noise pollution at source. — CO4 [K$_2$]

30. Brief the factors that might be primarily responsible for Sick Building Syndrome (SBS). — CO4 [K$_2$]

Answer any TWO Questions
PART D (2 x 10 = 20 Marks)

31. Write the effects of air pollution on human beings, animals and vegetation. — CO1 [K$_2$]

32. List and explain any three methods of controlling particulate emission. — CO3 [K$_2$]

33. Explain the analytical procedure for the determining SO2 concentration from stack — CO2 [K$_4$]

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