: ENVIRONMENTAL CHEMISTRY:

BY

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Introduction:-

The Earth is a unique planet of solar System .

Where there various forms of life live and survive under different condition. This is due to optimum

distance of the earth from the Sun .

The temperature of earth is neither too much hot as in Venus and mercury nor too much cold like Jupiter and other planets.

The earth is surrounding with the blanket of air which contains oxygen, which is essential for survival of most form of life.

That air regulates the temperature on the earth surface

The moderate temperature helps in regulation of water in different form of atmosphere as well as on the earth.

* The earth is life supporting region known as “ Biosphere”. It extends to 20 km from the bottom of ocean, in this region various form of life like microbes, plants and animals can survive.
* The region of biosphere is depends upon physical and chemical living as well as non living components of environments.
* The non living components of the environments are the Atmosphere (Air), Hydrosphere (Water), and lithosphere ( Land ).
* Living or biological component is “Biosphere”.
  + Biosphere includes plants, animals, microbes and other organisms.
  + Environment includes –
  + i) Atmosphere ii) Hydrosphere iii) Lithosphere and iv) Biosphere –
  + Man on this planet biosphere occupies a central position and make use of other form of life for various purposes such as food, shelter etc.
  + Thus it is essential to study the various components of environment that affect the man and other form of life on this planet.

Environmental chemistry is defined as “ The study of chemical phenomenon in the environment ”.

* The study of sources, reactions, transports effects and fates of various chemical species in the air, water and soil is called as “Environmental chemistry”.
* It is not a single disciplinary science but is multidisciplinary science which covers

Chemistry , biology, physics, agriculture, medical science , public health ,sanitary

engineering etc.

* Mostly it is regarded with pollutions. It becomes a matter of concern for one and all today.
* Components of Environment:-
* 1. Atmosphere :-
* It is protective blanket of gases which is surrounding to the earth. It extends thousands

Of Km above the earth surface.

* The atmosphere is held to the earth by the force of gravity of the total mass of

atmosphere extends 99% within a height of 30 km from the earth surfaces.

* The total mass of the atmosphere is is about 5 x 1015 metric tonnes .
  + Composition of Atmosphere :-
  + It make up with gases, water vapour’s , and aerosols. It has major gases in the air is nitrogen and oxygen.
  + Pure dry air on an average contains 78% of nitrogen and 21% of oxygen. Remaining 1% other gases.
  + Major components :- nitrogen , oxygen &water vapour’s.
  + Minor Components :- argon , Carbon dioxide.
  + Tracer :- Inert gases, Hydrocarbons, different oxides of SO x, NO x , CO x, etc.
* The main components are nitrogen , oxygen , carbon dioxide, and water vapour’s.
* Atmosphere divided into different layers like:-
* 1. Troposphere:-
* It is lowest region of atmosphere closet to the earth. Extends roughly to a height 11 km.
* This region is of all the living organisms including plants and animals.
* 70 % total mass of the atmosphere and all the water vapour’s are concentrated in this region.
* All the dramatic events of weather occurs in this region.
* Temperature is steadly decreases to about 15 to – 560c.

* The minimum temperature is at 11 km above the earth’s surface this point

is called as “ tropopause ”.

It contains mainly nitrogen , oxygen , carbon dioxide, argon , aerosols, & water vapour’s.

* ii) STRATOSPHERE :-
* The next region is Stratosphere extended from 11-50 km . the temperature in this

region rises from -56 to -20c. temperature increases due to absorption of solar radiation.

Ozone is rich in this region which absorb harmful UV radiation coming from the sun

and convert into heat.

Ozone is formed from oxygen by photochemical reaction. Ozone content in this region is

more or less constant Besides ozone , it also contains oxygen, nitrogen and small amounts of water vapour’s

It is free from changing weather pattern.

iii) MESOSPHERE :-

Next to Stratosphere is Mesosphere extends up to height 90 km. the lowest

Temperature is -920c.

* This is due to low concentration of ozone, oxygen and nitrogen. It absorb solar radiation.
* iv) THERMOSPHERE :-
* This is region above mesosphere extends up to the height 500 km.
* The temperature in this region increases from – 92 to 12000c.
* This is due to the bombardment of molecular oxygen, nitrogen and atomic species

By energetic particles like electrons and protons coming from the sun this is electrical charged zone.

