

## SECOND SEMESTER EXAMINATION 2010-11

### ENVIRONMENT & ECOLOGY

*Time : 2 Hours*

*Total Marks : 50*

**Note:** The question paper contains three sections, Section-A, Section-B, and Section-C with the weightage of 10, 15 and 25 marks respectively. Follow the instruction given in each Section.

#### SECTION—A

This question contains 10 questions of Multiple choice/Fill in the blanks/True-False, Matching the correct answer type questions. Attempt all parts of this Section.

1. Choose the correct answer from the multiple choices given below: (1×3=3)

(a) The part of the earth and its atmosphere in which organisms live is:

- (i) Biosphere (ii) Biome  
(iii) Biomass (iv) Biota

Ans. (i) Biosphere

(b) Which of the following is an abiotic component of the ecosystem?

- (i) Bacteria (ii) Plants  
(iii) Humus (iv) Fungi

Ans. (iii) Humus

(c) BOD measures:

- (i) Industrial pollution  
(ii) Air pollution  
(iii) Water pollution  
(iv) Dissolved oxygen needed by microbes to decompose organic waste.

Ans. (iv) Dissolved oxygen needed by microbes to decompose organic waste.

Fill in the following blanks with suitable words:

(1×3=3)

(d) Eutrofication of lakes is caused due to excessive presence of \_\_\_\_\_ and

Ans. Nitrates & Phosphate

(e) In waterlogged soils the plant roots do not get adequate \_\_\_\_\_ for respiration

Ans. Oxygen (Air)

(f) The ecological factors related to soil and substratum is called \_\_\_\_\_.

Ans. Edaphic Factors

Indicate the following statements True or False

(1×2=2)

(g) Sludge left over in the biogas plant cannot be used as a fertilizer.

(True/False)

Ans. False

(h) The major source of soil salinity is excessive irrigation. (True/False)

Ans. True

Match the following:

(½×4=2)

- (i) Overgrazing — Kalpavriksha  
(j) Blue baby syndrome — Saprotrophs  
(k) Chipko movement — Soil erosion  
(l) Detritivores — Nitrates

Ans. Match the following:

- (i) Overgrazing — Soil erosion  
(j) Blue Baby Syndrome — Nitrates  
(k) Chipko movement — Kalpavriksha  
(l) Detritivores — Saprotrophs

## SECTION — B

Q.2. Attempt any three parts of the following:

(5×3=15)

(a) Briefly describe the need of public awareness about the environment.

Ans. Rapid industrialization, urbanization and unsustainable use of resources have given birth to the grave danger of pollution and other major environmental problems, which directly or indirectly influences the human life. If proper measures should not be taken, our natural resources will end one day and it will be the last day of human on earth. The main objective of awareness is to aware individuals and social groups so they acquire knowledge to develop skills and abilities to participate actively in solving environmental problems. There is a strong need to create public awareness through government bodies, scholars, scientists and different NGO's. The objectives of environmental education or awareness are:

1. Creating the awareness about environmental problems among people.
2. Motivating public to participate in environmental protection and environment improvement.
3. To identify the root cause of ecological problems related with human activities.
4. To know about the depleting natural resources and its conservation.
5. To gain the knowledge of the sensitivity of our environment and its related problems.

(b) Describe in brief the salient features, structures and functions of forest ecosystem.

Ans. Structure Of Forest Ecosystem: An ecosystem may be divided into two components.

1. **Abiotic Components (Non Living)** – The abiotic components of forest an ecosystem includes both physical and chemical features. Physical features includes wind, soil, moisture, temperature, light etc while chemical features includes water, gases as oxy-

gen, minerals as iron, sulfur, carbon, nitrogen etc.

2. **Biotic Components (Living)** – The biotic components of an ecosystem may be divided as

(a) **Producers** – Producers comprises of green plants which fixes the radiant energy of the sun to form food during the process of photosynthesis. Examples are Sal, Sheesham etc.

(b) **Consumers** – These are organisms which feed upon green plants (autotrophs). They are divided as herbivores, carnivores and omnivores.

(i) **Herbivores** – Those organisms which feed on green plants only are called herbivores. They are also called as primary consumers. Examples are Cow, Goat, Deer, Camel etc.

