

ELECTIVE PAPER

MEN-E 205 :

Air pollution management

M.M.: 70

Unit I

Chemical composition of air: Classification of elements, chemical speciation, Particles, ions and radicals in the atmosphere. Chemical processes for formation of inorganic and organic particulate matter. Thermochemical and photochemical reactions in the atmosphere.

Unit II

Natural and anthropogenic sources of air pollution. Primary and Secondary pollutants, Transport and diffusion of pollutants. Laws governing the behaviour of pollutants in the atmosphere. Methods of monitoring and control of air pollutants, SO₂, NO_x, CO, SPM. Effect of pollutants on human beings, plants, animals, materials and on climate. Acid rain, Air Quality standards.

Unit III

Heat transfer processes. Scale of meteorology: pressure, temperature, precipitation, humidity, radiation and wind. Atmospheric stability, inversion, and mixing height, wind rose. Effect of lapse rate on plume behaviour. Maximum mixing depth, Gaussian dispersion model, Effective stack height.

Unit IV

Control devices for particulate matter: Principle and design of gravitational settler, centrifugal collector, wet collector, fabric filters and electrostatic precipitator. Control of gaseous contaminants through adsorption, absorption, condensation and combustion including catalytic combustion.

Unit V

Stack sampling (with special emphasis on isokinetic sampling) and analysis of temperature, flow velocity, composition. Green belt design. Control of air pollution by process change. Management strategies for air pollution abatement. Vehicular pollution and urban air quality management.

NOTE: The question paper shall consist of two sections (A & B). Section A shall contain ten short answer type questions of six marks each and student has to attempt any five questions in about 150 words each. Section B shall consist eight long answer type questions of ten marks each and student shall be required to attempt any four questions in detail. Questions shall be uniformly distributed from the entire syllabus. The previous year paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.