Notes

10.3.3 Prevention and control of air pollution

(i) Indoor air pollution

Poor ventilation due to faulty design of buildings leads to pollution of the confined space. Paints, carpets, furniture, etc. in rooms may give out volatile organic compounds (VOCs). Use of disinfectants, fumigants, etc. may release hazardous gases. In hospitals, pathogens present in waste remain in the air in the form of spores. This can result in hospital acquired infections and is an occupational health hazard. In congested areas, slums and rural areas burning of firewood and biomass results in lot of smoke. Children and ladies exposed to smoke may suffer from acute respiratory problems which include running nose, cough, sore throat, lung infection, asthama, difficulty in breathing, noisy respiration and wheezing.

(ii) Prevention and control of indoor air pollution

Use of wood and dung cakes should be replaced by cleaner fuels such as biogas, kerosene or electricity. But supply of electricity is limited. Similarly kerosene is also limited. Improved stoves for looking like smokeless chullahs have high thermal efficiency and reduced emission of pollutants including smoke. The house designs should incorporate a well ventilated kitchen. Use of biogas and CNG (Compressed Natural Gas) need to be encouraged. Those species of trees such as babul (*Acacia nilotica*) which are least smoky should be planted and used. Charcoal is a comparatively cleaner fuel. Indoor pollution due to decay of exposed kitchen waste can be reduced by covering the waste properly. Segregation of waste, pretreatment at source, sanitization of rooms will help in checking indoor air pollution.

(iii) Prevention and control of industrial pollution

Industrial pollution can be greatly reduced by:

(a) use of cleaner fuels such as liquefied natural gas (LNG) in power plants, fertilizer plants etc. which is cheaper in addition to being environmentally friendly.

(b) employing environment friendly industrial processes so that emission of pollutants and hazardous waste is minimized.

(c) installing devices which reduce release of pollutants. Devices like filters, electrostatic precipitators, inertial collectors, scrubbers, gravel bed filters or dry scrubbers are described below:

(i) **Filters** – Filters remove particulate matter from the gas stream. The medium of a filter may be made of fibrous materials like cloth, granular material like sand, a rigid material like screen, or any mat like felt pad. Baghouse filtration system is the most common one and is made of cotton or synthetic fibres (for low temperatures) or glass cloth fabrics (for higher temperature up to 290°C).

(ii) **Electrostatic precipitators (ESP)-** The emanating dust is charged with ions and the ionized particulate matter is collected on an oppositely charged surface. The particles

are removed from the collection surface by occasional shaking or by rapping the surface. ESPs are used in boilers, furnaces, and many other units of thermal power plants, cement factories, steel plants, etc.

(iii) **Inertial collectors –** It works on the principle that inertia of SPM in a gas is higher than its solvent and as inertia is a function of the mass of the particulate matter this device collects heavier particles more efficiently. 'Cyclone' is a common inertial collector used in gas cleaning plants.

(iv) **Scrubbers** – Scrubbers are wet collectors. They remove aerosols from a stream of gas either by collecting wet particles on a surface followed by their removal, or else the particles are wetted by a scrubbing liquid. The particles get trapped as they travel from supporting gaseous medium across the interface to the liquid scrubbing medium.

Gaseous pollutants can be removed by absorption in a liquid using a wet scrubber and depends on the type of the gas to be removed e.g. for removal of sulphur dioxide alkaline solution is needed as it dissolves sulphur dioxide. Gaseous pollutants may be absorbed on an activated solid surface like silica gel, alumina, carbon, etc. Silica gel can remove water vapour. Condensation allows the recovery of many by products in coal and petroleum processing industries from their liquid effluents.

Apart from the use of above mentioned devices, other control measures are-

- increasing the height of chimneys.
- closing industries which pollute the environment.
- shifting of polluting industries away from cities and heavily populated areas.
- development and maintenance of green belt of adequate width.

(iv) Control of vehicular pollution

- The emission standards for automobiles have been set which if followed will reduce the pollution. Standards have been set for the durability of catalytic converters which reduce vehicular emission.
- In cities like Delhi, motor vehicles need to obtain Pollution Under Control (PUC) certificate at regular intervals. This ensures that levels of pollutants emitted from vehicle exhaust are not beyond the prescribed legal limits.
- The price of diesel is much cheaper than petrol which promotes use of diesel. To reduce emission of sulphurdioxide, sulphur content in diesel has been reduced to 0.05%.
- Earlier lead in the form of tetraethyl lead was added in the petrol to raise octane level for smooth running of engines. Addition of lead in petrol has been banned to prevent emission of lead particles with the vehicular emission.

green houses, in the botanical gardens these gases are known as green house gases and the heating effect is known as green house effect. If greenhouse gases are not checked, by the turn of the century the temperature may rise by 5^0C. This will melt the polar ice caps and increase the sea level leading to coastal flooding, loss of coastal areas and ecosystems like swamps and marshes, etc.

10.6 NOISE POLLUTION

Noise is one of the most pervasive pollutant. A musical clock may be nice to listen during the day, but may be an irritant during sleep at night. Noise by definition is "sound without value" or "any noise that is unwanted by the recipient". Noise in industries such as stone cutting and crushing, steel forgings , loudspeakers, shouting by hawkers selling their wares, movement of heavy transport vehicles, railways and airports leads to irritation and an increased blood pressure, loss of temper, decrease in work efficiency, loss of hearing which may be first temporary but can become permanent in the noise stress continues. It is therefore of utmost importance that excessive noise is controlled. Noise level is measured in terms of decibels (dB). W.H.O. (World Health Organization) has prescribed optimum noise level as 45 dB by day and 35 dB by night. Anything above 80 dB is hazardous. The table10.4 gives the noise intensity in some of the common activities.

Table 10.4: Sources of some noise and their intensity

Source	Intensity	Source	Intensity
Quiet Conversation	20-30dB	Radio Music	50-60 dB
Loud Conversation	60 dB	Traffic Noise	60-90 dB
Lawn Mower	60-80 dB	Heavy Truck	90-100 dB
Aircraft Noise	90-120 dB	Space Vehicle Launch	140-179 dB
Beat Music	120 dB		
Motor Cycle	105 dB	Jet Engine	140 dB

10.6.1 Sources of noise pollution

Noise pollution is a growing problem. All human activities contribute to noise pollution to varying extent. Sources of noise pollution are many and may be located indoors or outdoors.

Indoor sources include noise produced by radio, television, generators, electric fans, air coolers, air conditioners, different home appliances, and family conflict. Noise pollution is more in cities due to a higher concentration of population and industries and activities such as transportation. Noise like other pollutants is a by product of industrialization, urbanization and modern civilization.