UNIT V

1. Discuss the role of legislation in noise control.

The concern of the government for providing clean environment through environmental policy, planning and management has been very deep and sincere since 1970s. This is very clear from the national plan documents. The management of environmental despoliation was for the first time clearly provided in the Fourth Five Year Plan (1969-74). This plan highlighted the environmental issues in the following words:

"It is an obligation of each generation to maintain the productive capacity of land, air, water and wild life in a manner which leaves its successors some choice in the creation of a healthy environment.

The physical environment is a dynamic complex and interconnected system in which action in one part affects others. There is also the interdependence of living things and their relationships with land, air and water planning for harmonious development recognizes unity nature and man". Since then the environmental matters have assumed significance and the Sixth Five Year Plan (1980- 1985) also attached importance to the subject of environmental conservation and control.

Perceiving the problems of environment and its impact on national development environmental management has come to occupy a place of priority at the hands of government. That the government is seized of the matter is clear from the fact that now a separate Department of Environment (DOE) has been created to tackle the ecological crisis problems.

Some states too have also set up their department of environment.15 The Bhopal gas tragedy of 1984, one of the world's worst industrial disasters which claimed 30,000 lives and crippled 1,50,000 revealed several inadequacies in our safety and environmental legislations, particularly in its capacity to prevent and deal with consequences of catastrophic accidents involving hazardous chemicals.

After the disaster, the Government of India and Indian public has become aware and are now more vigilant in protecting environment.

In the period following Bhopal disaster, there have been major changes and new enactments in the following laws were included

- 1987 amendments to the Factories Act, 1948 and the rules;

- Enactment of a new Environment (Protection) Act 1986 and a series of rules; under, including 1992 amendment to Environment Protection Rules;
- Manufacture Storage and Import of Hazardous Chemical Rules, 1989;
- The Public Liability Insurance Act, 1991;
- Revised Motor Vehicle Act, 1988;
- Central Motor Vehicle Rules, 1989 with latest amendments;
- Narcotic Drugs and Psychotropic Substance Act, 1985;
- .The Bhopal Gas Leak Disaster (Processing of Claims) Act, 1985;

The above mentioned changes, amendments and enactments taken together have provided a significant frame work for the preservation and control of major accidents involving noise pollution, hazardous chemicals and have placed new responsibilities on and in challenging role for key factors i.e. industry and its top management workers and their organizations, regulatory agencies and local authorities and people residing in the vicinity of the industry.

The effective implementation and enforcement of these provisions, the establishment of a suitable supporting infrastructure and maintenance and the role awareness among key factors would continue to remain challenges in the years to come. The fitting of multi-toned horns and emission of excessive smoke are prohibited under Central Motor Vehicle Rules, 1989.

In India there are two weapons for fighting against the decibel level. First weapon is pollution control statutes and the other is provided in our Constitution under Articles 19(1) (a) and 21

These rifles may be called the Noise Pollution (Regulation and Control) Rules, 2000.

Ambient air quality standards in respect of noise for different areas/zones. -

(1) The ambient air quality standards in respect of noise different areas/ zones shall be such as specified in the Schedule annexed to these rules.

(2) The State Government may categorize the areas into industrial, commercial, residential or silence areas/zones for the purpose of implementation of noise standards for different areas.

(3) The State Government shall take measures for abatement of noise including noise emanating from vehicular movements and ensure that the existing noise levels do not exceed the

ambient air quality standards specified under these rules.

(4) All development authorities, local bodies and other concerned authorities while planning developmental activity or carrying out functions relating to town and country planning shall take into consideration all aspects of noise pollution as a parameter of life to avoid noise menace and to achieve the objective of maintaining the ambient air quality standards in respect of noise.

(5) An area comprising not less than 100 meters around hospitals, educational institutions and courts may be declared as silence area/zone for the purpose of these rules.

Responsibility as to enforcement of noise pollution control measures.-

(1) The noise levels in any area/zone shall not exceed the ambient air quality standards in, respect of noise as specified in the Schedule.

(2) The authority shall be responsible for the enforcement of noise pollution control measures and the due compliance of the ambient air quality standards in respect of noise.