(ii) **Carnivores** - Those organisms which feed on flesh or meat are called carnivores. They are also called as secondary consumers. Examples are Lion, Tiger, Wolf etc.

(iii) Those organisms which feed on green plants as well as flesh or meat are called omnivores. Examples are crow, dog etc.

3. **Decomposers** – They includes mainly bacteria and fungi which feeds on dead organic matter to break complex compound into simpler form and make them available for autotrophs.

**Function of An Ecosystem:** The green plants fixes the radiant energy of the sun with the help of minerals present in atmosphere or in soil to make complex substance (Carbohydrates) during the process of photosynthesis. When consumers feed on these green plants, energy is transferred to them. In this way the minerals and energy flows in an ecosystem. When these consumers die the nutrients are released and absorbed by soil which is again used by green plants or producers.

(c) Explain the equitable use of resources for sustainable survival.

Ans. – Living environment is different at different location due to variations in latitude, alti-

tude, topography but both biotic and abiotic system supports and maintained a healthy relationship for the sustenance of life on earth. However some human activities intended for progress and development are exceeding and disturbing the carrying capacity of environment for achieving and maintaining a healthy relationship for the sustenance of life is termed as sustainability. Sustainability itself reflects the equitable use of resources present in the environment.

For achieving sustainability there must be a balance between development and environment. Principles of equitable resource are.

1. **Population control.** Increasing population puts tremendous pressure on natural resources so it is required to check the growth of population because if a species exceeded in ecosystem their requirements also exceeded therefore it puts an extra pressure on the natural resources.
2. **Conservation of natural resources.** If we need to use the natural resources for long time and without compromising the need of future generation requirement it is necessary to conserve the natural resources by shifting the demand of exhaustible and polluting fossil fuel to renewable and non-polluting natural resources.
3. **Reduce, reuse, and recycle.** In this modern era where the comforts are on the priority it is required that things should be long lasting which reduces the input of matter in ecosystem while those which are wastes should be recycle and reuse in the manufacturing of other products and at least use 60 % of substance from the waste.

**(d) Describe the effects of deforestation. Explain the measures taken for its remedy to conserve the forest wealth.**

**Ans.** Deforestation means complete clearing of trees and their replacement by using land for other purpose.

**Effects:**

1. **Loss of biodiversity:** Forest are the abode of wild species and if their will

no forest cover the conflicts occurs in between man and wild animal the consequences will be destruction of wild species.

2. **Soil erosion:** Plant roots trap the soil and if there will no forest then movement of topsoil increases which causes soil erosion.
3. **Low rainfall**
4. **Desertification**
5. **Landslides in hilly areas:** Plant roots trap the soil which prevents landslides in rainy season.
6. **Lowering of water table:** Without vegetation water runoff without any retention, therefore water table will not be recharged.

**Controlling Measures:**

1. **Planting Trees**
2. **Recycling and reuse of forest products**
3. **Decrease the use of trees for timber purposes**
4. **Provide appropriate environment for the growth of different type of trees**
5. **To create public awareness**
6. **Strictly follow the forest Conservation Act, 1980.**

**(e) What is geothermal energy? Discuss its merits and limitations.**

**Ans.** Geothermal energy is the heat from the Earth. It's clean and sustainable. Resources of geothermal energy range from the shallow ground to hot water and hot rock found a few miles beneath the Earth's surface, and down even deeper to the extremely high temperatures of molten rock called magma.

**Merits:**

1. When a power station harnesses geothermal power in the correct manner, there are no by products, which are beneficial to the environment.
2. No consumption of any type of fossil fuels.
3. Geothermal energy does not output any type of greenhouse effect.
4. After the construction of a geothermal

5. In terms of energy consumption, a geothermal power plant is self-sufficient.
6. Another advantage to geothermal energy is that the power plants do not have to be huge which is great for protecting the natural environment.

