HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination November 2025

Roll no.....

Name of the Course and semester: B.Tech (Civil Engineering), SEM: V
Name of the Paper: Air and Noise Pollution
Paper Code: TCE511

Time: 3 hour Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty).
(iv) Each sub-question carries 10 marks.

Q1. (2X10=20 Marks) CO-1

a. Explain the causes and consequences of ozone layer depletion and discuss how greenhouse gases contribute to global warming and climate change.
b. Discuss the chemical reactions of pollutants in the atmosphere leading to the formation of photochemical smog.
c. Compare and contrast London smog and Los Angeles (photochemical) smog in terms of composition, formation conditions, and effects.

Q2. (2X10=20 Marks) CO-2

a. Discuss the role of environmental regulations and international agreements (such as the Kyoto Protocol or Paris Agreement) in the control of air pollution.
b. What are the methods used for particulate matter measurement? Discuss high-volume sampling and PM2.5/PM10 monitoring techniques.
c. List the National Ambient Air Quality Standards (NAAQS) as per the Central Pollution Control Board (CPCB), India. Explain how these standards are categorized for industrial, residential, and sensitive areas.

Q3. (2X10=20 Marks) CO-3

a. Define Indoor Air Quality (IAQ) and discuss the major indoor air pollutants, their sources, effects, and control strategies to maintain healthy indoor environments.
b. Explain the fundamental principles of air pollution control. How do source reduction and pollutant removal methods differ in their approach to controlling emissions?
c. Discuss the design and working of particulate emission control devices such as settling chambers and cyclone separators. How does particle size influence their collection efficiency?

Q4. (2X10=20 Marks) CO-4

a. Explain the basic principles of acoustics and discuss how sound is characterized in terms of frequency, wavelength, and amplitude.
b. Describe the characteristics and examples of plane, point, and line sound sources. How does the nature of the source affect sound propagation?
c. Explain the concept of psychoacoustics. How does human perception of sound influence the assessment of noise pollution?

Q5. (2X10=20 Marks) CO-5

a. Explain the physiological and psychological effects of noise exposure on human health. How is annoyance due to noise quantified using rating schemes?
b. Discuss the national and international noise standards and limit values for various environments (industrial, residential, commercial, and silence zones).
c. Define and differentiate between various noise indices such as L_{10}, L_{50}, L_{90}, L_{eq}, L_{dn}, and CNEL. What is their significance in noise assessment?