ENVIROMENTAL ISSUES

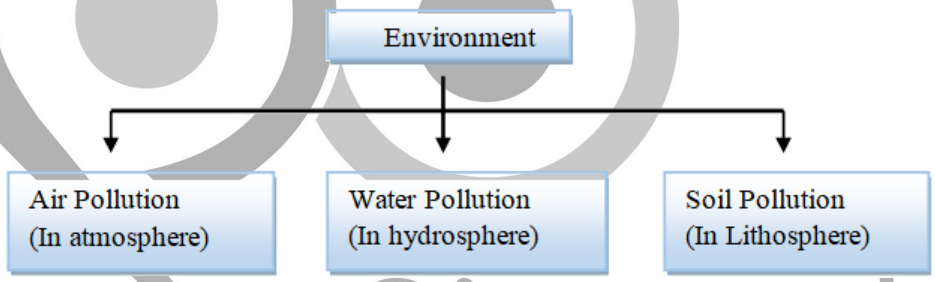
Pollution

It is an undesirable change in physical, chemical or biological characteristics of our air land and water. It spoils our raw material resources environment and adversely affects biological species including human beings. It causes global environmental changes like higher concentration of CO_2 & other greenhouse gases as well as depletion of stratospheric O_3.

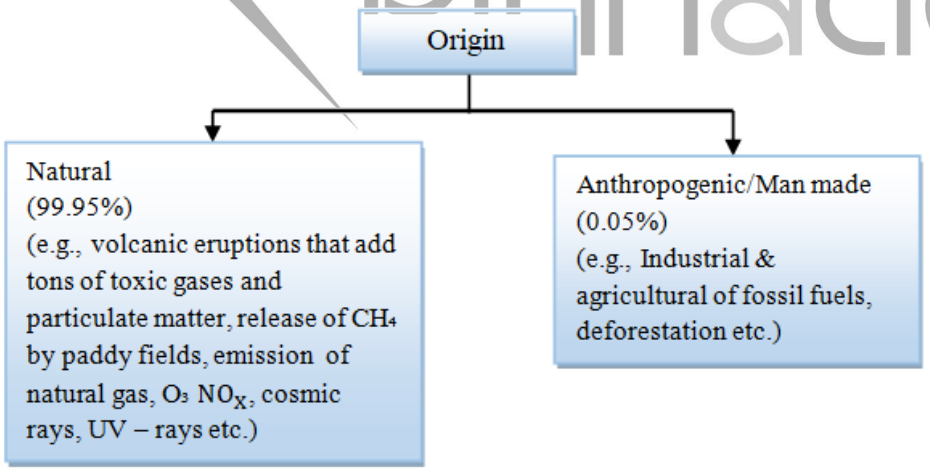
In order to control environmental pollution, the government of India has passed the **Environment (Protection) Act 1986** to protect and improve the quality of our environment (air, water and soil).

Kinds of Pollution

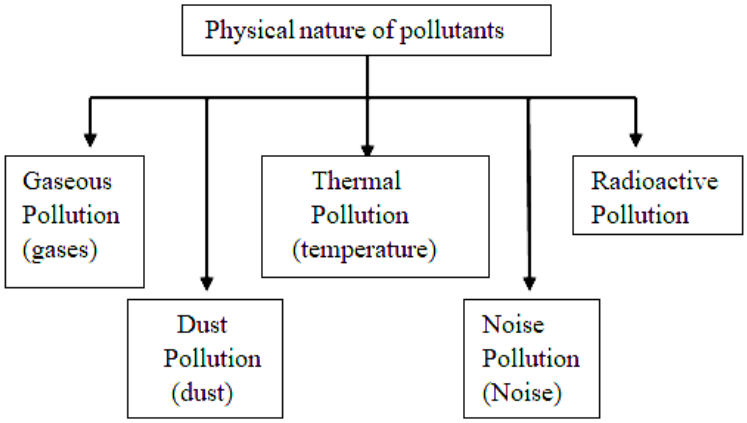
1. On the basis of part of environment where it occurs most, it is of three types



2. On the basis of origin pollution is of two



3. On the basis of physical nature of pollutants there are five types of pollution.



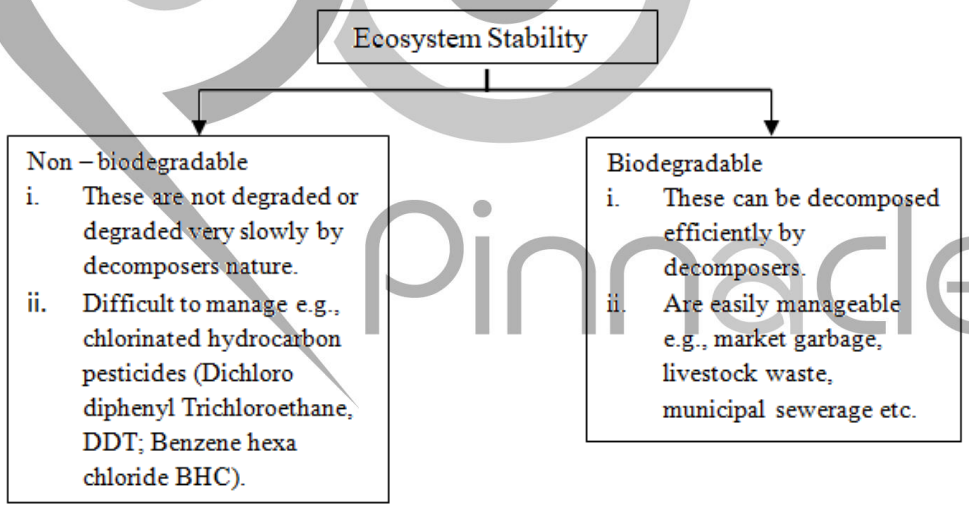
4. On the basis of emission of pollutant it is of two types
   - **i. Fixed source pollution** –Pollution coming out from fixed sources like small scale industries, mineral smelters, electrical power plants etc.
   - **ii. Mobile source pollution –** Pollutants coming out from a moving structure like transport vehicles etc.

Automobiles are a major cause for atmospheric pollution atleast in the metro cities. As the number of vehicles increase on the streets, this problem is now shifting to the other cities too.

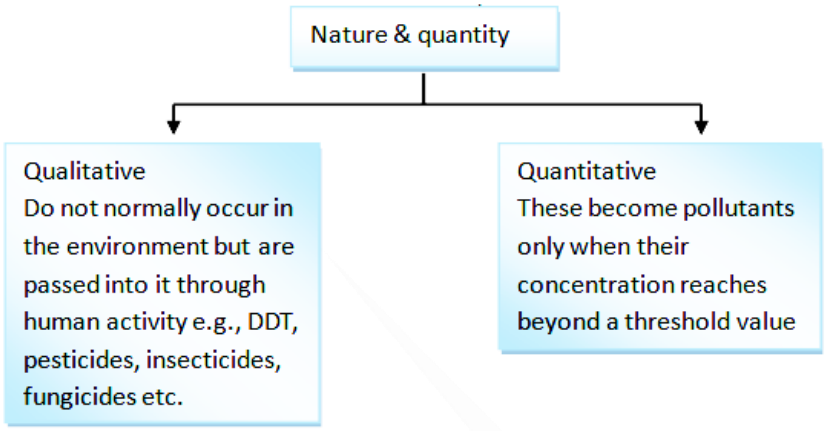
Kinds of Pollutants:

Any non-living substance (e.g. dust, smoke), physical factor (e.g. heat, noise), chemical (e.g. SO_2) or biotic component which in its excess on release produces an undesirable change in the environment is called as pollutant.

1. On the basis of stability in in ecosystem these are of two types:



On the basis of their nature and quantity the pollutants are of two types



2. On the basis of their changed/ unchanged nature

AIR POLLUTION

Human beings are dependent on air for respiratory needs. Air Pollutants cause injury to all living organisms. They reduce growth and yield of crops and cause premature death of plants. Air pollutants also deleteriously affect the respiratory system of humans and of animals. Harmful effects depend on the concentration of pollutants, duration of exposure and the organism. Smokestacks of thermal power plants, smelters and other industries release particulate and gaseous air pollutants together with harmless gases, such as nitrogen, etc. These pollutants must be separated / filtered out before releasing the harmless gases into the atmosphere.

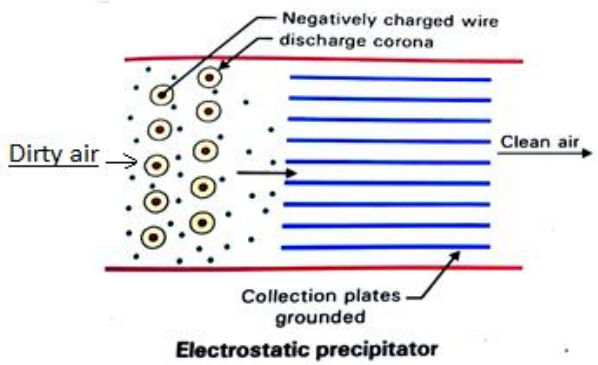
CONTROL OF AIR POLLUTION

It can be done by many ways:

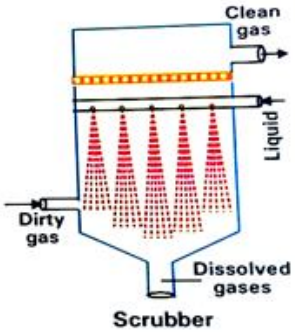
1. **Preventive strategies –**
   (i) Suitable fuel selection (e.g. fuel with less S content) and its efficient utilisation to reduce pollutant level in emission
   (ii) Modification in industrial processes to reduce emissions.
   (iii) Correct selection of manufacturing site and zoning for industrial set up to disperse pollution sources.
   (iv) Proper maintaince of automobiles along with use of lead-free petrol or diesel can reduce the pollutants they emit.
2. **Common methods of eliminating or reducing pollutants**
   (i) Control of particulate matter: It is done by using two types of devices.

Arresters	Scrubbers
These are to separate particulate air pollutants from contaminated air.	These are of two types i.e., dry and wet and are least used for particulate matter. However these are effective for gaseous pollutants.

The most widely used arrest is ESP which can remove over 99 per cent particulate matter present in the exhaust from a thermal power plant, it has electrode wires that are maintained at serval thousand volts, which produce a coronal that releases electrons. These electrons attach to dust particles giving them a net negative charge. The collecting plates are grounded and attract the charged dust particles. The velocity of air between the plates must be low enough to allow the dust to fall.
Recently the dangers of very small particulate matter have been realised are not removed by these precipitators.
A scrubber can remove gases like sulphur dioxide. In a scrubber the exhaust is passed through a spray of water or time.
According to Central Pollution Control Board (CPCB), Particulate Size 2.5 micrometers or less than 2.5 micrometer are responsible for causing the greatest harm to human health. These fine particulates can be inhaled deep into the lungs and can cause breathing and respiratory symptoms, irritation, inflammations and damage to the lungs and premature deaths.

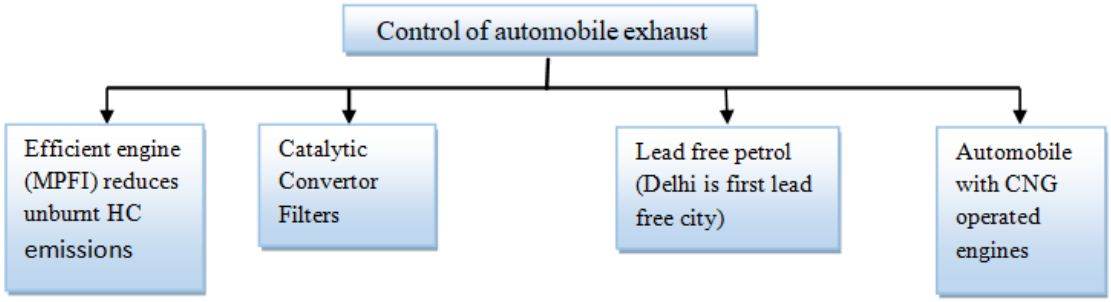


Electrostatic precipitator



Scrubber

1. Other specific methods for control



2. Bagasse and rice husk: Bagasse should not be used as fuel. Rice husk should be first converted into briquettes. (Block of inflammable matter)
3. Fly Ash: About 38% fly ash is produced by coal based thermal plants. It should be removed through wet method and used in building material.
4. Green belts – Growing rows of trees for purifying the air.

