

AIR AND NOISE POLLUTION
(CIVL 3241)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group - A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) Coning plume occurs under
(a) Inversion condition (b) Super adiabatic environment
(c) Neutral condition (d) Sub adiabatic environment.
- (ii) The primary air pollutant which is formed due to incomplete combustion of organic matter is
(a) Methane (b) Sulphur dioxide
(c) Ozone (d) Carbon monoxide.
- (iii) The device, which can be used to control gaseous as well as particulate pollutants in the industrial emissions is known as
(a) Cyclone Collectors (b) Dynamic precipitators
(c) Spray towers (d) Fabric filters.
- (iv) The important gaseous pollutants, contributing to acid rains are
(a) SO₂ and NO_x (b) CO₂ and H₂S
(c) NO_x and O₃ (d) None of these.
- (v) The temperature gradient of ambient air, is called
(a) adiabatic lapse rate (b) super adiabatic lapse rate
(c) environmental lapse rate (d) dry adiabatic lapse rate.
- (vi) Following is used for measuring intensity of sound
(a) Sound level meter (b) Frequency meter
(c) both (a) and (b) (d) all of the above.
- (vii) Leachate is a coloured liquid that comes out of
(a) Septic Tanks (b) Sanitary Landfill
(c) Compost Plants (d) Aerated Lagoons.

- (viii) Man-made emission of chloro fluorocarbons (CFCs), is likely to deplete the ozone layer in the troposphere, leading to increase in
(a) Radioactivity (b) Heat
(c) Sound (d) Ultra violet radiations.
- (ix) Looping Plume occurs in
(a) Super-adiabatic environment (b) Sub-adiabatic environment
(c) Inverse condition (d) None of the above.
- (x) What is the dB of a threshold of pain?
(a) 100 (b) 110 (c) 120 (d) 146.

Group – B

2. (a) What is a 'Plume'? Define 'Lapse Rate'. Explain the types of lapse rate with appropriate diagram. [(CO2)(Remember/LOCQ)]
(b) What do you mean by 'inversion'? Explain the types of inversion. [(CO3)(Understand/IOCQ)]
7 + 5 = 12
3. (a) Define effective height of a stack with figure. [(CO2)(Understand/LOCQ)]
(b) An industry utilises 0.5 ml of oil fuel per month. It has also been estimated that for every 1 ml of fuel oil burnt in the factory, per year, the quantities of various pollutants emitted are given as:
Particulate Matter = 2.9 t/yr
SO₂ = 60 t/yr
NO_x = 8 t/yr
HC = 0.4 t/yr
CO = 0.5 t/yr
Calculate the height of the chimney required to be provided for safe dispersion of the pollutants. [(CO2)(Analyse/HOCQ)]
2 + 10 = 12

Group – C

4. Describe any three of the mechanical devices used for controlling air pollution (with diagram, working principle & removal efficiency):
(i) Fabric filters
(ii) Electrostatic precipitators
(iii) Cyclone collectors. [(CO2)(Remember/IOCQ)]
(3 × 4) = 12
5. (a) Enlist the various natural self cleansing properties of the environment to control air pollution. [(CO1)(Understand/LOCQ)]
(b) Explain in detail about any mechanical device that can control both gaseous pollutants as well as particulate matter. [(CO2)(Remember/IOCQ)]

- (c) Briefly explain any three measures that would help to control air pollution from automobile industry. [[CO2](Understand/IOCQ)]
4 + 5 + 3 = 12

Group - D

6. Define Noise. Differentiate between the term "Sound pressure level" and "Sound level", bringing out clearly the basic characteristics of the three type of weighting networks. [[CO5](Remember/IOCQ)]
(2 + 4 + 6) = 12
7. What is Ozone layer depletion? Write about its effects on biotic and abiotic world. Write short note on Montreal Protocol. [[CO5](Remember/IOCQ)]
(6 + 6) = 12

Group - E

8. Describe the various land filling method with diagram. Mention the various composition of municipal solid waste. Define lechate and monofill. [[CO6](Remember/IOCQ)]
(6 + 4 + 2) = 12
9. (a) What is sanitary landfill? Describe sanitary landfill with proper diagram showing different components. [[CO6](Remember/IOCQ)]
- (b) Describe different phases of landfill along with the diagram showing different gases formed in the landfill. [[CO6](Remember/IOCQ)]
5 + 7 = 12

| Cognition Level | LOCQ | IOCQ | HOCQ |
|-------------------------|------|------|------|
| Percentage distribution | 13.5 | 76.1 | 10.4 |

Course Outcome:

After the completion of the course students will be able to

1. Understand the basic concepts of environmental pollution.
2. Justify the use of pollution control equipment and their design.
3. Identify air pollution problems.
4. Understand industry specific treatment technologies.
5. Assess the various aspects of noise pollution and understand the different environmental laws.
6. Get an overall understanding of various ways to manage solid waste.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question