The ionization of nitrogen and oxygen takes place with release of heat. These ions are responsible for the reflection of radio waves on the earth and enables wireless communication.

* This region is also called as “ionosphere” in this region there is high concentration of ions of oxygen, nitrogen and electrons.
* The region above the ionosphere is extends up to 1600 km and merged into outer space is called as “exosphere”.
* EXOSPHERE :-
* It contains mainly atomic and ionic oxygen ,hydrogen and helium.

The chemical and photochemical reactions are occurs in the atmosphere these are:-

The CO2 and H2O present in the atmosphere are used by green plants in presence of sunlight and form carbohydrates. This process is called as“photosynthesis”. In this process chlorophyll plays an important role as a catalyst.

* 6CO2 + 6H2O Sunlight C6H12O6 + 6O2

Chlorophyll

The released oxygen utilized in the degradation of organic material by aerobic organism .

Organic matter + O2 CO2 + H2O

Free nitrogen in the atmosphere is converted into nitrates by nitrifying bacteria process called as “Nitrogen Fixation”.

Some of the gases like water vapour’s, CO2 ,NO ,and methane absorbthe heat energy reflected by earth surface and re-emits towards the surface and air near the surface becomes warmed increase the temperature. Such gases are called as “greenhouse gases” and the phenomenon is known as “ greenhouse effect”.

Another important constituents of trophospere is the aerosol or suspended particles.

most of them acts as nuclei around which water vapour’s condense to form “clouds”.

The N2 , O2 , O3 and H2O are presents in Stratosphere this layer contains Ozone that prevent the dangerous and harmful radiation coming from sun .it filtered to them and then pass towards earth’s surface.

O2 UV O + O

The highly reactive oxygen atom combines with oxygen molecule and form ozone.

O + O2 + M O3 + M [exothermic reaction]

Where M is inert substance like N2 .

This layer acts as shield against UV radiation which can causes cancer , genetic mutation and destroy crops.

2. HYDROSPHERE :-

The total water present on the earth in solid , liquid and gaseous form makes hydrosphere. Water covers 71% of total surface of earths , some time called as “water planet”.

It includes all types of water resources like ocean , seas, rivers , lakes , streams , reservoir’s , glaciers , polar ice caps and ground water i.e. water below earth surface.

97.3% of water is in ocean , polar ice and glaciers provides 2%, while underground fresh water is 0.6% and 0.01% in lakes and rivers .

Water is used for drinking purposes . A man consumes about 2.2 litre of water daily. Sea water is unfit for drinking or agriculture because that contains high percent of dissolved salts.

It contains number of dissolved gases used in biological process in photosynthesis . dissolved phosphate and nitrates acts as fertilizers for phytoplanktons.

3. LITHOSPHERE :-

It is solid component of the earth cantains soil,rocks,mountains, it is region interact

with hydrosphere, atmosphere, and biosphere the earth has three layers Crust, Mantle

and outer-inner core the mantle is called as “Crust”. Surface of earth covered with soil

It is most important part of lithosphere from the point of view of environment. it

contains organic matter , it is storehouse of minerals, which is used for growing of

plants it contains micro organisms like – bacteria , fungi, algae, protozoa, worms.

4. BIOSPHERE :-

It is most important part of earth in which all life survive, it is interface between living and non living .

A community of organism interacting with each other with non living surroundings is called as “ Ecosystem”.

Ecosystem has two parts living and non living i.e. biotic and abiotic.

Energy for biosphere is provided by the action of photosynthesis. Living organisms used elements for their healthy growth are of two type’s macro and micronutrients.

ENVIRONMENTAL POLLUTION :-

The pollution our environment is biggest hazards to humanity today because un favourable activities carried out by man himself.

“ Any undesirable changes like physical, chemical or biological in the air ,water and land that becomes harmful to man directly or indirectly through his animals, plants, industrial units or raw material is called as “ environmental Pollution”.

It is of two types Natural and Artificial Pollution.

Natural Pollution :-

It originates from natural processes like volcanic eruptions, forest fires , coal mines,

bacterial decomposition of agricultural matter , pollen grains of flowers , excreta of

animals ,floods and radioactive substances.

Artificial pollution:-

It originates from the activities of man. Like over - population, urbanization and industrialisation.

POLLUTION :-

It is defined as the “ Any material solid , liquid or gaseous present in concentration in the environment causes harmful effect on the human being such material is called as “pollutant” and process is called as “Pollution”.