Restrictions on the use of loud speakers/public address system. –

(l) A loudspeaker or a public address system shall not be used except after obtaining written permission from the authority. -

(2) A loud speaker or a public address system shall not be used at night (between 10.00 p.m. to 6.00 a.m.) except in closed premises for communication within, e.g. auditoria, conference rooms, conference rooms, community halls and banquet halls.

Consequences of any violation in silence zone/area.-

- Whoever, in any place covered under the silence zone/area commits any of the following offence, he shall be liable for penalty under the provisions of the Act :-
- Whoever, plays any music or rises any sound amplifiers,
- Whoever, beats a drum or tom-tom or blows a horn either, musical or pressure, or trumpet or beats or sounds any instrument, or
- Whoever, exhibits any mimetic, musical or other performances of a nature to attract crowds.

Complaints to be made to the authority-

(1) A person may, if the noise level exceeds the ambient noise standards by 11) dB (A) or more given in the corresponding columns against any area/zone, make a complaint to the authority.

(2) The authority shall act on the complaint and take action against the violator in accordance with the provisions of these rules and any other law in force.

Power to prohibit etc. continuance of music sound or noise.-

(1) If the authority is satisfied from the report of an officer in charge of a police station or other information received by him that it is necessary to do so in order to prevent annoyance, disturbance, discomfort or injury risk of annoyance, disturbance, discomfort or injury to the public or any person who dwell or occupy property on the vicinity, he may, by written order issue such directions as he may consider necessary to any person for preventing, prohibiting, controlling or regulating: -

(a) The incidence or continuance in or upon any premise of-

(i) Any vocal or instrumental music,

(ii) Sounds caused by playing, beating, clashing, blowing or use in any manner whatsoever of any instrument including loudspeakers, public address systems, appliance or apparatus or contrivance which is capable of producing or re-producing sound, or

(b) The carrying on in or upon, any premises of any trade, avocation or operation or process resulting in or attended with noise.

(2) The authority empowered under sub-rule (1) may, either oil its own motion, or on the application of any person aggrieved by an order made tinder sub-rule (1), either rescind, modify or alter any such order:

Provided that before any such application is disposed of, the said authority shall afford to the applicant an opportunity of appearing before if either in person or by a person representing him and showing cause against the order and shall, if it reflects any such application either wholly or in part, record its reasons for such rejection.

2. Discuss the sources of noise pollution.

Noise pollution like other pollutants is also a by- product of industrialization, urbanizations and modern civilization.Tthe noise pollution has two sources, i.e. industrial and non- industrial.

The industrial source includes the noise from various industries and big machines working at a very high speed and high noise intensity.

Non- industrial source of noise includes the noise created by transport/vehicular traffic and the neighborhood noise generated by various noise pollution can also be divided in the categories , namely, natural and manmade.

Most leading noise sources will fall into the following categories: roads traffic, aircraft, railroads, construction, industry, noise in buildings, and consumer products.

1. Road Traffic Noise:

In the city, the main sources of traffic noise are the motors and exhaust system of autos , smaller trucks, buses, and motorcycles. This type of noise can be augmented by narrow streets and tall buildings, which produce a canyon in which traffic noise reverberates.

2. Air Craft Noise:

Now-a-days , the problem of low flying military aircraft has added a new dimension to community annoyance, as the nation seeks to improve its nap-of the- earth aircraft operations over national parks, wilderness areas , and other areas previously unaffected by aircraft noise has claimed national attention over recent years.

3. Noise from railroads:

The noise from locomotive engines, horns and whistles, and switching and shunting operation in rail yards can impact neighboring communities and railroad workers. For example, rail car retarders can produce a high frequency, high level screech that can reach peak levels of 120 dB at a distance of 100 feet, which translates to levels as high as 138, or 140 dB at the railroad worker's ear.

4. Construction Noise:

The noise from the construction of highways , city streets , and buildings is a major contributor to the urban scene . Construction noise sources include pneumatic hammers, air compressors, bulldozers, loaders, dump trucks (and their back-up signals), and pavement breakers.

5. Noise in Industry:

Although industrial noise is one of the less prevalent community noise problems, neighbors of noisy manufacturing plants can be disturbed by sources such as fans, motors, and compressors mounted on the outside of buildings Interior noise can also be transmitted to the community through open windows and doors, and even through building walls. These interior noise sources have significant impacts on industrial workers, among whom noise- induced hearing loss is unfortunately common.

