KUMARAGURU
college of technology
character is life

M.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(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 the 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. Process involved in the measurement of PM2.5 in the industry stack   CO1   [K2]

   Collection of air sample

    Measurement of temperature and pressure

    Removing of probe from monitoring kit

    Taking of thimble weight with air sample

   a)   2-3-4-1   b)   2-1-3-4
   c)   3-4-2-1   d)   4-1-3-2

2. The Air (Prevention & Control of Pollution) Act in the year ----   CO3   [K1]

   a)   1974   b)   1981
   c)   1976   d)   1985

3. When ALR and ELR is in stable condition, the plume rise is known as ……….   CO2   [K2]

   a)   Looping   b)   Fumigation
   c)   Fanning   d)   Coning

4. Match List I with List II   CO1   [K2]

List I	List II
A. Lead acid battery	i. Carbon monoxide
B. Motor vehicle	ii. Particulates
C. Fertilizer industry	iii. Cyanide
D. Plating industry	iv. Lead

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

5. Assertion (A): lofting occurs when there is a strong lapse rate above a surface inversion   CO2   [K2]
   Reason (R): The plume diffusion is rapid upward
   a) Both A and R are Individually true and   b) Both A and R are Individually true but
      R is the correct explanation of A   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. Radon gas from kitchen counter top may cause   CO4   [K2]
   a) Dried skin   b) Asthma

   c) Carcinogen diseases   d) Lung cancer

7. Assertion (A): Wet scrubber removes particulates from a gaseous stream. Reason (R):   CO2   [K2]
   In the wet scrubber, water droplets come into contact with the particulates.
   a) Both A and R are Individually true and   b) Both A and R are Individually true but
      R is the correct explanation of A   R is not the correct explanation of A
   c) A is true but R is false   d) A is false but R is true

8. Electrostatic precipitator is most useful for which one of the following industries?   CO3   [K1}
   a) Tannery   b) Hydroelectric power generation
   c) Thermal power generation   d) Textile factory

9. Multiple selection item with multiple choice code   CO1   [K2]
   Which of the following air pollutants are released by thermal power plants ?(I) Oxides
   of nitrogen,(II) Oxides of sulphur,(III) Ammonia,(IV) Carbon monoxide
   a) (I), (III) and (IV) only   b) (I), (II) and (IV) only
   c) (II) and (III) only   d) (I), (II, (III) and (IV

10. Which of the following steps can take by government in order to reduce the noise   CO4   [K1]
    pollution?
    a) Enforcement of all noise laws   b) increasing the number of new vehicles
    c) Constructing more roads   d) All the above

PART B (10 x 2 = 20 Marks)

11. Differentiate major and secondary air pollutants with suitable example.   CO1   [K2]

12. Calculate AQI Index for 24hours average   CO1   [K3]
    P.M10 $=70 \ \mu g/m3$
    Ammonia $=300 \ \mu g/m3$
    PM2.5 $=70 \ \mu g/m3$
    SO2 $=40 \ \mu g/m3$

13. Determine the effective height of a stack, with the following given data: Physical stack   CO2   [K3]
    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 °

14. Calculate the lapse rate on plume for the following data and comment your result.   CO2 [K3]

Z (m)	T('C)
2	-3.08
318	-6.21

15. Define SICK BUILDING SYNDROME and its symptoms.   CO3 [K2]

16. Distinguish between catalytic combustion and Catalytic oxidation.   CO3 [K2]

17. List out the meteorological factors of air pollution.   CO2 [K2]

18. A plate type electrostatic precipitator in a cement plant for removing dust particle   CO3 [K3]
    consist of 10 equal channels. The spacing between the plates is 0.15m and the plates
    are 2mhigh and 2m long.The unit handles 1000,m3/hr

19. Give the new five norms proposed by Central Control Board (CPCB) for Noise   CO4 [K2]
    Pollution violation.

20. Define "Hearing Threshhold Level"(HTL) and mention its limit.   CO4 [K1]

PART C (6 x 5 = 30 Marks)

21. What are the major effects of air pollution on human health and properties.   CO1 [K2]

22. List and explain the dispersion characteristics of stack plumes.in the ambient air.   CO2 [K2]

23. What is meant by air sampling? Explain non-isokinetic, isokinetic sampling and   CO1 [K2]
    sampling train.

24. A multi tray settling chamber having 8 trays, including the bottom surface,   CO3 [K3]
    handles 6m3/s of air 20 C. The trays are spaced 0.25m apart and the chamber is to
    be 1 m wide and 4m long. What is the minimum particle sze of density
    2000kg/m3 that can be collected with 100% efficiency. What will be the
    efficiency of the settling chamber if 50um particle are to be removed

25. State the major indoor air pollutants and explain their ill effects   CO4 [K2]

26. Explain the Noise pollution control acts and legislation in INDIA   CO4 [K2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27. Explain the term acoustic zoning and give its limits as per National Ambient Air   CO4 [K2]
    Quality standards (NAAQS)

28. A stack in an urban area is emitting 80 g/s of NO. It has an effective stack height   CO2 [K3]
    of 100 m. The wind speed is 4 m/s at 10 m. It is a clear summer day with the sun
    nearly overhead. Estimate the ground level concentration at a) 2 km downwind
    on the centerline and 0.1 km off the centerline σy =290 σz = 220

29. The cyclone with a diameter of 1.0m handles 3.0m3/s of standards air carrying particle with a density of 2000kg/m3.Using Ne =6.Determine the collection efficiency as a fuction of particle diameter.
Assume velocity = 24m/s and width of inlet =0.25mviscosity-1.81x10-5

CO3   [K3]

30. Find the average sound pressure level when four sounds 40,50,60,72 dB are measured in an area.Take average sound pressure level as 20microns Pascal (upa) And also find the Equivalent Noise Level for a fluctuating noise lasting for 95 microns as given below.

CO4   [K3]

SL.NO	Noise Level	Lasting for (time in mts)
1	80	10
2	60	80
3	100	05

31. What are the sources of noise ? How noise become a pollution problem? Discuss in detail "Control of noise at source"

CO4   [K2]

****