Pollutants are chemical , biological or physical agents that have undesirable effect on living organism including human health.

Pollutants are of two types –

1. Non degradable :–

These are poisons like mercuric salts, aluminium cans , lead compounds, phenolic chemicals, pesticides etc. which are do not degrade in ecosystem naturally and are not recycled.

ii) Bio-degradable :-

These are domestic wastes can decomposed under natural process by micro-organism ,complete degradation does not takes place and creates problems.

Types of Pollutions :-

The common pollutions are :-

1. Air pollution
2. Water pollution

iii) Soil or Land pollution.

The classification of pollution is done according to the type of pollutants by

which pollution has been takes place. These are :-

Air, Water, Soil , Noise , Thermal , Radiation , Marine , Solid waste , Industrial , Plastic ,Oil Soap and Detergents , Toxic metals , Smog pollutions.

AIR POLLUTION :-

Air is one of the most important constituents of man’s environments. It has been calculated that a man breaths about 22,000 times a day inhaling 16 kg of air by mass.

Air is essentially a mixture of gases , due to the activity of living organisms , different gases released in the atmosphere.

It is defined as “ The outdoor ambient in which certain substances are present in concentration that has undesirable effects on man and it’s environments .

The atmospheric pollutions includes Tropospheric , Stratospheric pollution.

Sources of air pollutants are –

Natural pollutants :

a) Volcanic eruption emits poisonous gases like CO, SO2 ,H2S etc.

b) Forest fires caused by lightning

c) Pollen grains dispersal

d) Bacterial decomposition of organic matter.

e) Wind erosion of Soil

f) Natural radioactivity .etc.

Man made pollutants :-

The human activities are responsible for air pollution are-

a) Burning of fossil fuels such as coal ,wood ,etc.

b) Combustion of gasoline in the automobiles

c) Deforestation

d) Over –population

e) Fast industrialization

f) Agriculture activities

g) Nuclear explosion.

Air pollutants are of two types –

1. Primary pollutants:-

These are harmful chemicals which are directly enter into the atmosphere as natural and human activities ,these includes inorganic gases such as – SO2 , CO, CO2 NH3 , H2S ,HF ,NOx etc. hydrocarbons and radioactive substances particulate such as ash ,dust, smoke, fumes , aerosols etc.

1. Secondary pollutants:-

These are harmful chemical substances which are formed by chemical interaction between primary pollutant and normal atmospheric constituents.

For example- SO2 is primary pollutant .it reacts with oxygen in the environment to form SO3 ,which further react with water vapours to form H2SO4.

2SO2 + O2 2SO3

SO3 + H2O H2SO4

Thus, SO3 and H2SO4 are secondary pollutants.

Major air pollutants are :-

1. Carbon monoxide ( CO )
2. Oxides of Sulphur (SOx)
3. Oxides of nitrogen ( NOx)
4. Hydrocarbons ( CxHy)
5. Particulates.
6. CARBON MONOXIDE ( CO ) :-

During breathing , Hemoglobin present in the red blood cell combines with oxygen and form “ Oxyhemoglobin” which supply the oxygen to various parts of body.

Hb + O2 HbO2 (Oxyhemoglobin)

But when the person inhaled Carbon monoxide , it has 500 times greater affinity about hemoglobin than oxygen.

Hb + CO HbCO (Deoxyhemoglobin).

CO is colourless , tasteless and odourless gas ,insoluble in water highly toxic and has great affinity towards hemoglobin of the blood and form complex “Deoxyhemoglobin”. that causes unconsciousness in an hour and causes death in four hours.

If this gas is inhaled by the person at low concentration of 200 ppm , it causes symptoms of poisoning ,headache, giddiness, dizziness and cardiac and pulmonary complication leading to paralysis and finally death.

Near about 80 % of CO comes from automobiles due to the incomplete combustion of fuel. Cigarette smoke contains 2% CO due to incomplete combustion of tobacco.

Control of CO pollution :-

The internal combustion engines in the automobiles are the primary source of carbon monoxide emission. Engine emits mixture of gases consisting of CO, Nox , hydrocarbons and particulates.

If any particular method is used to control any one of these pollutant , that results in the increase of other pollutants.

For example –when air-fuel ratio is 16:1, then emission of CO and hydrocarbons is reduced but the emission of NO x is increases thus for minimizing the emission of CO, the modification are needed in the internal combustion of engine or in quality of fuel.