6. Noise in building:

Apartment dwellers are often annoyed by noise in their homes, especially when the building is not well designed and constructed. In this case, internal building noise from plumbing, boilers, generators, air conditioners, and fans, can be audible and annoying. Improperly insulated walls and ceilings can reveal the soundof-amplified music, voices, footfalls and noisy activities from neighboring units. External noise from emergency vehicles, traffic, refuse collection, and other city noises can be a problem for urban residents, especially when windows are open or insufficiently glazed.

7. Noise from Consumer products:

Certain household equipment, such as vacuum cleaners and some kitchen appliances have been and continue to be noisemakers, although their contribution to the daily noise dose is usually not very large.

3. Explain the effects of noise pollution.

Effects On Human Being, Animal and Property:

Noise has always been with the human civilization but it was never so obvious, so intense, so varied & so pervasive as it is seen in the last of this century.

Noise pollution makes men more irritable. The effect of noise pollution is multifaceted & inter related.

The effects of Noise Pollution on Human Being, Animal and property are as follows:

It decreases the efficiency of a man

Regarding the impact of noise on human efficiency there are number of experiments which print out the fact that human efficiency increases with noise reduction. A study by Sinha & Sinha in India suggested that reducing industrial booths could improve the quality of their work. Thus human efficiency is related with noise.

Lack of concentration

For better quality of work there should be concentration , Noise causes lack of concentration. In big cities , mostly all the offices are on main road. The noise of traffic or the loud speakers of different types of horns divert the attention of the people working in offices

Fatigue

Because of Noise Pollution, people cannot concentrate on their work. Thus they have to give their more time for completing the work and they feel tiring.

Abortion is caused

There should be cool and calm atmosphere during the pregnancy. Unpleasant sounds make a lady of irriative nature. Sudden Noise causes abortion in females.

It causes Blood Pressure

Noise Pollution causes certain diseases in human. It attacks on the person's peace of mind. The noises are recognized as major contributing factors in accelerating the already existing tensions of modern living. These tensions result in certain disease like blood pressure or mental illness etc.

Temporary of permanent Deafness

The effect of nose on audition is well recognized. Mechanics , locomotive drivers, telephone operators etc. All have their hearing . Impairment as a result of noise at the place of work. Physictist, physicians & psychologists are of the view that continued exposure to noise level above. 80 to 100 db is unsafe, Loud noise causes temporary or permanent deafness.

EFFECT ON VEGETATION

Poor quality of Crops:- Now is well known to all that plants are similar to human being. They are also as sensitive as man. There should be cool & peaceful environment for their better growth. Noise pollution causes poor quality of crops in a pleasant atmosphere.

EFFECT ON ANIMAL

Noise pollution damage the nervous system of animal. Animal looses the control of its mind. They become dangerous.

EFFECT ON PROPERTY

Loud noise is very dangerous to buildings, bridges and monuments. It creates waves which struck the walls and put the building in danger condition. It weakens the edifice of buildings

4. List the standards of noise level.

CPCB has laid down the permissible noise level in India for different areas. In industrial areas, the permissible limit is 75 dB for daytime and 70 dB at night. In commercial areas, it is 65 dB and 55 dB while in residential areas it is 55 dB and 45 dB during daytime and night respectively. Additionally, there is a category called 'silent zone' which includes areas that lie within 100 meters of the premises of schools, colleges, hospitals and courts. The permissible noise limit in this zone is 50 dB during the day and 40 dB during the nigh

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Zone	Permissible noise level standards in the daytime (dB)	Permissible noise level standards at night (dB)
Industrial Zone	75	70
Commercial Zone	65	55
Residential Zone	55	45
Silent Zone	50	40

According to CPCB guidelines, the maximum permissible diesel generator noise level for new generators with up to 1000 KVA rated capacity is 75 dB (A). Furthermore, there should be an acoustic enclosure for a diesel generator. The generator noise reduction enclosure aids in treating the room acoustically. The enclosure is made of generator soundproof materials that cut noise pollution to ensure that the neighbours are undisturbed. The acceptable generator noise level of DG sets used for domestic purposes is 85-90 dB (A).