Controlling Vehicular Air pollutants

Delhi has the maximum number of vehicles in India. In 1990 the total number of cars in Delhi was more than the combined number for the states of west Bengal and Gujarat. Since 80% of air pollution in urban areas is due to automobiles, Delhi used to rank fourth amongst the 41 most polluted cities of the world. The problem of air pollution was so serious that most Delhites began to complain of burning eyes and respiratory discomforts. Public interest litigation (PIL) was field in Supreme Court.

The Supreme Court directed the government to take appropriate measures for reducing pollution caused by automobiles through:

i. Switch over of public transport from disel/ petrol to CNG (methane).
ii. Phasing out of old vehicles.
iii. Compulsory use of unleaded petrol and reduced sulphur content of disel.
iv. Compulsory regular check up to pollution emission of vehicles and enforcement of euro ll norms.

Hybrid vehicle technology – In this technology either petrol or CNG can be used in vehicle.

Fitting the vehicles with catalytic converter

Catalytic converters, having expensive metals namely platinum- palladium and rhodium as the catalytic converter, unburnt hydrocarbons are converted into carbon dioxide and water, and carbon monoxide and nitric oxide are changed to carbon dioxide and nitrogen gas , respectively. Motor vehicles equipped with catalytic converter should use unleaded petrol because lead in the petrol inactivates the catalyst.

Delhi became the first city of the world to use CNG for its public transport system and auto rickshaws by the end of 2002. CNG (compressed natural gas) is a better fuel than petrol or diesel because it is

i. Cheaper
ii. Burns more efficiently.
iii. does not produce much pollution.
iv. cannot be siphoned off by thieves.
v. Cannot be adulterated like petrol and diesel.

The man problem with switching over to CNG is difficulty of laying down pipelines to deliver CNG through distribution points / pumps & ensuring uninterrupted supply.

The government of India through a new **Auto fuel policy** has laid out a roadmap to cut down vehicular pollution in Indian cities. More stringent norms for fuel mean steadily reducing the sulphur and aromatic content in petrol and diesel fuels. Euro –lll norms stipulates that

i. Sulphur should be controlled at 350 parts-per-million (ppm) in diesel and 150 ppm in petrol.

ii. Aromatic hydrocarbons are to be contained at 42 per cent of the concerned fuel.
iii. The goal according to the roadmap is to reduce sulphur to 50 ppm in petrol and diesel and bring down the level to 35 per cent.
iv. Corresponding to the fuel, vehicle engines will also need to be upgraded.

Mass Emission Standards (Bharat stage ll which is equivalent to Euro norms) are no applicable in any of the cities of India.

Mass Emission Standards in India

Type of Vehicles	Norms	Cities of Implementation
4 Wheelers	Bharat Stage III	Throughout the country since October 2010
4 Wheelers	Bharat Stage IV	13 Mega cities (Delhi and NCR. Mumbai, Kolkata, Chennai, Bangalore, Surat, Kanpur, Agra, Lucknow, and Sholapur) since April, 2010.
3 Wheelers	Bharat Stage III	Throughout the country since October 2010
2 Wheelers	Bharat Stage III	Throughout the country since October 2010

Because of the above mentioned measures adopted by Government, the air quality of Delhi has improved with a substantial fall in SO_2, CO_2, NOx level between 1997 – 2005

Euro norms are designated as Euro – I, Euro – II, Euro – III and Euro – IV and they are related to three parameters i.e. hydrocarbon & NO_2 particulate matter, carbon monoxide.

In India the Air Prevention and Control of pollution) Act

Came into force in 1987 to include noise as an air pollutant.

NOISE POLLUTION:

Loud disturbing sound dumped into the ambient atmosphere without regard to the adverse effects it may have on the organisms.

Unit of sound is **decibel** (dB and was given after the scientist Graham Bell.

Noise or pollutant sound has a value of more than 80dB is harmful for human beings.

Loud conversation = 70 dB.
Truck and Bus = 90 dB.
Jet aeroplane/rocket = 150 dB or more

Source of Noise Pollution:

Industrial machines, transport vehicles, sound amplifiers, cracker blasting, industrial & mini- detonation defence equipment, domestic gadgets etc.

Effects

It affects heartbeat, peripheral circulation, Breathing pattern. Persistent noisy environment can cause annovance, irritability, headache, deafness & sleeplessness.

Control:

i. By using sound proof insulating jackets or filters for noisy machines.
ii. Use of **ear muffs.**
iii. Acoustic zoning includes zone formation on the basis of noise level.
iv. **Silent zone** of 100m around schools & hospitals should be notified.

v. **Green muffler** is planting 4-5 rows of trees & shrubs grown along sounds, railway tracks, around industries & residential areas.

vi. Maintenance of machines.

vii. Constructing aerodromes away from residential areas. Night flights should be banned.

Stringent laws should be laid down in relation to noise like delimitation of horn-free zones around hospitals and schools permissible sound levels of crackers and of loudspeakers timings after which loudspeakers cannot be played, etc., need to be enforced to protect ourselves from noise pollution.

Material generally used for sound proofing of rooms like studio and auditorium is Styrofoam. Curtains and carpets are acoustic furnishing which absorb sound waves and therefore reduced sound level.

WATER POLLUTION:

Degradation of water quality by different materials like inorganic, organic, heat etc. In urban areas 90% of pollution is due to human waste and 10% by industrial waste while in rular area 58% is due to agricultural run off water.

Water pollution is a serious problem in India. 50-60% of Indian population suffers from water borne diseases and 30-40% of deaths are due to water pollution. 44 million people are affected by poor quality of water.

Type of water pollutants

It is of three type's i.e.

i. Biological: It includes bacteria, viruses, worms, protozoa & are mostly added by excreta of animals.

ii. Chemical: It includes inorganic compounds like phosphates, nitrates, fluorides, chlorides & organic compounds like phenols, plastic dyes, and pesticides. The metals include Cd, Hg, Cu, Zn and As.

iii. Physical: Hot water and oil spills.

Source of Water pollution

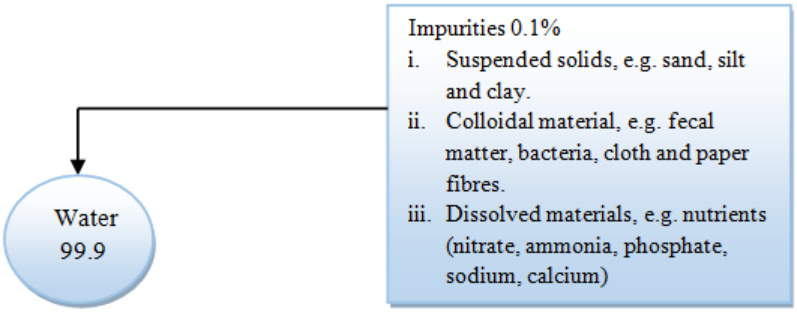
i. **Natural sources of water pollution:** Clay and silt from soil erosion, leaching of minerals, falling of organic matter from the banks.

ii. **Anthropogenic or man-made sources of water pollution :** Domestic waste sewage, soaps and detergents, run-off from agriculture fields having fertilizers and pesticides industrial wastes, heat, waste from animal sheds and slaughter house, oil pollution etc.

Domestic sewage

The different sources are kitchen, toilet wastes, detergents, organic matter as food, bacteria. Only 0.1%, of municipal waste water consists of sewage impurities. The rest 99.9% is water.

Solids are relatively easy to remove but dissolved salts such as nitrates, phosphates, and other nutrients, and toxic metal ions and organic compounds are difficult to remove.



Domestic sewage primarily contain biodegradable organic matter. It stimulates the activity of decomposer arganisms collectively called **sewage fungus**. It contains bacteria, fungi and some algae. The property of organic matter in getting decomposed through microbial activity is known as **putrescibility**

Decomposition of organic matter by microbes require oxygen (present dissolved in water, DO). Degree of impurity of water due to organic matter is measured in terms of B.O.D. (Biochemical oxygen demand) : it is amount of oxygen in mg required to decompose organic or biodegradable materials present in 1 litre of water when kept at temperature of 20 ^{0}C for 5 days in dark.

i. A weak organic waste has BOD less then 1500mg/l.

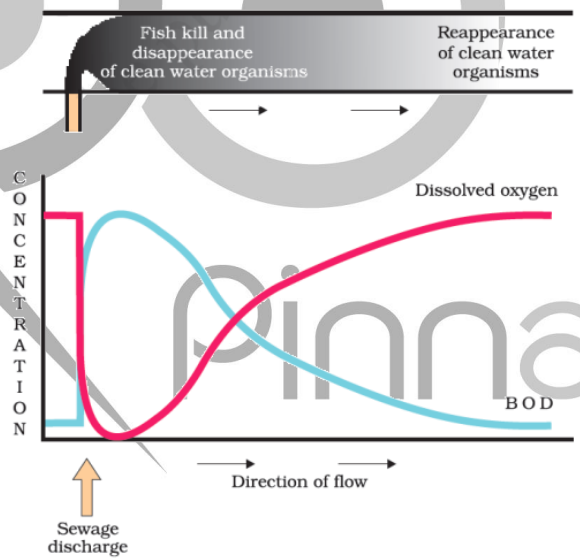
ii. Medium organic waste has BOD 1500-4000 mg/l.

iii. High organic waste has BOD is ≥ 4000 mg/l.

BOD of domestic sewage 200 – 300 mg/I.
BOD of distillery effluent 40000 – 50000 mg/I.
BOD of paper mill effluent 100 – 115 mg/I.
BOD of sugar mill effluent 800 – 2100 mg/I.

Dissolved oxygen (DO)

It is amount of oxygen dissolved in water its value is less than 8.0 mg/l in contaminated water and less than 4.0 mg/l in heavily contaminated water.



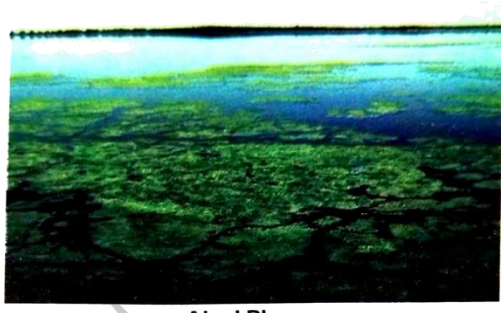
Discharge of domestic sewage into a river will result in rise of BOD and sharp decline in DO because decomposer organisms consume a lot of oxygen. If sewage quantity is large, the whole of dissolved oxygen may be consumed leaving mothing for respiration of fish and other clean water organisms. They, therefore, get killed. However, as sewage is decomposed, there is a gradual rise in dissolved oxygen downstream. Fish and other clean water organisms reappear indicating the recovery of river from sewage pollution.

Limit of BOD prescribed by CPCB for discharge of industrial and municipal waste water into natural surface water is <30 ppm

Effects of water pollution

Eutrophication:

It is the natural aging of a lake by biological enrichment of its water. In a young lake the water is cold and clear, supporting little life. With time, streams draining into the lake introduce nutrients such as nitrogen and phosphorous, which encourage the growth of aquatic organisms.



Algal Bloom

As the lake's fertility increases, plant and animal life burgeons and organic remains begin to be deposited on the lake bottom. Over the centuries, as silt and organic debris pile up, the lake grows shallower and warmer with warm-water organisms grow along with those that thrive in a cold environment. Marsh plants take root in the shallows and begin to fil in the original lake basin.