Fuels such as CNG ( Condensed natural gas) and LNG ( Liquified natural gas )must be used.that release minimum quantity of pollutants.

1. OXIDES OF SULPHUR ( SO x ):-

Two common oxides of sulphur are represented by formula SOx are sulphur dioxide (SO2) and sulphur trioxide ( SO3). These are most serious gaseous pollutants of the atmosphere.

Bothe are colourless gases with pungent smell. SO2 is primary pollutant while SO3 is secondary pollutant.67% of SO2is present in the atmosphere is released by volcanic eruption. i.e. natural source. And remaining 33% is discharged due to human activity.

Man made source is burning of coal ,on combustion sulphur present in coal is 6% that get oxidized to sulphur dioxide.

S + O2 SO2

It released in atmosphere is due to combustion of petroleum also released from industries when sulphur containing ores like iron pyrites, FeS2, Zinc blende ZnS burns it release SO2.

SO2 in the atmosphere is oxidized to SO3 , that react with moisture in the atmosphere to form sulphuric acid. it comes down to the earth as acid rain.

SO2 + O2 2SO3 .

SO3 + H2OH2SO4

Harmful effects of SOx :-

Both SO2 and SO3 are highly irritating gases to Respiratoy tract of human beings. Even at low concentration it causes drying of mouth, throat and eye irritation. It brings breathlessness and affect to Larynx ( Voice Box).

Its higher concentration causes lung cancer ,SO3 is more harmful than SO2.

In plants it affects the growth and causes Chlorosis disease i.e leaves becomes yellowish.

Taj Mahal is affected by SO2 gas. it fades the luster of marbles.

Control :-

1. By use the low sulphur content fuels like natural gas .
2. 2by using alternate source of energy such as hydroelectric power and nuclear power plant instead of thermal power plants.
3. OXIDES OF NITROGEN ( NO x) :-

Nitrogen forms a number of oxides like- nitrous oxide (N2O) , nitic oxide (NO) , nitrogen dioxide ( NO2) ,dinitrogen trioxide ( N2O3) and dinitrogen pentoxide ( N2O5) .

Out of these first three are causes the pollution in atmosphere.

Natural source :- 78 % of nitrogen and 21% of oxygen is present in atmosphere. But these two gases does not react to each other unless the temperature very high.

When lightening is done in the sky nitrogen react with oxygen to form nitric oxide (NO). which is further oxidized to nitrogen doxide ( NO2).

N2 + O2 electric discharge 2NO

2NO + O2 2NO2

NOx also released in atmosphere due to the bacterial action on organic matter .

Effects Of NO x :-

NO is less toxic and less active biologically than NO2. It is irritant to eyes ,nose and to throat .it causes viral infections and causes disease bronchestis and respiratory problems. Similar to CO ,NO combines with haemoglobin and reduces oxygen transport efficiency.

In plants :-

It reduces the growth of plant and decreases rate of photosynthesis. It forms photochemical smog. No2 react with moisture and form nitrous and nitric acid and comes on earth as acid rain .

2NO2 + H2OHNO3 + HNO2

Control :-

Catalytic converters are used in automobiles which convert the vehicular exhaust into free nitrogen and trace of ammonia.

4.HYDROCARBONS :- ( C x H y) :-

These are chemical compounds of carbon and hydrogen can be saturated and unsaturated,branched or straight or ring compounds are volatile or gaseous state at atmospheric condition.

Methane is main hydrocarbon present in atmosphere other are ethylene ,ethane ,propane , acetylene, toluene and so on.

Sources :-

A) Natural :-

1. Methane is released in atmosphere due to anaerobic decomposition of organic matter in soil , water and sediments.

B) Man made :- Incomplete combustion of fossil fuel in industry and thermal power plants and automobile release CH into the atmosphere.

Effects :- It causes irritation in eyes , nose ,lungs ,hydrocarbons are carcinogenic causes cancer.

5.PARTICULATES :-

The size of the particulates ranging from the diameter of 0.0002µ . ( 1 µ = 10-6 ). It is in the form of Mists , smoke , Fumes , Dust form.SO2 convert into SO3 that react with moisture in the atmosphere and to form H2SO4 as acid rain,that reacts with NH3 in air to form Ammonium sulphate as particulates

.

NH3 + H2SO4 (NH4)2SO4.