**Limitations:**

1. Geothermal power plant cannot build in some vacant land plot somewhere. The area where a geothermal energy power plant would be built should consist of those suitable hot rocks at just the right depth for drilling.
2. In addition, the type of rock must be easy to drill into.
3. It is important to take care of a geothermal site because if the holes were drilled improperly, then potentially harmful minerals and gas could escape from underground. These hazardous materials are nearly impossible to get rid of properly.
4. Pollution may occur due to improper drilling at geothermal stations.

**SECTION — C**

Attempt any five parts of the following:

(5×5=25)

Q.3.(a) What is meant by structure of an eco-system? Explain the various components of an ecosystem. Discuss the functions of any one form of the ecosystem.

**Ans. Structure of An Ecosystem** – The physical and visible arrangement of surrounding takes the structure that can be defined by following points.

1. The number of species, their life cycle, biomass, reproduction etc.
2. The quantity and distribution of non living material.
3. The range of gradient for survival for living species.

There are two main components of ecosystem by which all above mentioned facts can be clearly defined. These components are.

**1. Abiotic Components (Non Living)** – The abiotic components of an ecosystem includes both physical and chemical features. Physical features includes wind, soil, moisture, temperature, light etc while chemical features includes water, gases as oxygen, minerals as iron, sulfur, carbon, nitrogen etc. The kind of chemicals which are present in any ecosystem may regulate the activities of autotrophs and heterotrophs.

**2. Biotic Components (Living)** – The biotic components of an ecosystem may be divided as

- a) **Producers:** Producers comprises of green plants which fixes the radiant energy of the sun to form food during the process of photosynthesis.
- b) **Consumers:** These are organisms which feed upon green plants (autotrophs). They are divided as herbivores, carnivores and omnivores.
  - (i) **Herbivores:** Those organisms which feed on green plants only are called herbivores. They are also called as primary consumers. Examples are Cow, Goat, Deer, Camel etc.
  - (ii) **Carnivores:** Those organisms which feed on flesh or meat are called carnivores. They are also called as secondary consumers. Examples are Lion, Tiger, Wolf etc.
  - (iii) Those organisms which feed on green plants as well as flesh or meat are called omnivores. Examples are human beings and dog.

3. **Decomposers:** They includes mainly bacteria and fungi which feeds on dead organic matter to break complex compound into simpler form and make them available for autotrophs.

**Function of An Ecosystem :** The Producers fixes the radiant energy of the sun with the help of minerals present in atmosphere or in soil to make complex substance (Carbohydrates) during the process of photosynthesis. When consumers feed on these green plants, energy is transferred to them. In this way the minerals and energy flows in an ecosystem. When these consumers die the salts (nutrients) are released and absorbed by soil which is again used by autotrophs.

(b) **“Flow of energy is unidirectional and continuous in an ecosystem.” Comment.**

**Ans.** Energy flow is the movement of energy through an ecosystem through a series of organisms and back to the external environment. It is one of the most fundamental processes that is common to all the ecosystems. The unidirectional flow of energy in an ecosystem can be well demonstrated by the two laws of thermodynamics. Therefore it is necessary to know properly about an ecosystem which includes fixing of radiant energy of sun by producers and transformation of this energy to consumers and decomposers and the loss of energy during the whole process.

The plants of fresh water ecosystem receive 111876 g cal/cm<sup>2</sup>/year and fix only 111 unit by reflecting 118761 unit of solar radiation. The fixed energy is used by decomposer (3 unit), not utilized form (70 unit) and insperation it is 23 unit that is 21 % of fixed radiation. In herbivorous level the utilization of energy in respiration increases up to 4.6 unit (30 %) and finally in carivores it rises up to 1.8 unit (60%).

According to first law of thermodynamics, energy can neither be created nor destroyed; energy can simply change its form. In an ecosystem, autotrophs i.e green plants fix the radiant energy of the sun and converted it into chemical energy. This chemical energy is transferred to hetrotrophs i.e. consumers when they feed upon autotrophs and finally when hetrotrophs die this energy is transferred to decomposers which feed upon them.

According to second law of thermodynamics, during energy transformation large part of energy is lost as heat into the atmosphere. It may become clear from the figure that there is a successive decrease in energy at higher trophic levels.