Eventually, the lake gives way to large masses of floating plants (bog), finally converting into land. Depending on climate, size of the lake and other factors, the natural aging of a lake may span thousands of years.

However, pollutants from man's activities like effluents from the industries and homes can radically accelerate the again process. This phenomenon has been called cultural or Accelerated Eutrophication. It occurs due to passage of sewage and run off from fertilized field into ponds, lakes and other water bodies.

The prime contaminants are nitrates and phosphates, which act as plant nutrients. They overstimulate the growth of algae (algae bloom), causing unsightly scum and unpleasant odors, and robbing the water of dissolved oxygen vital to other aquatic life.

Sewage from our homes as well from hospitals are likely to contain many undesirable pathogenic microorganisms, and it disposal into a water without proper treatment may cause outbreak of serious diseases, such as dysentery, typhoid, jaundice, cholera etc.

Water hyacinth (Eichhornia crassipes) which was introduced in India for beautiful mauve coloured flowers is the world's most problematic aquatic weed, also called 'Terror of Bengal'. They grow abundantly in eutrophic water bodies, and lead to an imbalance in the ecosystem dynamics of the water body.

Plankton, Molluscs and fish will be eliminated due to reduced DO and presence of secondary pollutants. However, some pollution tolerant species survive, e.g., annelid worm Tubifex and some insect larvae like Chironomus. They are considered to be **pollution indicators,** which feed on organic matter.

Diatoms are also good pollution indicator.

Nuisance growth of aquatic plant & bloom farming algae in natural water is generally due to high concentration of phosphorus.
Green scum in fresh water bodies is due to green algae & blue green algae.
Algal bloom imparts a distinct colour to water is due to their pigment.

A case study of integrated waste water treatment:

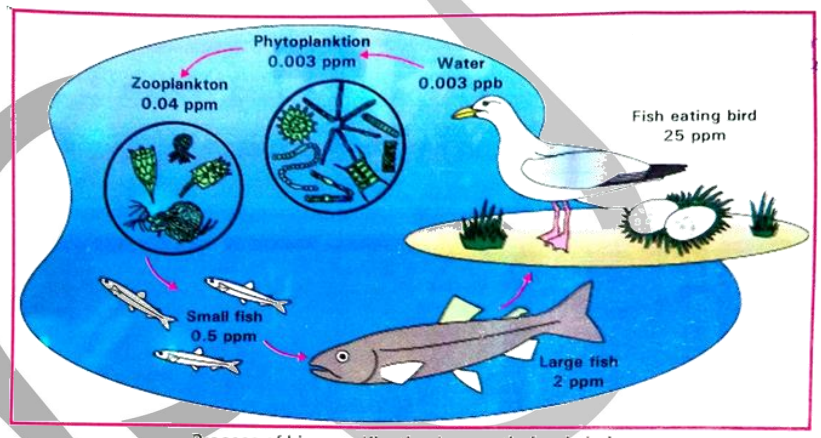
Wastewater including sewage can be treated in an integrated manner, by utilising a mix of article and natural processes. An example of such an initiative is the town of Arcata, situated along the northern coast of California. Collaborating with biologists from the Humbold State University, the townspeople created an integrated waste water treatment process within a natural system. The cleaning occurs in two stages

1. The conventional sedimentation, filtering and chlorine treatments are given. After this stage, lot of dangerous pollutants like dissolved heavy metals still remains. To combat this, an innovative approach was taken and
2. The biologists developed a series of six connected marshes over 60 hectares of marshland. Appropriate plants, algae, fungi and bacteria were seeded into this area, which neutralise, absorb and assimilate the pollutants. Hence, as the water flows through the marshes, it gets purified naturally.

The marshes also constitute a sanctuary, with a high level of biodiversity in the form of fishes animals and birds that now reside there.

A citizens group called Friends of the Arcata Marsh (FOAM) is responsible for the upkeep and safeguarding of this wonderful project.

'Ecosan' toilets are working in many areas of Kerala and Sri Lanka where water is not used for human waste disposal rather ecological sanitation is the system where human excreta can be recycled into a resource (as natural fertilizer).



Process of biomagnification in aquatic food chain

Industrial effluents:

Waste water from industries like petroleum, paper manufacturing, metal extraction and processing, chemical manufacturing, etc., often contain toxin substances, notably, heavy metals (defined as elements with density >5 g/cm^3 such as mercury, cadmium, copper, lead, etc.) and a variety of organic compounds.

Effects:

Mercury causes **Minamata diseases (**noticed in 1952, Japan at Minamata Bay) causes numbness of limbs & lips, blurring of vision, apathy, mental disorder and genetic changes.

Asbestos causes **asbestosis** (lung cancer)

Cadmium causes **Ouch – Ouch/itaitai** disease (bone disorder, cancer of liver and lungs, anaemia).

Nitrate causes **cyanosis/ blue baby syndrome / methaemoglobinaemia** (nitrates reacts with haemoglobin).

Excess of **fluoride** causes **skeletal fluorosis,** teeth deformity, hardened bones, stiff and painful joint.

Excess of **arsenic** causes **Blackfoot disease.** Its chronic exposure also causes Diarrhoea, peripheral neuritis hyperkeratosis, lung & skin cancers.

Biological magnification / bioconcentration / biological amplification – the phenomenon through which certain pollutants get accumulated in tissues in increasing concentrations along the food chain e.g. DDT and mercury

A few toxic substances, often present in industrial waste waters can undergo biomagnification.

Above figure shows biomagnification of DDT in an aquatic food chain e.g. DDT and mercury.

A few toxic substances, often present in industrial waste waters can undergo biomagnification.

Above figure shows biomagnification of DDT in an aquatic food chain. In this manner, the concentration of DDT is increased at successive tropic levels; say if it starts at 0.003 ppb (ppb= parts per million) in fish eating birds, Sea Gulls through biomagnification.

High concentrations of DDT disturb calcium metabolism

In birds, which causes thinning of eggshell and their premature?

Breaking, eventually causing decline in bird populations.

Population of Bald eagle has declined due to it.

DDT was banned in USA in 1972 and in India in 1985

For agricultural use.

Thermal Pollution:

Release of hot waste water having 8-10^{o}C higher temperature than intake water causes thermal pollution.

Effects

Causes deoxygenation as warmer water has lesser DO / dissolved oxygen; e.g., at O^{o}C it is ppm and 20^{o}C it is 1ppm.

i. Denaturation of enzymes
ii. Decreased decomposition
iii. Salmon does not spawn & trout eggs fail to hatch.

Heated (thermal) wastewaters flowing out of electricity –generating units, e.g., thermal power plants, constitute another important category of pollutants. Thermal wastewater eliminates or reduces the number of organisms sensitive to high temperature, and may enhance the growth of plants and fish in extremely cold areas but, only after causing damage to the indigenous flora and fauna.

EI Nino is warm ocean or Peru current or hot water current appearing after every 5 to 8 years is east pacific coast off Peru and Equador (related with monsoon in India). It kills fish over thousands of KM in the sea.

SOIL POLLUTION:

Soil Pollution is unfavourable alteration in physical, chemical and biological nature of soil- due to addition or removal of substances and factors which reduce its productivity, quality to support plants and ground water quality lying below it.

Source of Soil Pollution:

AGROCHEMICALS:

Pesticides: Most pesticides are broad spectrum killing most of the organisms. They are therefore, called biocides. Many of them are also persistent. Some of them even adversely effect the useful organisms in later stages. The phenomena are called ecological boomerang or ecological back lash.

Fertilisers: These reduce soil microflora. In aquatic system, they can lead to eutrophication.

Case study of organic farming:

Integrated organic farming is a cyclical, zero- waste procedure, where waste products from one process are cycled in as nutrients for other processes. This allows the maximum utilisation of resource and increases the efficiency of production. **Ramesh Chandra Dagar**, a farmer in Sonipat, Haryana, is doing just this. He includes bee keeping,

dairy management, water harvesting, composting and agriculture in a chain of processes, which support each other and allow an extremely economical and sustainable venture. There is no need to use chemical fertilisers for crops, as cattle excreta (dung) are used as manure. Crop waste is used to create compost, which can be used as a natural fertiliser or can be used to generate natural gas for satisfying the energy needs of the farm. Dagar has created the **Haryana Kisan Welfare Club**, with a current membership of 5000 farmers in order to spread information and help on the practice of integrated organic farming.

SOLID WASTE:

It refers to everything that goes out in trash includes

i. **Municipal waste:** They are solid wastes from homes, shops, offices, schools and streets. It includes wastepaper, textiles, leather, metals, glass, rubber, plastic & polythene, food wastes etc.

ii. **Industrial wastes:** It includes scrap, effluents, sludge and flyash.

iii. **Mining waste:** Causes mine spoil. The mine dust kills, vegetation & causes ground water spoilage. Nearby water bodies are also polluted by this process.

iv. **Hazardous wastes:** It includes industrial waste like pesticides, rubber, dyes, chemicals, metals and hospital waste like infected organic wastes, pathogens, pathogen carries, harmful chemicals, needles, syringes and vials.

v. **Defunct ships:** Old defunct ships are broken down in developing like India, Bangla Desh and Pakistan in demand for scrap metal. They possess a number of toxic materials like asbestos, lead, mercury, PCB'ss (Polychlorinated Biphenyls) etc.

vi. **Electronic waste:** Irreparable computers, mobiles and other electronic goods are called a waste.

Control of solid waste:

1. **Burning:** it reduces the volume of waste. If burnt openly in dumps, it may not be burn to completion. When burnt in closed conditions it can be done by two methods

   i. **Incineration:** Waste is burnt aerobically at 900^{o}C to 1300^{o}C. the use of incinerator is crucial for hospital waste.

   ii. **Pyrolysis:** The waste is heated anaerobically at a temperature of 1650^{o}C.

2. **Dumping (landfilling):** Piling of waste on selected low lying area is called dumping. It is two types i.e.,

   i. **Tipping or open dumping:** Collected waste is dumped over low lying area outside the residential complexes; open dumping produces a lot of odour and serve as breeding ground for rats and files.

   ii. **Controlled Tipping or sanitary landfills –** The waste is pulverised and spread over a low lying area. It is compacted and covered by a layer on earth.

- Landfills are also not really much of a solution since the amount of garbage generation specially in the metros has increased so much that these sites are getting filled too. Also there is danger of seepage of chemicals, etc., from these landfills polluting the underground water resources.

3. **Recovery and recycling** : All waste that we generate can be categorised into three types :

   i. bio- degradable
   ii. recyclable
   iii. the non- biodegradable

It is important that all garbage generated is sorted. What can be reused or recycled separated out ; our kabadiwallahs and rag- pickers do a great job of separation of materials for recycling. Biodegradable materials can

be put into deep pits in ground and be left for natural breakdown. That leaves only the non- biodegradable to be disposed off.

Prime goal for controlling non- biodegradable is to reduce generation of such wastes. State Governments across country are trying to push for reduction is use of plastics and use of eco-friendly packaging.

E- waste: E waste are buried in landfills or incinerated. Over half of the e- wastes generated in the developed world are exported to developing countries, mainly to silicon; nickel and gold are recovered during recycling process. Unlike developed countries, which have specifically built facilities for recycling is the only solution for treatment of e- wastes. Eventually recycling is the only solution for treatment of e-wastes provided it is carried out in an environment friendly manner.

Case study of remedy for plastic waste:

A plastic sack manufacturer in Bangalore has managed to find the ideal solution to the ever- increasing problem of accumulating plastic waste. Ahmed Khan, aged 57 years old, has been producing plastic sacks for 20 years. About 8 years ago, he realised that plastic waste was a real problem.