Effects on Human beings :-

Small size of particulates when inhaled by person it directly pass into the lungs and they permanently lodge in the lungs and causes cancer and various diseases concerned about respiratory tract.

There is also many biological particulates such as bacteria , pollen grains , fungal spore that cause allergy and bronchitis in man.

Some of the particulates having adverse effects on human health .these are –

1. Cadmium oxide – Prostrate cancer , high blood pressure.
2. Benzene – Blood cancer ( Leukemia ).
3. Vinyl chloride – Sarcoma of liver
4. Arsenic – Lungs ,Liver and Skin cancer
5. Benzidine – Bladder cancer
6. Lead particulates – Nervous diseases.

Effect on plants :-

Particulates deposit on leaves of the plants. And damage the leaf structure such as – necrosis , chlotosis and epinasty. They destroy the chlorophyll and decrease the photosynthesis,

EFFECTS OF AIR POLLUTION :-

1. ACID RAIN :-

The different oxides like SOx  NOx COx reacts with moisture in the atmosphere to form the respected acids comes to the earth’s as acid rain. It damages the environments.

1. SMOG :-

Photochemical smog also called as Los Angeles smog observed first time in Los angeles in 1950.

Smoke + Fog Smog

Classical smog is first observed in London in 1952 also called as London smog or sulphurous smog .

3.Green house effect;-

The gases present in the atmosphere are responsible for greenhouse effect,such gases called as greenhouse gases such as carbon dioxide ,water vapours , methane ,oxides of nitrogen , ozone , chlorofluorocarbon etc. it causes global warming .

4. Depletion of Ozone layer :-

Ozone layer is present in the region of stratosphere acts as umbrella. That protect the earth from power ful radiation that destroyed by the gases release from different industries such as Chloro Fluoro Carbon ( CFCl3) called as “Freons”.

WATER POLLUTION :-

Next to air , water is more important factors in the life systems. It is most important natural source ,near about 80 % of earth surface is occupied by water only 2.5 % of is fresh water

Water is used for irrigation, industry , domestic needs, and for sanitation and disposal waste.

Man has polluted much of this limited supply of water by industrial waste , sewage and by number of synthetic chemicals.

Water pollution is the presence of any foreign substance in water which decreases the quality of water and have harmful effect on the human being.

The common water pollutants are

1. Plant nutrients
2. Inorganic chemicals and minerals
3. Suspended solids
4. Radioactive substances
5. Thermal discharges
6. Oil
7. Disease causing agents
8. Synthetic organic compounds

9.Oxygen – demanding wastes etc.

1. Plant nutrients :-

Nitrogen and Phosphorus fertilizers are drained from agricultural lands or from other sources into water bodies. That stimulate the growth of algae and aquatic plants due to added nutrients is called as “Eutrophication”. during the decomposition of aquatic plants by micro-organisms , the amount of dissolved oxygen decreases that fatal for aquatic species.

2. Inorganic chemicals and minerals :-

Many of inorganic chemicals and minerals when discharged into water bodies causes the poison and destroy the aquatic life, most of elements like cadmium , chromium ,lead , mercury , Alkalies discharge from textile industry ,tanneries , paper industry can destroy the aquatic life.

Recently the level of fluorides in the drinking water has increased in different part of India, and causes disease “fluorosis” (un curable disease of bone).

1. Suspended solids :-

Sand ,Silt and Minerals from the land comes in water and they block the sunlight required for photosynthesis and it reduce availability of food to fishes.

1. Radioactive substances :-

The refining of uranium ore is important source of radioactive waste the water pollution, such substances enter in the body of humans through food and water. Accumulate in blood and in certain vital organs like liver , thyroid glands ,bone and muscular tissues and causes cancer.

1. Thermal discharges :- Power plants and industries used large amount of water for cooling purposes .such used water directly discharged into water bodies ,then temperature of water bodies increases and lowers down the DO and becomes harmful to micro – organisms.
2. Oil :-

Oil and oil wastes enters into rivers and water bodies from oil refineries , storage tanks automobile waste oil, petro- chemical plants and industrial effluents ,spillage from oil tankers .

It is insoluble in water, floats and spread rapidly into a thin layer , it is responsible for death of birds , it reduced DO level in water and destroy the aquatic life.

1. Disease causing agents:-

These are the various pathogenic micro – organism enter into water bodies with sewage and other wastes , bacteria and viruses causes various diseases such as – cholera ,typhoid , dysentery , gastroenteritis ,polio , hepatitis etc.