**Q.4.(a) What is the impact of mining on the environment? Discuss necessity of conservation of mineral resources.**

**Ans.** Mining: The extraction of minerals is a violent process which inevitably has a great impact on the environment. It involves the following:

- Stripping of large areas of topsoil and of all flora and fauna in addition to manmade constructions.
- Mining usually involves the destruction of resources which people rely on such as agricultural land, drinking or fishing waters, hunting grounds, religious or recreational areas as well as even their homes themselves. If these people are not involved in the decision-making process and/or if they do not benefit from the mine, a conflict will arise.

**Effect of Mining on environment can be described as:**

1. Mining involves deforestation and de-vegetation of a large area which results into ecological imbalance and loss of habitat to wildlife. Precious agriculture land is also consumed in this process.

2. Defacing or disfiguration of the landscape takes place due to mining. This results into destruction of soil fertility, hydrology and land topography. It induces erosion and siltation of water-bodies.
3. Subsurface mining sometimes causes subsidence of land which results into cracking or tilting of nearby building, highway, railway traces etc.
4. Pollution of surface and groundwater takes places due to release and leaching of harmful element (e.g. Cadmium, Cobalt, Copper, Lead etc.) from mines. Acid mine drainage is one of the common problems of this kind.
5. Serious occupational health hazards are associate with mining. Miners generally suffer from respiratory and skin diseases, like Asthma, Bronchitis, Black lung disease, Asbestosis, sili-cosis etc.

**NEED OF THE CONSERVATION:** Because minerals are the non renewable natural resource therefore they may be exhausted. So it can be used by using sustainably. Exploitation of mineral resources is the mining operation whereby minerals are extracted from any mineral deposit processed, transported, sold or exported for commercial purposes. Due to excessive exploitation many mineral resources are near to exhausted and will not be available in near future. The exploitation of mineral resources has to be done keeping in view not only the present but the long term needs. The strategy for exploitation and development of each mineral shall be formulated and reviewed periodically on the basis of available resources: If these resource will use indiscriminately it will dumped in to the surrounding and may cause a number of health hazards.

**Q.4.(b) Why the groundwater level is gradually depleting? How will you suggest preventing the groundwater exploitation from bulk users?**

**Ans.** The main cause of ground water depletion are:

1. **Urbanization** - Due to increase concrete surface area the percolation of water reduces.
2. **Increase run off** - Due to less forest cover the residence time of water reduces and reach to ocean.
3. **Population** Due to increase of population the per capita demand of water also increase exponentially
4. **Industrialization.**

**Suggestion:**

1. Proper recharging of ground water and use of rain water harvesting technique.
2. Strict implementation of rules and regulation.
3. Create awareness about the ill effect of ground water exploitation.
4. Water should be consumed sustainably.

**Q.5.(a) What are the alternative energy resources? Differentiate between renewable and non-renewable natural resources.**

**Ans. Alternative Energy Resources:** Solar, wind, geothermal are alternative energy resources. They are also called as ecofriendly energy resource. Energy can be defined as the ability to do work. The effect of energy in our life and society is enormous and basically controls everyday aspects of our lives. Energy is the lifeline of the economy for any country. Energy is used to do all types of work which is manifested in the form of movement, displacement, heat, light, etc.

ated continuously in nature and are inexhaustible e.g. wood, solar energy, wind energy, tidal energy, hydropower, biomass energy, biofuels, geothermal energy and hydrogen. They are also known as non-conventional source of energy and they can be used again and again in an endless manner.

**Non-renewable Energy Resources** - They have accumulated in nature over a long span of time and cannot be quickly replenished when exhausted e.g. coal, petroleum, natural gas and nuclear fuels like uranium and thorium. Interestingly, wood is a renewable resource as we can get new wood by growing a tree within 15-20 years but it has taken millions of years for the formation of coal from trees and cannot be regenerated in our life time, hence coal is non-renewable energy source.