Polyblend, a fine powder of recycled modified plastic, was developed then by his company. This mixture is mixed with the bitumen that is used to lay roads. In collaboration with R.V. college of Engineering and the Bangalore City Corporation, Ahmed Khan proved that blends of polyblend and bitumen, when used to lay roads, enhanced the bitumen's water repellant properties, and helped to increase road life by a factor of three.

The raw material for creating polyblend is any plastic film waste. So, against the price of Rs. 0.40 per kg that rag pickers had been getting for plastic waste, khan now offers Rs. 6. Using Khan's technique, by the year 2002, more than 40 kms of road in Bangalore has already been laid. At this rate, Khan will soon be running short of plastic waste in Bangalore, to produce polyblend. Thanks to innovations like polyblend, we might still avoid being smothered by plastic waste.

RADIOACTIVE WASTES:

These are wastes which release radioactivity (emission of a α- particles, β- particles, or gamma rays) from nuclide of their elements. Traces of radioactive elements occur in a number of products, e.g., Polonium in tobacco, radon indoors, several ores.

Initially, nuclear energy was considered as a non- polluting way for generating electricity. Later on it was realised that the use of nuclear energy has two very serious inherent problems.

The first is accidental leakage, as occurred in the Three mile Island (USA) and Chernobyl (Ukraine) incident and the second is safe disposal of radioactive wastes.

Radiation, that is given off by nuclear waste is extremely damaging to organisms, because it causes mutations at a very high rate. At high does, nuclear radiation is lethal but at lower doses, it creates various disorders, the most frequent of all being cancer. Therefore, nuclear waste is an extremely potent pollutant and has to be dealt with utmost caution.

It has been recommended that storage of nuclear waste, after sufficient pre- treatment, should be done in suitably shielded containers buried within the rocks, about 500m deep below the earth's surface (not agreeable to many people).

Bhopal gas tragedy happened on 2nd December, 1984. It occurs due to reaction of MIC (Methyl isocyanate) with water. Sr – 90 is radioactive element causes cancer.

Environmental laws for controlling pollution	
Act	**Aim**
1. The environment (Protection) Act, 1986	Protection of air, water and soil quality & control of environmental pollutants.
2. The Insecticide Act, 1968	Regulation of import, manufacture, sale, transport, distribution and use of insecticides with a view of preventing risk to human health & other organisms.
3. The water (Prevention & control of pollution) Act, 1974	Preservation of water quality and control of water pollution with a concern for detrimental effects of water pollutants on human and also on the biological world.
4. The Air (Prevention and control of pollution) Act, 1981	Prevention of air pollution for the harmful effects of air pollutants on human health & also on the biological world.
5. Amendments in Air Act in 1987	Noise recongised as an air pollutant.

A green House Effect:

The term' Greenhouse effect' has been derived from a phenomenon that occurs in a greenhouse. Greenhouse looks like a small glass house and is used for growing plants especially during winter. In greenhouse the glass panel lets the light in but does not allow heat to escape. Therefore, the greenhouse warm up, very much like inside a car that has been parked in the sun for a few hours.

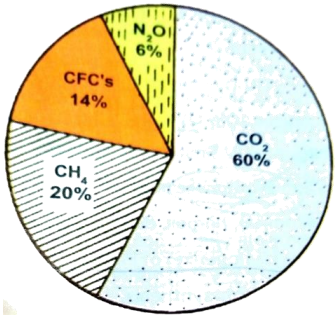
The greenhouse effect is a naturally occurring phenomenon that is responsible for heating of Earth's surface and atmosphere. Without greenhouse effect the average temperature at surface of Earth would have been a chilly -18 ^{o}C rather than the present average of 15 ^{o}C

Out of the total energy of sunlight that reaches the outermost atmosphere, clouds and gases reflect about one-fourth of the oncoming solar radiation falls on Earth's surface heating it, while a small proportion is reflected back.

Earth's surface re-emits heat in the form of infrared radiation but part of this does not escape as atmospheric gases (e.g., carbon dioxide, methane, etc.) absorb a major fraction of it. The molecules of these gases radiate heat energy and a major part of which again comes to Earth's surface, thus heating it up once again. This cycle is repeated many a times. The above- mentioned gases – carbon dioxide and methane – are commonly known as greenhouse gases because they are commonly known as greenhouse gases because they are responsible for the greenhouse effect.

Greenhouse gases/radioactively active gases – are those which can absorb long wave IR radiation. These gases includes **CO_2-60% CH_4-20% CFCs-14% N_2O-6%.**

Carbondioxide and methane are commonly known as greenhouse gases.



Greenhouse gases percentage in atmosphere

Excessive increase in gases concentration would retain more & more of IR radiation, resulting in **enhanced greenhouse effect. The consequent increase in the in the global mean temperature is called global warming.** The increase in greenhouse gases & their consequent effect on climate is assessed by **intergovernment panel on climate change (IPCC).**

Increase in the level of greenhouse gases has led to considerable heating of Earth heading to global warming. During the past century the temperature of Earth has increases by 0.6 ^{o}C most of it during the last three decades. Scientists believe that this rise in temperature is leading to deleterious changes (e.g. EI Nino effect), thus leading to increased melting of polar ice caps as well as of other place like the Himalayan snow caps. Over many years, this will result in sea level that can submerge many coastal areas.

The source/cause of different Greenhouse gases:

Carbon dioxide (CO_2): It is most abundant greenhouse gas its sources are destruction of forest/ Vegetation, excessive combustion, change in land use and fresh water wetlands.

Methane (CH_4): Its causes are enteric fermentation in cattle, flooded rice fields and biomass burning.

Chlorofluorocarbons (CFCs): It is non- toxic non- flammable, highly stable, synthetic gaseous compounds of carbons and halogens. It's synthesized in 20th century and persists for 45-260 years in the atmosphere.

Its causes are air conditioners, refrigeration, evaporation of industrial solvents, production of plastic foams and propellants in aerosol spray cans.

Nitrous oxide (N_2O) : It sources are agriculture, biomass burning (livestock wastes etc.), industrial processes (e.g., nylon manufacture), N_2 rich fertilisers and nitrate contaminated ground water.

Possible effects of increasing greenhouse gases

i. **CO_2 fertilisation effect –** Response of plants to elevated CO_2 concentration is called CO_2 fertilisation effect.
ii. **Global warming -** It leads to different effects on weather & climate Sea level change Effects on range of species distribution

On food production

High temperature increase plants diseases, explosive growth of weeds, increase in basal rate of respiration of plants etc. probably decreases the crop production.

In tropics and subtropics small temperature rise will have detrimental effect on crop- productivity e.g., in rice there will decrease in 5% output for each 1^0 increase in temperature.

STRATEGIES/STEPS TO COUNTERACT GLOBAL WARMING

Limited use of fossil fuels & developing alternative renewable sources of energy (i.e. wind energy, solar energy etc.)
Increased vegetation cover, especially forest for increased utilisation of CO_2.
Reduced use of nitrogen fertilisatisers for reducing N_2O emissions. Developing substitutes for CFCs e.g., HFCS (Hydroflourocarbons), HCIFCs (Hydrochorofloro carbons) or HCs like isobutane / propane.

Stratospheric O_3 depletion:

The ozone shield (ozonosphere) in the stratosphere helps in dissipating energy of UV as heat. Thus is protects the earth biota form harmful effects of UV- rays, so is called good ozone.

The thickness of the ozone in a column of air from the ground to the top of the atmosphere is measured in terms of **Dobson units** (DU)

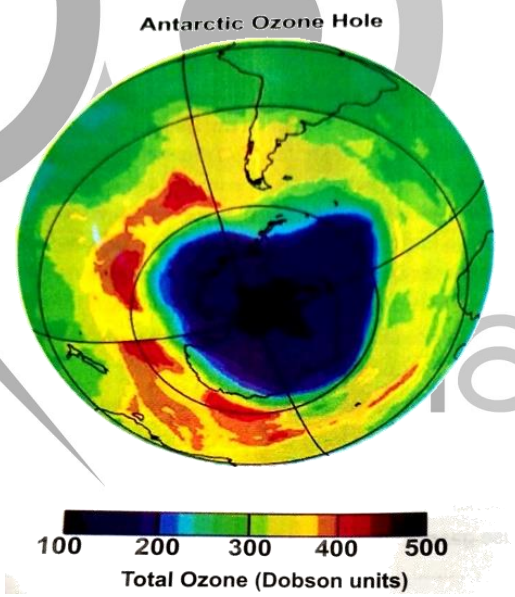
Ozone hole – The decline in spring time ozone layer thickness over Antarctica is called ozone hole. It was 1st discovered over Antarctica in 1985 by Farman. And then it was discovered over Arctic (1990).

ODS- (Ozone depleting substances) - These substances that react with ozone present in stratosphere & destroy the same. Major ODS are CFCs, NO_x, SO_2, halon, CCI_4, methyl chloroform, CI.

CFCs are most damaging as they produce **'active chlorine'** (CI & CIO radicals) in the presence of UV radiation. These radicals catalytically destroy O_3 converting it to O_2. One atom of Cl can convert one lakh molecules of ozone to oxygen. The reactions were discovered by **Mario Molina, Sherwood Rowland, Paul Crutzen** for which they received a Nobel Prize in chemistry in 1995.

Ozone hole over Antarctica

Ozone hole over Antarctica develops each year between late August and early October. Ozone depleting substances (e.g., CFCs) realsed by Industrialised countries of Europe, North America, Russia & Japan reach stratosphere from where they are pushed towards poles by winds. During winter there is no sunlight. The temperature is very low (-85°C). It favours formation of ice clouds. As the time Antarctica air is completely from the rest over the earth. It circulates over the polar region and is called polar vertex. Ice clouds provides catalytic surface where chloric & other reactants of ODS can react with ozone & degrade it. However, sunlight is necessary for it. It is available during spring, when ozone hole disappears during summer as warmth mixes up Antarctica air with air of other parts of world.



Effect of O_3 depletion –

i. Increased UV-B reaching the earth (A5% loss of O_3 increase 10% UV-B).
ii. High dose of UV-B Causes inflammation of cornea, called **snow-blindness** cataract, skin cancer (including melanoma), herpes, dimming of eyes sight.
iii. Diminished functioning of immune system.
iv. Diminished photosynthesis, seed germination and seed setting
v. Damaged nucleic acids and more mutations.
vi. Inhibits photosynthesis in most phyloplankton.

International efforts for mitigating global changes	
Effort	**Aim**
1. Montreal Protocol (1987) Montreal (Canada). Effective in 1989.	Protection of stratosphere O_3 by limiting the production & use of ODS, phasing out fo ODS & helping developing countries to implement use of alternatives of CFCs.
2. Helsinki Declaration (1989)	Montreal Protocol was ratified by 82 nations at Helsinki. They pledged to phase out CFCs by 2000.
3. Earth summit, 1992 (at Rio de Janerio, Brazil by UNCED, United Nations conference on environment development)	Reduction in greenhouse gas emission.
4. Kyoto Protocol, 1997 (at Kyoto, Japan) Kyoto protocol was endorsed at CoP – 3. (Conference of party)	Reduce greenhouse gas emission to a level 5% below 1990 level by the commitment period of 2008 – 2012.
5. Beijing Protocol (1999)	The protocol lays down steps to reduce emission of CFCs and other ozone depleting substances. It separates the efforts to be made by developing and developed countries.

DEGRADATION BY IMPROPER RESOURCE UTILISATION AND MAINTENANCE

The degradation of natural resources can occur, not just by the action of pollution but also by improper resource utilisation practices.

1. **Soil erosion and desertification:** The development of the top soil takes centuries. But, it can be removed very easily due to human activities like over- cultivation practices, resulting in arid patches of land. When large barren patches extend and meet over time, a desert created.
2. **Waterlogging and soil salinity:** Irrigation without proper drainage of water leads to waterlogging in the soil. Besides affecting the crops, waterlogging draws salt to the surface of the soil and thus increasing salinity of the soil which effects growth of crops.