1. Synthetic organic compounds :-

Pesticides , detergents and other industrial chemicals when contaminates the water it becomes poisons for plants ,animals and humans and causes skin disorder diseases.

1. Oxygen demanding wastes :-

Dissolved oxygen is required the plant and animal life in any aquatic system. if DO level decreases the aquatic organisms not survive.

Soil Pollution :-

The soil or earth is nothing but the mother of all plants , animals and human being. It is very essential directly or indirectly for the survival of various biological species including man.

The word soil derived from a latin word solum means earthy materials in which plants grow. The main component of the soil are inorganic matter 90-95% and organic matter 5-10 %.besides soil contains water and air. the composition of soil is varies from place to place.

Soil has becomes the dumping ground of the most of waste products. i.e domestic. Human, animal , industrial and agricultural dumping of waste is alarming rate over the world. whole earth becomes poisonous and creating pollution.

Mostly soil polluted by agrochemicals such as pesticides (insecticides , fungicides , herbicides , insecticides ), fertilizers and manures , besides that soil also polluted by deadly pathogenic organisms .The pollutants in the soil remains for longer periods .

Sources of Soil Pollution :-

The main sources of soil pollutions are –

1. Industrial waste
2. Urban and domestic waste
3. Agrochemicals
4. Soil erosion
5. Radioactive pollutants
6. Acid rain
7. Industrial waste :- These are the major source of soil pollution. These wastes are mostly toxic due to the presence of cyanides , cadmium , chromates , acids , alkali’s , metals like nickel ,mercury lead etc. 50% of raw materials used by industries become waste products which are either thrown into water or dumped into soil. the wastes are discharged from textile ,paper , and pulp industry, chemicals and drugs industry, soap and detergents industry , food processing industry , glass ,cement industry the material dumped is mostly non – bio degradable becomes poison to humanity.
8. Urban and domestic wastes :-

Combined waste called as refuse. It contains garbage and waste materials like plastics , glass , metallic containers , fibers , papers , both these domestic wastes are more harmful . waste emits poisonous gases ,toxic hydrocarbons , and pathogenic organisms.

3.Agrochemicals :-

The agrochemicals such as fertilizers and pesticides ( insecticides , fungicides , herbicides) are commonly used for agricultural crops. These find their way into food chain that consumed by animals and humans and causes number of health hazards. No doubt, fertilizers increase the agricultural yield but they have adverse effects.

Pesticides are the chemicals which are used to save plants from pests , rats and parasitic fungi. it includes insecticides , fungicides , herbicides , these substances cause soil pollution and have adverse effect on health of animals and human beings. WHO reported more than 50,000 people of developing countries are affected and poisoned annually and die about 5000 peoples. .

Insecticides:-

These are the chemicals used to kill insects which damage the crop. After World War II, DDT was used to control the damages caused by insects , rodents ,weeds , and various crop diseases . BHC ( Benzene hexa Chloride ) aldrin ,dieldrin etc. it is not possible to ban the use of insecticides but the best option is to search for alternatives insecticides which will kill pests but are friendly to environment.

1. Soil erosion :-

Top soil is the most important as all agricultural activities , are depends on it. the top soil is dissipated (flow) by water or wind , such situation is termed as “ Soil erosion”. Such soil become unstable for vegetation or agricultural production. It is natural process cause by flow of water over the field and by wind. Roots of grasses are an excellent binding material to keep the soil intact over growing ,over cropping accelerate soil erosion.

1. Radioactive pollutants:-

It produce in nuclear reactors , laboratories and hospitals . nuclear explosion also produce large number of radioactive wastes. Dumping of nuclear waste is the biggest problem .from the soil it pass on to human beings and animals in the form of food. Radioactive substances emits rays are harmful to human and animal cells.

1. Acid rain :-

It disturb the fertility of the soil. fixation of nitrogen by symbiotic bacteria is inhibited. It makes the soil acidic .that affects the plants and animals. acid rain damages the forest and other vegetation.

Control of soil pollution:-

1. The use of fertilizers and pesticides must be reduced.
2. Forest must be restored and grass cover to check the soil erosion and floods.
3. Proper methods should be adopted for the disposal of solid wastes.
4. The gas and liquid can be used as fuels. Must used “Gobar gas” produce from dung.

Noise Pollution :-