**(b) Discuss in brief the effect of radiation from nuclear reactor on the environment with suitable examples.**

**Ans. Effects of Radioactive pollutants:** Radiation damages living organisms by initiating harmful chemical reactions in tissues. For example, bonds are broken in the macromolecules that carry out life processes. In case of acute radiation poisoning, bone marrow which produces red blood cells is destroyed and the concentration of red blood cells is diminished. When food containing radionuclide is taken by man, some of them concentrate in specific body organs where they cause a number of undesirable diseases of bones and tissues (due to accumulation of Cs-137 and Sr-90) and thyroid gland (due to accumulation of I-131). Different effects of radioactive pollutants are given as under:

**SOMATIC EFFECTS:**

**Immediate:**

- Radiation sickness
- Acute radiation syndrome

**Delayed:**

- Leukaemia
- Carcinogenesis
- Foetal developmental abnormalities
- Shortening of life

**Genetic Effects:**

- Chromosome mutations
- Point mutations

Examples: Chernobyl Disaster

**Management of Radioactive Waste are:**

1. Bury it deep underground
2. Bury it under the Antarctic ice sheet or the Greenland ice cap
3. Dump it in the deep oceans (Ocean Dumping)
4. Send it into space.
5. Bury it in thick deposits of mud on the deep ocean floor in geologically stable areas
6. Decommissioning old nuclear power plants
7. Change it into harmless, or less harmful isotopes

**Q.6.(a) How the growth in population, economic development, excess land use, technological options and social preferences affect the environmental pollution?**

**Ans.** The growth in population, economic development, excess land use, technological options and social preferences create stress on the natural resources and increase environmental pollution by following ways

1. Increased pollution
2. Depletion of natural resources
3. Lowering of water table, fresh water crises.
4. Ozone depletion, Acid Rain, Global Warming etc.
5. Health hazards
6. Loss of flora and Fauna.

**(b) Describe in brief the concept of 'Solid Waste Management' with the basic problems involved. Distinguish between the incineration and combustion methods of solid waste disposal.**

**Ans.** Municipal solid waste management in India – waste is the precious raw material located at wrong place therefore it is required to use the waste material. The government of India enacted a technology policy statement in 1983 on waste management with the objectives of 'Recycling waste material and make full utilization of products and ensures harmony with the environment that preserve the ecological balance and improve the quality of habitat.

Some of the techniques of solid waste management are:

Sanitary landfills, Composting, Incineration, Anaerobic Digestion, Recycling, Public Consciousness.

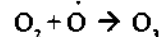
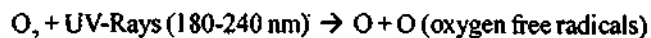
**Incineration :** It is a process that occurs in presence of  $O_2$  and at high temperature usually 600 -1000  $^{\circ}C$  but due to presence of rubber and plastics in waste the temperature range increases up to 1200  $^{\circ}C$  so that no dioxins and furans can be generated.

**Combustion** It is a process in which waste can not be segregated and burn by producing various pollutant that enter in to air and soil.

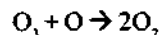
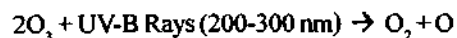
**Q.7.(a) What is Ozone hole? What are the causes of Ozone hole formation? What are the effects of depletion of Ozone layer?**

**Ans.** Electro-Magnetic Radiations coming from the sun are chiefly constituted by visible rays and UV-Rays. Visible rays reach the earth surface, while UV-rays are largely banned by ozone layer. There are three categories of UV radiation: UV-A (320-400 nm), UV-B (280-320 nm) and UV-C (200-280 nm). Most of these are absorbed by ozone in the stratosphere, so they do not reach the Earth's surface. Due to depletion of ozone layer, UV rays (particularly UV-B) reach the earth surface and causes harmful effects like skin cancer, eye sight defect (eye cataract) and genetic disorder (DNA-damage) in man, animals and plants.

**Ozone layer: Natural formation and destruction:** Ozone is created in the stratosphere by photolysis of oxygen in presence of UV radiation:







Scientists also found that ozone levels change periodically as part of regular natural cycles such as the changing seasons, sun cycles and winds. At different temperatures and pressures (i.e. varying altitudes within the stratosphere), there are different formation and destruction rates.

#### **International Efforts:**

1. Since 1970s, when ozone depleting effect of CFCs was discovered, worldwide scientists and policy makers started searching solution to this problem.
2. Montreal Protocol.
3. It was concluded that in order to stop ozone layer depletion, use of ozone depleting chemicals has to be stopped or phased out.

