

**AIR AND NOISE POLLUTION
(CIVL 3241)**

Time Allotted: 2½ hrs

Full Marks: 60

Figures out of the right margin indicate full marks.

*Candidates are required to answer Group A and
any 4 (four) from Group B to E, taking one from each group.*

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

Group – A

1. Answer any twelve:

12 × 1 = 12

Choose the correct alternative for the following

- (i) Greenhouse gases are those that absorb and emit infrared radiation. Examples include
(a) Nitrogen (b) Ozone
(c) Argon (d) None of (a), (b) & (c)
- (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) Following is used for measuring intensity of sound
(a) sound level meter (b) frequency meter
(c) both (a) and (b) (d) all of (a), (b) & (c)
- (v) During temperature inversion in atmosphere, air pollutants tend to
(a) Accumulate above inversion layer (b) Accumulate below inversion layer
(c) Disperse laterally (d) Disperse vertically
- (vi) Looping Plume occurs in
(a) Super-adiabatic environment (b) Sub-adiabatic environment
(c) Inverse condition (d) None of (a), (b) & (c)
- (vii) 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 (a), (b) & (c)

- (viii) Man-made emission of chlorofluorocarbons (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) Electrostatic precipitators remove
 (a) Sulphur dioxide (b) Ozone
 (c) Hydrocarbons (d) Sulphur tetroxide
- (x) 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.

Fill in the blanks with the correct word

- (xi) The main component of smog that forms in urban areas is _____.
- (xii) A sanitary landfill is also called an _____.
- (xiii) The principal gas in the 3rd phase of landfill is _____.
- (xiv) The permissible noise level in a residential area during night time is _____.
- (xv) What is the most common component of municipal solid waste (MSW) by weight _____.

Group - B

2. (a) Differentiate the primary and secondary air pollutants with example. [[CO1](Remember/LOCQ)]
- (b) A coal fired thermal power plant burns 6.25 tonnes of coal per hour, and discharges the combustion products through a stack having an effective height of 80m. The coal has a sulphur content of 4.7%, and the wind velocity at the top of the stack is 8.0m/sec. Atmospheric conditions are moderately to slightly unstable. Determine the maximum ground-level concentration of SO₂ and the distance from the stack at which this maximum occurs (assume necessary data). [[CO2](Analyze/HOCQ)]
- 3 + 9 = 12**
3. (a) Differentiate between: Environmental lapse Rate (ELR) and Adiabatic Lapse Rate (ALR). Also differentiate between dry and wet ALRs. [[CO1](Apply/IOCQ)]
- (b) Define subsidence and radiation inversion. [[CO1](Remember/LOCQ)]
- (c) Explain double inversion. [[CO1](Remember/LOCQ)]
- 6 + 4 + 2 = 12**

Group - C

4. Discuss in detail about the suggested treatment for the following industries:
 (i) Dairy Industry (Milk processing industries) (ii) Petro-chemical Industries
 (iii) Tannery (leather) industry. [[CO4](Apply/IOCQ)]
- (3 × 4) = 12**

5. (a) Enumerate and describe briefly any two devices that are used to control gaseous emissions from the industries (draw neat sketches). [[CO3](Analyse/HOCQ)]
 (b) Enumerate the engineering measures that are adopted to reduce emissions of air pollutants from automobiles. [[CO2](Apply/IOCQ)]
6 + 6 = 12

Group - D

6. (a) Differentiate between "sound power" and "sound intensity". [[CO5](Remember/IOCQ)]
 (b) While recording A-weighted sound level 4 readings have been taken at the site at different time of the day. These readings are: 50, 56, 60 and 42 dB(A) re: 20 µPa. What is the average sound level? [[CO4](Remember/LOCQ)]
4 + 8 = 12
7. What is Eutrophication. Write about its effects on biotic and abiotic world. Write short note on Montreal Protocol. [[CO5](Remember/LOCQ)]
(6 + 6) = 12

Group - E

8. (a) What is monofills. Describe sanitary landfill with proper diagram showing different components. [[CO6](Apply/IOCQ)]
 (b) Describe different Phases of landfill along with the diagram showing different gases formed in the landfill. [[CO6](Apply/IOCQ)]
5 + 7 = 12
9. Describe the various waste processing methods with diagram. Mention the various composition of municipal solid waste. Define cell and lift. [[CO6](Remember/IOCQ)]
(6 + 4 + 2) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	34	50	16

Course Outcome (CO):

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.