Waterlogging and soil salinity are some of the problems that have come in wale of green revolution.

Deforestation

It is the conversion of forested areas to non- forested ones. According to an estimate, almost 40% forests have been lost in the tropics, compared to only 1% in the temperate region. At the beginning of the 20^{th} century, forests covered about 30% of the land of India. By the end of the century, it shrunk to 19.4%.

Causes of deforestation

1. **Agriculture:** It is one of the major reasons of the deforestation. Forests are converted to agricultural lands so as to feed the growing human population.
2. **Jhum cultivation:** It is slash and burn agriculture prevalent in north-eastern states of India. In this the farmers cut down the trees of the forest and burn plant remains. The ash is used as a fertiliser and the land is then used for farming or cattle grazing. After cultivation, the area is left for several years so as to allow its recovery. The farmers then move on to other areas and repeat this process. In earlier, enough time-gap was given such that the land recovered from the effect of cultivation, this recovery phase is done away with, resulting in deforestation.

3. **Demand for wood:** For industry, mostly timber and paper industry, fire wood.
4. **Mountain and forest roads.**
5. **Cattle ranching.**
6. **Hydroelectric projects.**

Effects of Deforestation

i. Enhanced carbon dioxide concentration in the atmosphere because trees that could hold a lot of carbon in their biomass are lost. It is one of the major effects.

ii. Increased soil erosion may lead to desertification in extreme cases.

iii. Climatic changes, floods, cyclones, droughts, rainfall decreases.

iv. Biodiversity & germplasm loss due to habitat distruction.

v. Disturbs hydrological cycle.

FOREST CONSERVATION

It is protection, restoration and preservation of forest cover. As per National Forest Policy (1988), hills should have a forest cover of 67% while in plants it should be 33%

Forest cover can be increases through

1. **Afforestation:** It is growing forest cover over a bare area where it did not exist earlier.
2. **Reforestation:** It is restoring a forest cover over an area where it existed earlier but was removed at some point of time in the past.

Now a day's village and tribal communities are being involved in development and protection of degraded forests on share basis (fruits, gums, rubber, and medicines). It is called **joint forest management** or **JFM** (started 1980)

Van Mahotsava (a tree plantation movement) is celebrated two times a year i.e. July and February.

Case study of people's participation in conservation of forests:

1. **Bishnois:** In 1731, the king of Jodhpur (Rajasthan) asked his ministers to arrange wood for construction of a new palace. The ministers and workers went to a forest near a village inhabited by Bishnois for cutting down the trees, A Bishnoi woman Amrita Devi. Her three daughter and hundreds of other Bishnois lost their lives in saying trees. Such a commitment for saving environment is found nowhere else. The government of India has recently instituted **Amrita Devi Bishnoi Wildlife Protection Award** for individuals and rural communities who show extraordinary courage and dedication in protecting wildlife.
2. **Chipko Movement:** This movement was started in March 1974 in Gopeshwar in Chamoli district. This was initiated by two leaders named Chandi Prasad Bhatt of Gopeshwar and Sunder lal Bahugana of Silyara in Tehri region. This movement is meant for protecting the trees cutting in region.

Similar type of movement was also started by Pandurang Hedge in South for trees protection. It is know as **Appiko movement.** It aims at **uliso** (conservation), **belesu** (growth plantation) and **balasu** (rational use).

Silent valley of kerala was also saved through public agitation against setting up of hydroelectric project in natural forest area.

Renewable source of energy

i. Wind energy
ii. Solar energy

Miscellaneous points:

i. Most polluted city in the world is Tokyo & Kolkata in India.

ii. Threat to Taj is due to SO_2 released from Mathura refinery.

iii. Chernobyl, Ukraine (Russia) atomic reactor accident occurred in 1986. The reactor burnt due to over heating and causes leakage of radioactive materials.

iv. Ganga action plan for its cleaning was started in 1985.

v. World most problematic aquatic weed is Eichhornia.

vi. World environment day = 5^{th} June.

vii. National pollution prevention day = 2^{nd} December.

viii. World Ozone day = 16^{th} September.

ix. World Earth day = 22^{nd} April.

x. Major source of noise pollution is due to transport system.

xi. More indoor chemical pollution is due to burning mosquito coil.

xii. Bone – Material takes longest time for biodegradation.

xiii. Fertilizer industry causes both air and thermal pollution well as eutrophication.

xiv. Plants which are used for wind breaker in the agricultural field are used for wind breaker in the agricultural field are Prosopis, Acacia, Nerium.

xv. Multipurpose tree – Trees have several benefits such as used for fodder, fruit small timber, fuel, wood etc. e.g. Albizzia, Morus.

xvi. Social forestry – Planting trees on public and common land.

xvii. NEERI : National Environmental Engineering Research Institute, Indicator.

xviii. Lichen is SO_2 pollution indicator.

xix. Amaranthus, Chenopodium, Cynodon, Parthenium causes pollen allergy.

EXERCISE - 1

1. Pollution is rising due to
   (a) Rains
   (b) Research institutes
   (c) Population increase
   (d) Automobiles and industries.
2. Most harmful type of environmental pollutant are
   (a) Human organic wastes
   (b) Natural nutrients in excess
   (c) Waste animal feed
   (d) Non – biodegradable chemicals
3. DDT is
   (a) Biodegradable
   (b) Non – degradable
   (c) Not a pollutant
   (d) An antibiotic
4. Which one of the following is not a pollutant?
   (a) CO_2
   (b) SO_2
   (c) CO
   (d) NO_2
5. What is correct for scrubbers with respect to pollution?
   (a) It can be used for removing particulate pollutants
   (b) Removes pollutant gases like SO_2
   (c) Can be used for removed SPM
   (d) All of these
6. The particulate air pollutants released from a thermal power plant can be removed very effectively by arresters like
   (a) Scrubber
   (b) Porous filters
   (c) Electrostatic precipitators
   (d) None of these
7. What appropriate measures were suggested by Supreme court to government of India for reducing air pollution?
   (a) Use of CNG instead of petrol or diesel
   (b) Use of unleaded petrol
   (c) Regular check up of pollution emission of vehicles
   (d) All of these
8. According to Central Pollution Control Board, greatest harm to human health is caused by particulate size
   (a) 10 μ m
   (b) 10 μ m
   (c) 5 μ m
   (d) $\leq$ 2.5 μ
9. Major cause for atmospheric pollution in metro cities is
   (a) Industries
   (b) Automobiles
   (c) Smoking
   (d) Burning of coal
10. Catalytic converters used in automobiles are made up of
    (a) Gold – platinum – Rhodium
    (b) Platinum – palladium and gold
    (c) Platinum – palladium and Rhodium
    (d) Platinum – Rhodium and gold.
11. Motor vehicles fitted with catalytic converter must use unleaded petrol because
    (a) Lead pollutes atmosphere
    (b) Catalyses converters
    (c) Activate lead
    (d) Lead inactivates catalyst
12. All buses of Delhi were converted to run on CNG by the end of
    (a) 2004
    (b) 2002
    (c) 2003
    (d) 2005
13. Catalytic converters change unburnt hydrocarbons and NO_X respectively into
    (a) CH_4, CO_2 and Nitrates
    (b) CO_2, H_2O, nitrogen gas
    (c) CO_2, H_2 O, nitrogen oxides
    (d) CO_2 methane and nitrogen gas
14. What do smokestacks of thermal power plants, smelters and other industries release?
    a. Particulate matter
    b. Gaseous air pollutants
    c. Harmless gases such as N_2 & O_2
    (a) Both a, b
    (b) Only c
    (c) a, b, c
    (d) a, b
15. About how much particulate matter can be removed through an electrostatic precipitator present in the exhaust from a thermal power plant?
    (a) Over 90%

(b) Over 99%
(c) 100 %
(d) Over 10%

16. In which year was the Air (prevention and control of pollution) enacted and when was it amended to include noise as air pollution?
(a) 1984 and 1987
(b) 1981 and 1987
(c) 1974 and 1980
(d) 1986 and 1989

17. The affect of loud noise/noise pollution is
(a) Anxiety and irritability
(b) Altered breathing pattern
(c) Sleeplessness
(d) All

18. Areas around hospitals and schools are considered as
(a) Silent zones
(b) Protected zones
(c) Risky zones
(d) Noisy zones

19. Water pollution is due to
(a) Sulphur dioxide
(b) Carbon dioxide
(c) Oxygen
(d) Industrial discharges

20. Sudden mass death of fish is more likely to occur in
(a) Eutrophic lake
(b) Mesotrophic lake
(c) Oligotrophic lake
(d) Salt water lakes

21. Water pollution indicator organism is
(a) Diatoms
(b) Cholera vibrio
(c) Salmonella typhi
(d) Entamoeba histolytica

22. A lake Receving domenstic sewage shows
(a) Increased fish population due to higher nutrient availability
(b) Death of fish due to oxygen deficiency
(c) Drying up due to depositions
(d) Increased animal life

23. Arrange following according to the ascending order of BOD.
i. Highly polluted pond water
ii. Unpolluted pond water
iii. Distilled water
(a) I – ii – iii
(b) ii – I – iii
(c) iii – ii – I
(d) I – iii – ii

24. Limit of BOD prescribed by CPCB for discharge of industrial and municipal waste waters into natural surface waters is
(a) <3.0 ppm.
(b) <10 ppm.
(c) <30 ppm.
(d) <100 ppm.

25. In which year Government of India passed to Water (prevention and control of pollution) act
(a) 1981
(b) 1974
(c) 1987
(d) 1980

26. Lichens are sensitive indicators of which atmospheric pollutant?
(a) CO_2
(b) CO
(c) SO_2
(d) SPM

27. Bio – magnification refers to
(a) Rapid growth due to excessive intake of nutrients
(b) Increase in population size
(c) Decrease in population size
(d) Increase in concentration of nonbiodegradable pollutants as they pass through food chains

28. Bio – magnification of DDT causes decline in bird population by
(a) Bringing disturbance in calcium metabolism
(b) Thinning of egg shell.
(c) Premature breaking of egg
(d) All of above

29. Heavy metals are elements which have density
(a) 5g/ cm^3
(b) 5g/ mm^3
(c) >5g/ cm^3
(d) ≥ g/ cm^3

30. Which one of the following statements pertaining to pollutant is correct?
(a) DDT is non – biodegradable pollutant
(b) Excess fluoride in drinking water causes osteoporosis
(c) Excess cadmium causes “black foot” disease
(d) Mercury in water cause “itai – itai” disease

31. Thermal pollution is more prevalent near
(a) Hot water springs
(b) Coal based power plants
(c) Temperate zones
(d) Tropical zones.

32. Formation of nonfunctional methemoglobin causes blue – baby syndrome. This is due to
(a) Excess of arsenic in drinking water
(b) Excess of nitrate in drinking water
(c) Deficiency of iron in food
(d) Increased methane content in atmosphere

33. Minamata disease is due to pollutant
(a) Lead
(b) Mercury
(c) H_2 S
(d) Sulphur dioxide

34. Which one of the following disease is not due to contamination of water?
(a) Hepatitis – B
(b) Jaundice
(c) Cholera
(d) Typhoid

35. The most non – manageable solid waste which heavily contributes to environmental pollution is
(a) Kitchen waste and agricultural
(b) Metal waste and glass
(c) Plastic waste
(d) Paper – fibre waste

36. Hospital wastes are generally disposed of by
(a) Open dumping
(b) Sanitary refills
(c) Use of incinerators
(d) Recycling

37. When sewage is discharged into a river, what could happen?
a. Micro – organisms involved in biodegradation of organic matter in the water body consume a lot of oxygen resulting downstream from the point of sewage discharge
b. It could lead to mortality of fish
c. It could kill other aquatic animals
d. It may cause outbreak of serious diseases
(a) a, b
(b) b, c, d
(c) c
(d) a, b, c, d

38. Recycling of e – wastes in developing countries is carried out.
(a) Inside specifically built units
(b) By scientific methods
(c) By people manually
(d) By machines.