#### **(b) Discuss the salient features of:**

##### **(i) Wildlife (Protection) Act, 1972**

##### **(ii) Forest (Conservation) Act, 1980.**

**Ans. (i) Wildlife (Protection) Act, 1972:** The First Earth Summit of 1972 at Stockholm provided the real driving force for the enactment of a comprehensive legislation for the protection of wildlife in the country by the country's Parliament which was assented by the President on 9<sup>th</sup> September, 1972 which came to be known as the Wild life (Protection) Act, 1972. By now, it has been amended four times in 1982, 1986, 1991 and 1993. The Act provides a comprehensive schedule of mammals, amphibians and reptiles, birds, crustaceans and insects, beetles etc., which have been provided legislative protection. The Act has 66 Sections. The Wild Life (Protection) Act, 1972 provides for:

1. Constitution of authorities for wildlife preservation (Section 3-8);
2. Protection of specified plants (Section 17 A);
3. Prohibition of hunting of wild animals (Section 9 and 11);
4. Declaration of sanctuaries (Section 18), national parks (Section 35) and closed areas (Section 37);
5. Management of sanctuaries (Section 19-34), national parks (Section 35), and closed areas (Section 38);
6. Constitution of Central Zoo Authority (Section 38 A);
7. Granting license for hunting of animals for the purpose of education, scientific research, scientific management (Section 12);
8. Granting license for trade and commerce in wild animals, animal articles, trophies (Section 44, 48, 49);
9. Granting license for cultivation of specified but otherwise prohibited plants (Section 17 C);
10. Penalties for violation of various types (Section 51).

**PENALTIES** – Violations of various Sections of the Act do attract penalties of varying degree. For instance, if a person violates any conditions laid down in his permit/license granted to him under Section 38 J, he/she is liable to: (i) imprisonment upto 3 months and/or a fine upto Rs. 25,000; (ii) cancellation of his/her license granted for the purpose; (iii) cancellation of his/her Arms license. But if the offence relates to hunting within the boundaries of sanctuaries or national parks or close area, it invites still stringent penalties. The imprisonment in this case ranges between 1 year to 6 years coupled with a fine of not less than Rs. 5,000.

**(ii) Forest (Conservation) Act, 1980:** An Act to provide for the conservation of forests and for matters connected therewith

**1. Short title, extent and commencement.**

- (1) This Act may be called the Forest (Conservation) Act, 1980.
- (2) It extends to the whole of India except the State of Jammu and Kashmir.
- (3) It shall be deemed to have come into force on the 25th day of October, 1980.

**2. Restriction on the dereservation of forests or use of forest land for non-forest purpose.**

Notwithstanding anything contained in any other law for the time being in force in a State, no State Government or other authority shall make, except with the prior approval of the Central Government, any order directing-

- (i) That any reserved forest (within the meaning of the expression "reserved forest" in any law for the time being in force in that State) or any portion thereof, shall cease to be reserved;
- (ii) That any forest land or any portion thereof may be used for any non-forest purpose;
- (iii) That any forest land or any portion thereof may be assigned by way of lease or otherwise to any private person or to any authority, corporation, agency or any other organisation not owned, managed or controlled by Government;
- (iv) That any forest land or any portion thereof may be cleared of trees which have grown naturally in that land or portion, for the purpose of using it for reafforestation.

**Explanation:-** For the purpose of this section, "non-forest purpose" means the breaking up or clearing of any forest land or portion thereof for-

- (a) The cultivation of tea, coffee, spices, rubber, palms, oil-bearing plants, horticultural crops or medicinal plants;
- (b) Any purpose other than reafforestation; But does not include any work relating or ancillary to conservation, development and management of forests and wildlife, namely, the establishment of check-posts, fire lines, wireless communications and construction of fencing, bridges and culverts, dams, waterholes, trench marks, boundary marks, pipelines or other like purposes.

**3A. Penalty for contravention of the provisions of the Act.**

Whoever contravenes or abets the contravention of any of the provisions of Section 2, shall be punishable with simple imprisonment for a period which may extend to fifteen days.