Different types of generators in terms of noise level

On the basis of generator noise level standards, there are three types of generators:

- Silent/Soundproof generators
- Generators with noise level less than 75 dB
- Generators with noise level less than 120 dB

1. Silent or Soundproof Generators

Silent gensets are the ones that are fitted with a soundproof enclosure. A soundproof generator enclosure contains composite materials which include hard materials intended at reflecting the sound back and porous as well as resilient material which absorb the noise and convert it into heat energy. This is how noise can be prevented from contaminating the surroundings of the generator. Silent generators are ideal to be used in silent zones like schools, hospitals, courts, etc. They come with features like spark resistor, automatic low oil shutdown and fully enclosed covering. It's easy and comfortable to work even if you are close to silent gensets.

2. Generators with noise level less than 75 dB

It is natural that the more the power output the louder will be the generator. So, if you want a generator with a higher rated capacity, then you'll have to be ready to deal with some noise issues as well. Usually, generators with a noise level of less than 75 dB can find application in commercial areas as the demand for power output is high.

3. Generators with noise level less than 120 dB

The generators that have noise levels greater than 75 dB but less than 120 dB are ideal to be used in industrial areas. Though they produce more noise than other gensets, they can provide more power output which is essential for big manufacturing firms and industries. That is why a manufacturer would most likely choose this kind of generator.

5. **Describe the characteristics of sound waves**.

Following are the main characteristics of sound wave:

- Wavelength
- Amplitude
- Time period
- Frequency
- Speed

The peak of a wave is called compression or crest. The valley of a wave is called rarefaction or trough

WAVELENGTH

Wave length is the length between two consecutive peaks, i.e. crest or two consecutive valleys, i.e. trough of a wave. Wave length is represented by Greek letter λ (lambda). Louder sound has shorter wavelength and softer sound has longer wavelength. The SI unit of wavelength is metre (m).

AMPLITUDE:

Magnitude of maximum disturbance on either side of the normal position or mean value in a medium is called amplitude. In other words, amplitude is the distance from normal to the crest or trough.

Amplitude is the energy of sound. Louder sound has greater amplitude and softer sound has shorter amplitude. Thus, louder or softer sound is determined by its amplitude. Since louder sound has greater energy consequently greater amplitude, thus it travels to a longer distance. Softer sound has smaller energy consequently shorter amplitude, thus it travels to a shorter distance.

Amplitude is denoted by letter 'A'. The SI unit of amplitude is metre (m).

TIME-PERIOD

The time required to produce one complete wave or cycle or cycle is called time-period of the wave. Now, one complete wave is produced by one full vibration of the vibrating body. So, we can say that the time taken to complete one vibration is known as time-period. It is denoted by letter T. The unit of measurement of time-period is second (s).

FREQUENCY

The number of complete waves or cycles produced in one second is called frequency of the wave. Since one complete wave is produced by one full vibration of the vibrating body, so we can say that the number of vibrations per second is called frequency. For example: if 10 complete waves or vibrations are produced in one second then the frequency of the waves will be 10 hertz or 10 cycles per second. Do you know that the frequency of a wave is fixed and does not change even when it passes through different substances?

The S.I unit of frequency is hertz or Hz. A vibrating body emitting 1 wave per second is said to have a frequency of 1 hertz. That is 1 Hz is equal to 1 vibration per second.
Sometimes a bigger unit of frequency is known as kilohertz (kHz) that is 1 kHz = 1000 Hz. The frequency of a wave is denoted by the letter f.
The frequency of a wave is the same as the frequency of the vibrating body which produces the wave.

The time required to produce one complete wave is called time-period of the wave.
Suppose the time-period of a wave is T seconds.
In T seconds number of waves produced = 1
So, in 1 second, number of waves produced will be = 1/T
But the number of waves produced in 1 second is called its frequency.
Therefore, **F = 1/Time-period**
f = 1/T
where f = frequency of the wave
T = time-period of the wave

Velocity of Wave (Speed of Wave)

The distance travelled by a wave in one second is called velocity of the wave or speed of the wave. It is represented by the letter v. The S.I unit for measuring the velocity is metres per second (m/s or ms-1).