39. The use of polyblend along with bitumen for laying roads was jointly proposed by
(a) Ahmed khan
(b) R.V. College Engineering
(c) Bangalore City Corporation
(d) All of these

40. The effective method for controlling non – biodegradable waste is
(a) Developing recycling methods
(b) Reducing the generation of such wastes
(c) Decomposition
(d) Both (a) and (b)

41. The problems related with use of nuclear energy are
(a) Expensive
(b) Accidental leakage
(c) Safe disposal of radioactive wastes
(d) Both (b) and (c)

42. Safe method for the disposal of nuclear wastes can be carried out by their
(a) Recycling
(b) Burning it
(c) Storage in containers and then burying deep below earth's surface
(d) Reusing

43. How many statements are correct?
a. Recycling is the only solution for the treatment of e – wastes provided it is carried out in an environment friendly manner
b. Initially, nuclear energy was considered as a non – polluting way for generating electricity
c. Bhopal gas tragedy happened on 2nd December 1984
d. Insecticide act was passed in 1968
(a) One
(b) Two
(c) Three
(d) Four

44. Polyblend, a fine powder of recycled modified ____was developed by Ahmed khan. It is

mixed with ____which is used to lay roods increasing road life by a factor of three.
(a) Marble, coal
(b) Plastic, bitumen
(c) Fibre, coal
(d) Paper, charcoal

45. Methane gas producing field is
(a) Wheat field
(b) Paddy fields
(c) Cotton fields
(d) Pea fields

46. Hospitals generate hazardous wastes that contain
(a) Harmful chemicals
(b) Disinfectants
(c) Pathogenic micro – organism
(d) All the above

47. Hospital waste requires careful treatment and disposal. What is wrongly given about its treatment?
a. It is used in sanitary landfills
b. It is burnt in open dumps
c. It is burnt in incinerators
(a) a, b
(b) a only
(c) b only
(d) c only

48. Greenhouse effect is related to
(a) Global warming
(b) Increase growth of algae
(c) Kitchen gardens
(d) Terrace gardening

49. Greenhouse effect is caused by
(a) CH_4, SO_2
(b) CO_2 only
(c) Gases which absorb infra – red rays reflected from earth
(d) Combination of many gases

50. Which one is correct percentage of green house gases
(a) $N_2O - 6\%, CO_2 - 86\%$
(b) CO_2 4%, CFC – 30%
(c) CH_4 – 20%, N_2O – 18%
(d) CFC – 14%, Methane – 20%

51. Gases commonly known as green house gases are
(a) CH_4 and N_2O
(b) CO_2 and N_2O
(c) CFC and CO_2
(d) CO_2 and CH_4

52. Without green house effect the average temperature at surface of earth would have been
(a) – 28℃
(b) – 10 ℃
(c) – 18℃
(d) – 20 ℃

53. During the past century, the temperature of earth has increased by
(a) 1.6 ℃
(b) 0.6℃
(c) 2.6℃
(d) 0.16℃

54. How many statements are correct?
a. Response of plants to elevated CO_2 fertilisation effect
b. High temperature increases plant diseases, explosive growth of weed.
c. In rice there is decrease in 5% output for each 1° increase in temperature
d. Greenhouse gas is also called radioactively active gas
(a) One
(b) Two
(c) Three
(d) Four

55. Ozone hole refers to
(a) Hole in ozone layers
(b) Reduction in thickness of ozone layer in stratosphere
(c) Reduction in thickness of ozone introphosphere
(d) Increased concentration of ozone

56. Ozone hole is maximum over
(a) Europe
(b) Antartica
(c) India
(d) Africa

57. Ozone layer of stratosphere requires protection from indiscriminate use of
(a) Fungicides, insecticides, bactericides
(b) Aerosols and high flying jets
(c) Atomic explosions
(d) Fertilizers

58. Result of ozone hole is
(a) Green house effect
(b) Global warming
(c) Acid rain

(d) UV radiations reach the earth

59. Chipko movement began in
(a) 1953
(b) 1974
(c) 1963
(d) 1969

60. Montreal Protocol is connected with
(a) Global warming and climatic change
(b) Persistent organic pollutants
(c) Substances that deplete ozone
(d) Biosafety of GMO

61. Maximum ozones depletions caused by
(a) CO_2
(b) CFC
(c) CH_4
(d) SO_2

62. Which of the following is not the cause of deforestation?
(a) Conversion of forest land into agricultural land
(b) Use of wood for fuel
(c) Afforestation
(d) Cattle ranching

63. At the beginning of twentieth Century, forests covered about 30% of land of India. By the end of century it shrunk to
(a) 13.5%
(b) 20.5%
(c) 19.4%
(d) 29%

64. National Forest Policy (1988) of india has recommended forest cover for the plains and hills respectively
(a) 67% and 33%
(b) 30% and 70%
(c) 33% and 67%
(d) 70% and 30%

65. One of the major effects of deforestation is
(a) Loss of bio – diversity
(b) Enhanced CO_2 concentration
(c) Soil erosion
(d) Disturb hydrologic cycle

66. Water logging of soil results in
(a) Drawing salts to the surface
(b) Depletion of oxygen in soil
(c) Soil salinity
(d) All of these

67. Recognising the deletions effects of ozone depletion, an international treaty was signed at Canada in 1987. It was called
(a) Viena convention
(b) Kyoto protocol
(c) Montreal protocol
(d) Earth summit

68. Local communities in an area protect and manage forests and in return get benefit of various forest products such as fruits, gum, rubber and medicines etc. This concept is called _____ and was introduced in the _____ by the government of India.
(a) JFM, 1980s
(b) MAB, 1980s
(c) JFM, 1990s
(d) NFP, 1988s

69. Match column – A with column – B and select correct match.

Column – A	Column – B
i. Amrita Devi	a. Chipko movement
ii. Ramesh Chandra Dogra	b. Polyblend
iii. Ahmed khan	c. Organic forming
iv. Sunder Lal Bahuguna	d. Conservation of forest

(a) I – b, ii – a, iii – c, iv – d
(b) I – d, ii – c, iii – a, iv – b
(c) I – c, ii – d, iii – b, iv – a
(d) I – d, ii – c, iii – b, iv – a

70. Slash & burn agriculture is commonly called as _____in North – Eastern states of India.
(a) Agroforestry
(b) Social forestry
(c) Jhum cultivation
(d) Taungya sustem

EXERCISE - 2

1. Pollution is
   (a) Removal of top soil
   (b) Release of toxic material
   (c) Undesirable materials in environment
   (d) All the above
2. CPCB stands for
   (a) Central prevention & conservation of biodiversity
   (b) Central pollution control board
   (c) Central pollution & conservation board
   (d) None of the above
3. Silent zone is 100 m around
   (a) Schools & hospitals
   (b) Gardens
   (c) Children park
   (d) Industrial area
4. To control the pollution of particulate matter, the devices are
   (a) Filtration
   (b) ESP
   (c) Scrubbers
   (d) None
5. Which one is not a pollutant normally?
   (a) Hydrocarbons
   (b) Carbon dioxide
   (c) Carbon monoxide
   (d) Sulphur dioxide
6. Carbon monoxide is pollutant as it
   (a) Inactivates nerves
   (b) Inhibits glycolysis
   (c) Combines with oxygen
   (d) Combines with haemoglobin
7. In which year was the Air (prevention and control of pollution) enacted and when was it amended to include noise as air pollution?
   (a) 1984 and 1987
   (b) 1981 and 1987
   (c) 1974 and 1980
   (d) 1986 and 1989
8. Lichens indicate pollution by
   (a) O_3
   (b) SO_2
   (c) NO_2
   (d) CO
9. Pollutant of automobile exhausts that affects nervous system/produces mental diseases is
   (a) Mercury
   (b) Lead
   (c) Nitrogen oxide
   (d) Sulphur oxide
10. Main cause of pollution in metro cities is
   (a) Industries
   (b) Automobiles
   (c) Trees
   (d) Home fuel
11. Which method is used to remove particulate pollutants from the chimney smokes?
   (a) Combustion system
   (b) Dry system
   (c) Electrostatic precipitator
   (d) Wet system
12. Noise pollution is measured in
   (a) Hertz
   (b) Fathoms
   (c) Nanometers
   (d) Decibels
13. An effect of enhanced green house effect is
   (a) To make the earth hospitable, warm
   (b) Increase in the global mean temperature
   (c) Evenly distribution of diversity
   (d) Increase in food production due to supra – optimal temperature
14. Minamata disease is due to pollution of
   (a) Organic waste into drinking water
   (b) Oil spill in water
   (c) Industrial waste mercury into fishing water
   (d) Arsenic into the atmosphere
15. Which one of the following is likely to have the highest levels of DDT deposition is its body?
   (a) Phytoplanktons
   (b) Sea crab
   (c) Sea gull
   (d) Eel
16. Thermal pollution is more prevalent near
   (a) Hot water springs
   (b) Coal based power plants
   (c) Temperate zones
   (d) Tropical zones
17. BOD is
   (a) Biological oxygen deficit
   (b) Biosphere oxygen demand
   (c) Biochemical oxygen demand
   (d) None of these

18. If in a river biochemical oxygen demand (BOD) percentage is high then
(a) River is dry
(b) River is polluted
(c) River water is good for drinking
(d) River water is good for factory

19. Addition of phosphates and nitrates/fertilizers into water leads to
(a) Increased growth of decomposers
(b) Reduced algal growth
(c) Nutrient enrichment/eutrophication
(d) None

20. Fish die in water bodies polluted by sewage due to
(a) Pathogens
(b) Clogging of gills by slit
(c) Foul smell
(d) Reduction in oxygen

21. Events that take place in eutrophication are given below
a. Excessive growth of algae
b. Depletion of dissolved oxygen
c. Bacteria feed on dead organic matter
d. Aquatic body becomes rich in phosphates
(a) a, d, c, b
(b) d, a, c, b
(c) a, b, d, c
(d) d, b, c, a

22. Biomagnification is a process of
(a) Magnification of animals
(b) Enlargement of aquatic animals
(c) Concentration of dangerous chemical into body of members of food web
(d) None of these

23. Fluoride pollution mainly affects
(a) Kidney
(b) Brain
(c) Heart
(d) Teeth

24. Warm ocean surge of the Peru Current recurring every 5 – 8 years or so in the East Pacific of South America is widely known as
(a) Biomagnification
(b) Gulf Stream
(c) El Nino
(d) Eutrophication

25. Which one of the most important causative pollutant of soil?
(a) Glass junk
(b) Iron Junk
(c) Detergents
(d) Plastics

26. Strontium of radio – active fall out is
(a) Sr – 90
(b) Sr – 95
(c) Sr – 85
(d) Sr – 80

27. Water (prevention and control of pollution) act was inacted during
(a) 1952
(b) 1972
(c) 1974
(d) 1969

28. Methane gas producing field is
(a) Wheat field
(b) Paddy field
(c) Cotton field
(d) Groundnut field

29. The greenhouse effect is due to
(a) Impermeability of long wavelength radiations through CO_2 of the atmosphere
(b) Penetrability of low wavelength radiations through O_3 layer
(c) Penetrability of low wavelength radiations through CO_2
(d) Impermeability of long wavelength radiations through O_3 layer

30. A greenhouse gas is
(a) H_2
(b) CO
(c) CO_2
(d) N_2

31. Chief air pollutant which is likely to deplete ozone layer is
(a) Sulphur dioxide
(b) Carbon dioxide
(c) Nitrogen oxides
(d) Chloro fluorocarbons

32. Ozone depletion in stratosphere shall result in
(a) Forest fires
(b) Increased incidence of skin cancer
(c) Global warming
(d) None of these

