AIR AND NOISE POLLUTION

Paper Code: ETEN-212	**L**	**T/P**	**C**
Paper: Air and Noise Pollution	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The emphasis in this course will be the monitoring and control of particulate and Gaseous pollutants, Minimization of the noise and noise pollution including technical measures, Codes, regulations, directives and standards about noise pollution.

UNIT – I

Concept of unpolluted air, Gaseous and vapour pollutants in atmosphere, Scales of air pollution, Primary and secondary pollutants, Ambient Air Quality, Monitoring for pollutants (SO_2, NO_2, O_3, PAN, Particulates, Hydrocarbons, PAH's) and their health effects. Stack monitoring for SO_x, NO_x, CO, CO_2, Hydrocarbons, Fluorides, Ammonia, VOCs, Effects of air pollution on vegetation, materials and structures. Stack monitoring for thermal power plant, Oil refinery industry, Fertilizer industry, Non ferrous metal industry. Recent techniques of online stack monitoring, Emission inventory. Trends of AAQ in Urban, Rural and Industrial areas.

[T1,T2][No. of Hours: 11]

UNIT – II

Air quality criteria, National and International air emission standards and AAQ guidelines, Indoor air quality, Averaging time, Air pollution system, Alternative control strategies. GLC estimates for multiple sources using standard software (e.g., EPA's ISC model).Determination of effective stack height.

[T1, T2][No. of Hours 11]

UNIT – III

Distribution and sources of Particulate matter, Hood duct design, Particulate collection mechanisms, Control systems and their design. Flue-gas desulfurization processes, Flue gas control methods for NO_x. Emission standards for automobiles, Origin of exhaust emissions from gasoline, Diesel, CNG and LPG engines. Crankcase and evaporative emissions, Emission reduction by fuel changes, Emission reduction by engine design changes, Catalytic converters, Diesel engine emissions

[T1,T2][No. of Hours 11]

UNIT- IV

Noise: Characteristics, Sources, Types of noise, Impact of noise

Physics of sound- Speed of sound, Sound pressure, Frequency, Wavelength, RMS Sound Pressure, Sound Pressure Level, Loudness, Sound Power Level and Sound Energy Density, Sound propagation, Wind and temperature gradient.

Enclosures and Barriers: Lead as a noise barrier, Plenum barriers, Barrier around pipe, wires and rectangular duct work, High transmission loss ceilings, Acoustical foams, Nylon in noise reduction, damping compounds.

Noise measuring equipments: Sound Level Meter, Octave Band Analyzer, Statistical Analyzer and Noise Average Meter

[T1, T2][No. of Hours: 12]

Text Books:

[T1] Rao M.N. and Rao H.V.N., "Air Pollution", Tata McGraw Hill Publishing Company Ltd., New Delhi.

[T2] Wang L.K., Pereira N.C., Hung Y.T., "Advanced Air and noise pollution control", Volume I andII, Humana Press, New Jersey.

Reference Books :

[R1] Ghassemi A., "Pollution Control and Waste Minimization", Marcel Dekker, Inc., New York.

[R2] Rao C.S., "Environmental Pollution Control Engineering", New Age International (P) Ltd., New Delhi.

[R3] Singal S.P., "Noise pollution and control strategy", Alpha Science International, New Delhi.

[R4] Ray T.K., " Air Pollution Control In Industries", Volume I, Tbi, New Delhi.

[R5] Stern A.C., Boubel R.W., Fox D.L., Turner B., "Fundamentals of Air Pollution, Hardcover", Elsevier Science and Technology Books.

[R6] Narayanan P., "Environmental Pollution Principles, Analysis and Control", CBS Publishers