**3B. Offences by the Authorities and Government Departments.**

- (1) Where any offence under this Act has been committed -
  - (a) By any department of Government, the head of the department; or
  - (b) By any authority, every person who, at the time the offence was committed, was directly in charge of, and was responsible to, the authority for the conduct of the business of the authority as well as the authority;

**Q.8. Write short notes on the following:**

- (i) Population Stabilization
- (ii) Water Conservation

(iii) **Greenhouse Effect**

(iv) **Global Warming**

(v) **Acid Rain.**

**Ans. (i) Population Stabilization:** Population stabilization means control of population. Various steps should be taken to control the population are

1. Information regarding the merits of small family norms.
2. Methods of prevention and control of birth
3. Age of marriage: 21 years for males, 18 years for females.
4. Regulating the family size with one or two children.
5. Incentives for adopting family planning measures.

**(ii) Water Conservation –** Water conservation refers to reducing the usage of water and recycling of waste water for different purposes such as cleaning, manufacturing and agricultural irrigation.

Water conservation can be defined as:

1. Any beneficial reduction in water loss, use or waste as well as the preservation of water quality.
2. A reduction in water use accomplished by implementation of water conservation or water efficiency measures

Water-saving technology for the home includes:

1. Low-flow shower heads sometimes called energy-efficient shower heads as they also use less energy.
2. Low flush toilets and composting toilets. These have a dramatic impact in the developed world, as conventional Western toilets use large volumes of water.
3. Saline water (sea water) or rain water can be used for flushing toilets.
4. Wastewater reuse or recycling systems, allowing:
5. Reuse of gray water for flushing toilets or watering gardens
6. Recycling of wastewater through purification at a water treatment plant.
7. Rainwater harvesting
8. Weather-based irrigation controllers
9. Garden hose nozzles that shut off water when it is not being used, instead of letting a hose run.
10. Using low flow taps in wash basins

Water can also be conserved by landscaping with native plants and by changing behavior, such as shortening showers and not running the faucet while brushing teeth.

**(iii) Greenhouse Effect –** It is an essential phenomenon for survival of living organism on planet earth which gives a moderate condition for life. In normal conditions, it is positive for life where heat is being trapped by  $\text{CO}_2$  that increases the temperature of earth.

**(iv) Global Warming –** Global warming is the increase in the average temperature of the Earth near surface air and the oceans. Global surface temperature increased  $0.74 \pm 0.18 \text{ }^\circ\text{C}$  ( $1.33 \pm 0.32 \text{ }^\circ\text{F}$ ) during the last century.

### **EFFECTS OF GLOBAL WARMING:**

1. The melting glacier which is the early sign of heating of the earth's atmosphere is a great cause of concern.
2. There are wide spread diseases and contamination owing to natural calamities like floods and unseasonal rain.
3. The effect is direct as the oxygen level is going far below the level and there is increase in carbon dioxide. There are various statistical data collated so that a direct approach can be given to curb the problem. Stabilizing the temperature of the earth's surface has to be a collective job and there are organizations that are trying hard to get the message across.
4. The increase in sea level and high temperature makes water to evaporate and form clouds. This clearly indicates high rainfall also during off season and this is a cause of concern as excess rainfall can damage crops and habitat.

(v) **Acid Rain:** The term 'acid rain' means any form of precipitation like rain, fog, snow, or hail that contains harmful substances such as nitrogen and sulfur oxides. The major human sources do come from the industry, transportation, and a variety of power plants. Strictly speaking these industrial amounts of nitrogen, sulfur oxides and general pollutants from the air cause a drastic increase of the acidity of the precipitation and do also harm plants, humans, and buildings.

Air pollution affects both humans and the nature. Most obvious are the so-called direct effects on human health. Results of recent research show that small particles in the air caused more than 350,000 premature deaths within the 25 countries of the European Union in 2000. Furthermore it has to be taken into consideration that there are also other air pollutants as well as indirect effects on nature and humans. Those indirect effects include effects such as toxic groundwater and corrosion of materials. Due to drastic air pollution and the worsening of the general air quality, the climate does also get affected. If the climate gets warmer it affects a human's health.