33. Earth Summit at Rio – de – Jeneiro was related to
(a) Survey of natural resources
(b) Preventation of afforestation
(c) Soil fertility

(d) Conservation of environment

34. What percentage of total area in hilly regions does national forest policy suggest to be under forests?
(a) 30%
(b) 67%
(c) 33%
(d) 66%

35. Jhuming (shifting cultivation) requires
(a) Huge amount of fertilizers
(b) Long time for the regeneration of soil
(c) Excessive soil erosion for crop production
(d) Alternate crop pattern

36. Planting trees on public and common land is known as
(a) Social forestry
(b) Farm forestry
(c) Agroforestry
(d) Reforestation

37. Chipko movement is the world's most known eco development programme, started by S.L. Bahuguna in 1974in Tehri Garhwal (Uttaranchal). It is related with
(a) Plant/forest conservation
(b) Afforestation
(c) Conservation of natural resources
(d) Population control

38. Gas released during Bhopal tragedy was
(a) Methyl isocyanate
(b) Potassium isothiocyanate
(c) sodium isothiocyanate
(d) Ethyl isothiocyanate

39. MIC and Chernobyl tragedies occurred at
(a) Bhopal 1984, Ukraine 1990
(b) Bhopal 1984, Ukraine 1988
(c) Bhopal 1984, Ukraine 1986
(d) Bhopal 1986, Ukraine 1988

40. Ozone day, world environment day and national pollution prevention day celebrated respectively
(a) June 5, Sept. 16, Oct. 21
(b) June 5, Sept. 16, Dec. 21
(c) Sept 16, June 5, Dec. 28
(d) Sept. 16, June 5, Dec. 2

41. A: Thermal pollution is harmful for fishes.
R: Heat deoxygenates water.

42. A: Excess of nitrate in drinking water causes blue baby syndrome.
R: Nitrate combines with haemoglobin to form non – functional methemoglobin causing this disorder.

43. A: Population density of indicator organisms shows degree of water pollution.
R: Low BOD indicates less organic waste in water.

44. A: A silent zone is observed near hospitals and educational institutes.
R: Industries and commercial activities cause a lot of pollution.

Section – II

45. Which is incorrect with respect to air pollutants?
(a) These cause injury to all living organisms
(b) These increase growth and yield of crops
(c) These cause premature death of plants
(d) These deleteriously affect the respiratory system of humans and of animals

46. Harmful effects of air pollution depends on the
(a) Concentration of pollutants
(b) Organism
(c) Duration of exposure
(d) All of these

47. What can be done to reduce emission of poisonous gases as the exhaust from automobiles?
(a) Proper maintenance of automobiles
(b) Catalytic converters fitted having platinum palladium and rhodium as the catalysis
(c) Use of lead free petrol of diesel
(d) All of these

48. In India, Prevention and Control of Air Pollution Act came into force in 1981, but was amended to include noise as an air pollutant in
(a) 1997
(b) 1987
(c) 1983
(d) 1989

49. A brief exposure to extremely high sound level generated by take – of a jet plane or rocket, may damage ear drums. This sound level is of the order
(a) 150 dB or more
(b) 120 dB or more
(c) 70 dB or more
(d) 105 dB or more

50. How noise pollution can be reduced immediately without any financial loss to anybody?
    a. Use of sound absorbing materials
    b. Delimitation of horn – free zones
    c. Fixing of time for loud speakers
    d. Permissible sound level of crackers
    (a) a, b, c & d
    (b) b, c & d
    (c) a & c
    (d) a, b & d
51. Why compressed natural gas (CNG) is considered better than diesel?
    a. It burns most efficiently
    b. Very little of it is left unburnt
    c. It is cheaper than diesel
    d. It cannot be siphoned off by thieves
    (a) a, b & d
    (b) b, c & d
    (c) a & c
    (d) a, b, c & d
52. Which is correct regarding Government of India's new policy Euro – III/ Bharat – III w.r.t. different norms for vehicles?
    (a) Sulphur be controlled at 350 ppm in diesel and 150 ppm in petrol
    (b) Aromatic hydrocarbons are to be contained at 82 percent of the concerned fuel
    (c) Aromatic hydrocarbons are to be contained at 42 percent of the concerned fuel
    (d) Both (a) & (c)
53. Which is incorrect about Eichhornia crassipes?
    (a) It causes blocks in our waterways
    (b) It is world's most important aquatic plant
    (c) It grows abundantly
    (d) It leads to an imbalance in the ecosystem dynamics of the water body
54. Which is incorrect statement?
    (a) Large amount of nutrients in water causes excessive growth of planktons
    (b) Algal blooms cause fish growth
    (c) Some bloom – forming algae are toxic to humans
    (d) Algal blooms cause fish mortality
55. Approximate BOD of domestic sewage is
    (a) 200 – 300 mg/l
    (b) 40000 – 50000 mg/l
    (c) 100 – 115 mg/l
    (d) 800 – 2100 mg/I
56. Ageing process of a lake can be radically accelerated
    (a) With size of lake
    (b) With climate
    (c) From effluents of industries
    (d) None of these
57. Which is incorrect w.r.t. effects of sewage and industrial waste on lakes?
    (a) These decline the growth of algae
    (b) These may poison whole population of fishes
    (c) Thermal wastewater reduces the number of organisms sensitive to high temperature
    (d) These overstimulate the growth of algae
58. Ecological sanitation is a system for handling human excreta, using dry composting toilets. This is solution to human waste disposal, which is
    (a) Efficient
    (b) Hygienic
    (c) Cost effective
    (d) All of these
59. Which is incorrect about sanitary landfills?
    (a) These were adopted as the substitute for open – burning dumps
    (b) Wastes are dumped in a trench after compaction and covered with dirt everyday
    (c) These sites are becoming popular
    (d) Seepage of chemicals from these pollute underground water resources
60. Polyblend, a fine powder of recycled modified plastic developed by A. Khan and his company, mixed with bitumen is used to lay roads because it
    (a) Reduces bitumen's water repellant property
    (b) Increases road life by a factor of three
    (c) Enhances bitumen's water repellant property
    (d) Both (b) and (c)
61. Integrated organic farming is a process
    (a) Where waste products from a process are cycled in as nutrients for other process
    (b) Which allows maximum utilisation of resource
    (c) Which increases efficiency of production
    (d) All of these
62. Serious inherent problem in use of nuclear energy is
    (a) Accidental leakage

(b) Safe disposal of radioactive waste
(c) Both of these
(d) None of these

63. Storage of nuclear waste, after sufficient pro – treatment should be done in suitably shielded containers buried within the rocks, about
(a) 100 m below earth
(b) 500 m below earth
(c) 50 m below earth
(d) 250 m below earth

64. Without greenhouse effect the average temperature at surface of earth would have been
(a) 0℃
(b) 25℃
(c) – 18 ℃
(d) 8℃

65. Which of the following is NOT the method by which global warming can be controlled?
(a) By cutting down use of fossil fuel
(b) By improving efficiency of energy usage
(c) By increasing deforestation
(d) By planting tees

66. Which is correct about ozone?
(a) It acts as a shield absorbing UV radiations
(b) Thickness of ozone is measured in Dobson
(c) It is continuously formed by the action of UV rays on molecular oxygen
(d) All of these

67. Ozone hole over Antarctica develops each year between
(a) Late August and early October
(b) Late December and early February
(c) Late March and early May
(d) Late November and early January

68. What are effects of UV – B radiations on human?
(a) It damages DNA and causes mutation
(b) It causes ageing of skin and skin cancer
(c) Its high dose causes snow blindness
(d) All of these

69. The fertile top soil can be removed very easily resulting in arid patches of land. Which of the following is NOT one of the reason?
(a) Over cultivation
(b) Unrestricted grazing
(c) Reforestation
(d) Poor irrigation

70. Problems that come in wake of green revolution are
a. Water – logging
b. Soil erosion
c. Soil salinity
d. Desertification
(a) Both b & c
(b) Both a & c
(c) Both a & d
(d) Both B & d

71. At beginning of 20^{th} century, forests covered about 30% of land of India. By end of century it shrunk to
(a) 9.5%
(b) 24.4%
(c) 19.4%
(d) 12.6%

72. What are major reasons that cause deforestations?
(a) Conversion of forests to agriculture land
(b) Axing of trees for timber, fire wood
(c) Jhum cultivation
(d) All of these

73. Which community has shown a commitment of such a magnitude that human beings sacrificed their lives for the cause of the environment?
(a) Chipko
(b) Bishnois
(c) Both of these
(d) None of these

74. A: Motor vehicles equipped with catalytic converter should use unleaded petrol.
R: Lead in petrol activates the catalyst.

75. A: There is a sharp decline in dissolved O_2 downstream from the point of sewage discharge.
R: Micro – organisms involved in biodegradation of organic matter in the receiving water body consume a lot of O_2.

76. A: Few toxic substances, present in industrial waste waters, can undergo biomagnification in the aquatic food chain.
R: DDT is responsible for biological magnification.

77. A: High concentration of DDT causes decline in bird populations.
R: It disturbs calcium metabolism in birds which causes thinning of eggshell and their premature breaking.

78. Non – biodegradable pollutants are created by:
(a) Nature
(b) Excessive use of resources
(c) Humans
(d) Nature disasters

79. According to the Central Pollution Control Board, Particles that are responsible for causing great harm to human heath are of diameter:
(a) 2.50 micrometers
(b) 5.00 micrometers
(c) 10.00 micrometers
(d) 7.5 micrometers

80. The material generally used for sound proofing of rooms like a recording studio and auditorium, etc is:
(a) Cotton
(b) Coir
(c) Wood
(d) Styro foam

81. Compressed Natural Gas (CNG) is:
(a) Propane
(b) Methane
(c) Ethane
(d) Butane

82. World's most problematic aquatic weed is:
(a) Azolla
(b) Wolffia
(c) Eichhornia
(d) Trapa

83. Which of the following causes biomagnification?
(a) SO_2
(b) Mercury
(c) DDT
(d) Both (b) & (c)

84. The expanded form of DDT is
(a) Dichloro diphenyl Trichloroethane
(b) Dichloro diethyl Trichloroethane
(c) Dichloro dipyrydyl Trichloroethane
(d) Dichloro diphenyl tetrachloroacetate

85. Which material takes longest time for biodegradation?
(a) Cotton
(b) Paper
(c) Bone
(d) Jute

86. Which of the following is incorrect?
(a) Montreal protocol is associated with the control of emission of ozone depleting substances
(b) Methane & carbon dioxide are green house gases
(c) Dobson units are used to measure oxygen content
(d) Use of incinerators is crucial to disposal of hospital wastes

87. Among the following which one causes more in door chemical pollution?
(a) Burning coal
(b) Burning cooking gas
(c) Burning mosquito coil
(d) Room spray

88. The green scum seen in the fresh water bodies is:
(a) Blue green algae
(b) Red algae
(c) Green algae
(d) Both (a) and (c)

89. The loudness of a sound that a person can with stand without discomfort is about
(a) 150 dB
(b) 215 dB
(c) 90 dB
(d) 80 dB

90. Major source of noise pollution, world wide is due to
(a) Office equipment
(b) Transport system
(c) Sugar, textile and paper industries
(d) Oil refineries and thermal power plants.

91. Which diseases is not due to contamination of water?
(a) Hepatitis – B
(b) Jaundice
(c) Cholera
(d) Typhoid

92. Catalytic converters are fitted into automobiles to reduce emission of harmful gases. Catalytic converters changes unburnt hydrocarbons into
(a) CO_2 and water
(b) CO
(c) Methane
(d) CO and methane

93. Sulphur is removed from petroleum products to
(a) Reduce emission of sulphur dioxide in exhaust fumes

(b) Increase efficiency of automobiles engines
(c) Use sulphur removed from petroleum for commercial purposes
(d) Increase the life span of engine silencers

94. Which one of the following impurities is easiest to remove from wastewater?
(a) Bacteria
(b) Colloids
(c) Dissolved solids
(d) Suspended solids

95. Nuisance growth of aquatic plants and bloom – forming algae in natural waters is generally due to high concentrations of
(a) Carbon
(b) Sulphur
(c) Calcium
(d) Phosphorus

96. Which of the following is correct match?

Column – I	Column – II
i. Environment protection Act	a. 1974
ii. Air Preventation Control of Pollution act	b. 1987
iii. Water Act	c. 1986
iv. Amendment of Air Act to include noise	d. 1981

(a) I – c, ii – d, iii – a, iv – b
(b) I – a, ii – c, iii – b, iv – d
(c) I – d, ii – a, iii – b, iv – c
(d) I – c, ii – d, iii – b, iv – a

97. Algal blooms impart a distinct colour to water due to
(a) Their pigments
(b) Excretion of coloured substances
(c) Formation coloured chemicals in water facilitated by physiological degradation of algae
(d) Absorption of light by algal cell wall.

98. Match the items in column I and column II.

Column – I	Column – II
a. UV	i. biomagnification
b. Biodegradable organic matter	ii. Eutrophication
c. DDT	iii. Snow blindness
d. Phosphates	iv. BOD

(a) a - ii, b – I, c – iv, d – iii
(b) a – iii, b – ii, c – iv, d – I
(c) a – iii, b – iv, c - I, d – ii
(d) a – iii, b – I, c – iv, d – ii

99. In textbook you came across Three Mile Island and Chernobyl disasters associated with accidental leakage of radioactive wastes. In India we had Bhopal gas tragedy. It is associated with
(a) CO_2
(b) Methyl Iso – Cyanate
(c) CFC's
(d) Methyl Cyanate

100. Lead free petrol is recommended for automobiles because lead
(a) Inactivates catalytic converters
(b) Releases poisonous fumes
(c) Results in pollution
(d) All of these

101. In which year was the air (prevention and control of pollution) act amended to include noise as air pollution
(a) 1980
(b) 1987
(c) 1990
(d) 1992

102. Which city in India runs its entire public road transport on CNG?
(a) Mumbai
(b) Kolkata
(c) Delhi
(d) Chennai

103. What is the possible source of silt that gets deposited in the overhead water tanks?
(a) Soil particles carried by water from source of supply
(b) Dust particles
(c) Rain deposits
(d) All of these

104. Cultural eutrophication means
(a) Nutrient enrichment of water bodies caused by human activities
(b) Accelerated eutrophication
(c) Natural aging of lake
(d) Both (a) and (b)

105. Two adverse effects of particulate matter human health are
(a) Damage to liver and neuromuscular disorders
(b) Asthma and damage to lung
(c) Internal haemorrhage and damage to live
(d) Damage to erythrocytes & central nervous system

106. Raw material for polyblend is
(a) Plastic polythene
(b) Cotton fibre
(c) Cotton fibre
(d) Jute fibre

107. Blends of polyblend and bitumen help to increase road life because plastic in it
(a) Increases binding capacity
(b) Enhances water repellent property
(c) Make road smooth
(d) Both (a) and (b)

108. Two important plants which are used as wind breakers in the agricultural fields are
(a) Mangifera & Eucalyptus
(b) Acacia & Prosopis
(c) Polyalthia & Mangifera
(d) Guava & Mangifera

109. Industry which can cause both air and thermal pollution as well as eutrophication is
(a) Oil refinery
(b) Fertilizer factory
(c) Paper industry
(d) Sugar mill

110. Algal bloom is
(a) Decrease in the growth of algae
(b) Excessive growth of blue green algae on surface
(c) Higher productivity of algae in oceans
(d) All of these

111. Biomagnification is
(a) Bio concentration
(b) Increase in the concentration of persistent toxic material with the increase in trophic levels
(c) Magnification of living organisms
(d) Both (a) and (b)

112. Three major impurities in domestic waste water are
(a) Heavy metals, DDT and inorganic salts
(b) DDT, fertilizers and solid waste
(c) Soilds, biodegradable organic waste and dissolved materials
(d) Mercury, lead and organic waste

113. Reforestation is growing trees
(a) In waste land
(b) Around agricultural fields
(c) In deforested regions
(d) All of these

114. Electronic wastes can be best disposed of by
(a) Burying in landfills
(b) Incineration
(c) Recycling
(d) All of these

115. Carpets and curtains placed on the floor or on the wall surfaces reduce noise level by
(a) Absorbing sound waves
(b) Forming partition between source & overselves
(c) Muffling the noise
(d) All of these

116. Hybrid vehicles are, which
(a) Use either of fuels – petrol and CNG
(b) Can use both petrol and diesel
(c) Can run on battery also
(d) Can use disel

117. Which of the following is responsible for lowering dissolved oxygen in water, making it septic?
(a) Heavy metals
(b) Sewage waste
(c) Domestic waste
(d) Both (b) and (c)

118. Main green – house gas produced on large scale and its possible source respectively is
(a) Methane and burning of fossil fuels
(b) Carbon dioxide and wheat field
(c) Carbon dioxide and burning of fossil fuels
(d) Nitrogen oxide and paddy fields

119. Trees & shrubs planted near boundary walls acts as
(a) Barrier for sound pollution
(b) Dust and SPM catcher
(c) Both (a) and (b)
(d) Barrier for animals

120. National Forest Commission of India has recommended a larger forest cover for hills than in plains because in hilly areas, forests
(a) Protect soil from erosion and land slides
(b) Help in slow percolation of rain water
(c) Reduces run – water during raing season and prevents floods
(d) All of these

121. Snow blindness occurs when eye absorbs
(a) UV – B radiation
(b) Bright sun light
(c) Dust particles
(d) UV – A radiation

122. Release of DDT in the environment has resulted in
(a) Its biomagnification
(b) Decline in bird population
(c) Thinning & premature breaking of egg shells
(d) All of these

123. Non – conventional sources of power generation which are cheap and non – polluting are
(a) Solar panels
(b) Wind mills
(c) Photo voltaic cell
(d) All of these

124. Joint Forest Management (JFM) was introduced by government of India, in 1980, it involves
(a) Participation of local communities for protection and management of forests
(b) Establishment of a committee of officials
(c) Joining all forest management organisations
(d) All of these

125. DDT has caused decline in bird population as it
(a) Is a poison
(b) Disturbs calcium metabolism
(c) Causes thinning of egg shells and premature breaking
(d) Both (b) and (c)

126. Slash and burn agriculture commonly called as Jhum cultivation can become environment friendly provided
(a) Recovery phase of land is shortened
(b) Enough time gap is given after each cultivation
(c) Cultivation is continued at a place for many years
(d) After cutting down trees, plants are not burnt

127. Which among the following is not a source of nitrous oxide
(a) Nylon manufacture
(b) Agriculture
(c) Air conditioners
(d) Nitrate contaminated ground water

128. Organic farming is the form of agriculture that relies on techniques like
(a) Crop rotation
(b) Green manure
(c) Compost and biological pest control
(d) All of these

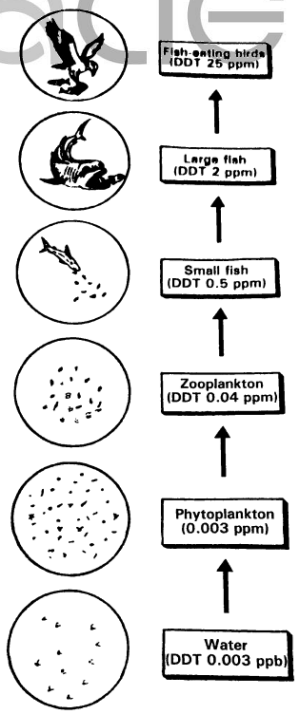
129. Without green house effect the average temperature at surface of earth would have been
(a) – 28 °
(b) – 8 ℃
(c) – 18 ℃
(d) – 12 ℃

130. Water logging and soil salinity are mainly caused by
(a) Absence of underground drainage
(b) Excessive irrigation
(c) Seepage from irrigation channels
(d) All of these

131. Which of the following is not a multipurpose plant?
(a) Albizzia
(b) Morus
(c) Triticum
(d) Both (a) and (b)

132. Basic characteristics of modern landfill site include
(a) Compaction and covering of waste
(b) Lining with clay or plastic to prevent leaching
(c) Installation of gas extraction system
(d) All of these

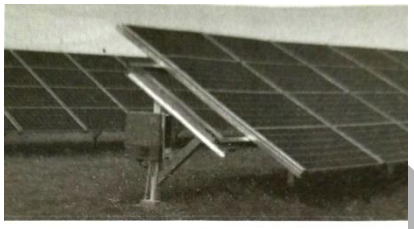
133. In the given figure, which ecological phenomenon is demonstrated?



(a) Eutrophication
(b) Pollution
(c) Biological magnification
(d) Algal bloom

134. In the above figure DDT concentration has increased with increase in the trophic levels because it is
(a) Non – biodegradable
(b) Persistent
(c) Reactive
(d) Both (a) & (b)

135. What common between the given two figures (A & B) of power generation methods?



A

B

(a) These or renewable sources of energy
(b) Both are non – polluting
(c) Both are non – exhaustive
(d) All of these

ANSWER KEY

EXERCISE – 1

Ques.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Ans.	d	d	b	a	d	c	d	d	b	c
Ques.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
Ans.	d	b	b	c	b	b	d	a	d	aa
Ques.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
Ans.	a	b	c	c	b	c	d	d	c	a
Ques.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
Ans.	b	b	b	a	c	c	d	c	d	d
Ques.	41.	42.	43.	44.	45.	46.	47.	48.	49.	50.
Ans.	d	c	d	b	b	d	a	a	c	d
Ques.	51.	52.	53.	54.	55.	56.	57.	58.	59.	60.
Ans.	d	c	b	d	b	b	b	d	b	c
Ques.	61.	62.	63.	64.	65.	66.	67.	68.	69.	70.
Ans.	b	c	c	c	b	d	c	a	d	c

EXERCISE – 2

Ques.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Ans.	d	b	a	b	b	d	b	b	b	b
Ques.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
Ans.	c	d	b	c	c	b	c	b	c	d
Ques.	21.	22.	23.	24.	25.	26.	27.	28.	29.	30.
Ans.	b	c	d	c	d	a	c	b	a	c
Ques.	31.	32.	33.	34.	35.	36.	37.	38.	39.	40.
Ans.	d	b	d	b	b	a	a	a	c	d
Ques.	41.	42.	43.	44.	45.	46.	47.	48.	49.	50.
Ans.	a	a	b	b	b	d	d	b	a	a
Ques.	51.	52.	53.	54.	55.	56.	57.	58.	59.	60.
Ans.	d	d	b	b	a	c	a	d	c	d
Ques.	61.	62.	63.	64.	65.	66.	67.	68.	69.	70.
Ans.	d	c	b	c	c	d	a	d	c	b
Ques.	71.	72.	73.	74.	75.	76.	77.	78.	79.	80.
Ans.	c	d	b	c	a	b	a	c	a	d
Ques.	81.	82.	83.	84.	85.	86.	87.	88.	89.	90.
Ans.	b	c	d	a	c	c	a	d	d	b
Ques.	91.	92.	93.	94.	95.	96.	97.	98.	99.	100.
Ans.	a	a	a	d	d	a	a	c	b	d
Ques.	101.	102.	103.	104.	105.	106.	107.	108.	109.	110.
Ans.	b	c	a	d	b	a	d	b	b	b
Ques.	111.	112.	113.	114.	115.	116.	117.	118.	119.	120.
Ans.	d	c	c	c	d	a	d	c	c	d
Ques.	121.	122.	123.	124.	125.	126.	127.	128.	129.	130.
Ans.	a	d	d	a	d	b	c	d	c	d
Ques.	131.	132.	133.	134.	135.					
Ans.	c	d	c	d	d					