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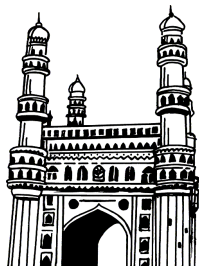

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CHAPTER - I Definition, Scope and Importance of Environmental Studies

1.1 DEFINITION, SCOPE AND IMPORTANCE OF ENVIRONMENTAL STUDIES

Q1. What is meant by environment studies? Write on its study of importance in society.

Ans :

Definition

Environmental studies deals with every issue that affects a living organism. It is multidisciplinary approach that brings about an appreciation of our natural world and human impact on its integrity.

Its components include biology, geology, chemistry, physics, engineering, sociology, health, anthropology, economics, statistics, computers and philosophy.

Scope of Importance of Environmental Studies

Environmental studies is an integration of several subjects that include both science and social studies. The scope of environmental studies is extremely wide and covers some aspects of nearly every major discipline.

Water, air, soil, minerals, oil the products we get from forests, grasslands, oceans and from agriculture and livestock, are all a part of our life support systems. Without them, life would be impossible and as we keep increasing in numbers and the quantity of resources each of us uses also increases, the earth's resource base must inevitably shrink. Added to this is the misuse of resources. We waste or pollute large amounts of nature's clear water, we create more and more material like plastic that we discard after a single use; and we waste colossal amounts of food, which is discarded as garbage. Manufacturing processes create solid waste by products that are discarded, as well as chemicals that flow out as liquid waste and pollute water, and gases that pollute the air. There accumulate in our environment, leading to a variety of diseases and other adverse environmental impacts now seriously affecting all our lives.

This situations will only improve if each of us begins to take actions in our daily lives that will help preserve our environmental resources. We cannot expect governments alone to manage the safeguarding of the environment, nor can we expect other people to prevent environmental damage. We need to do it ourselves. It is a responsibility that each of us must take on as one's own.

CHAPTER - II	Structure of Ecosystem – Abiotic & Biotic components Producers, Consumers, Decomposers, Food chains, Food webs, Ecological pyramids)

1.2 STRUCTURE OF ECOSYSTEM – ABIOTIC & BIOTIC COMPONENTS PRODUCERS, CONSUMERS, DECOMPOSERS, FOOD CHAINS, FOOD WEBS, ECOLOGICAL PYRAMIDS)

Q1. Describe about the structure and function of the ecosystem.

Ans :

Ecosystem has a non-living and living part that are linked to each others.

The Non-living components of an ecosystem are the amount of water, inorganic substances and organic compounds and climatic conditions, which depend on geographical conditions and location.

The living component of plant life ranges from extremely small bacteria, which live in the air, water and soil, algae which live in fresh and saltwater, to the terrestrial plants which range from grasses and herbs that grow after the monsoon every year, to the giant long – lived trees of the forest.

Producers

Plants are the "Producers" in the ecosystem, as they manufacture their food by using energy from the sun.

Consumers

The herbivorous animals are "primary consumers", as they live on the producers. In a forest, there are the insects, amphibians, reptiles, birds and mammals.

At a higher tropic level, there are carnivorous animals, or "Secondary Consumers", which live on the herbivores.

Decomposers

Decomposers or detrivores are a group of organisms consisting of small animals like worms, insects, bacteria, fungi, which break down dead organic material into smaller particles and finally into simpler substances that are used by plants as nutrition.

Functions

All the functions of the ecosystem are in some way related to the growth and regeneration of its plant and animal species. There interlinked processes can be depicted as the various cycles, all these processes depend on energy from sunlight.

Water Cycle

The rainwater that falls on land percolates into the ground, which is stored underground throughout the rest of the year. Water is drawing from the ground by plants along with the nutrients from the soil. The water is then transpired from the leaves as water vapor and returned to the atmosphere.

Carbon Cycle

Carbon is a building block of both plant and animal tissues. In the presence of sunlight, plants take up carbon dioxide from the atmosphere through leaves and combine with water, absorbed by their roots in the soil and are able to form carbohydrates that contain carbon, which is called as photosynthesis. Plants use this complex mechanism for their growth and development.

Herbivores feed on plant material, which is used by them for energy and for growth.

Oxygen Cycle

Oxygen is absorbed by plants and animals from the air during respiration. The plants return oxygen to the atmosphere during photosynthesis.

Nitrogen Cycle

Carnivores feed on herbivores that, in turn, feed on plants

2. Write about the important components of Ecosystem.

OR

What are the Abiotic and Biotic components of an Ecosystem ?

Ans :

Ecosystems are composed of a variety of abiotic and biotic components that function in an interrelated fashion. Some of the more important components are : Soil, atmosphere, radiation from the sun, water and living organisms.

Abiotic Components

The amount of inorganic substances as P,S, C, N, H etc., involved in material cycles. The amount of these inorganic substances, present at any given time in an ecosystem, is designated as the standing state or standing quality.

Amount and distribution of inorganic chemicals, such as chlorophyll etc., and of organic materials, as proteins carbohydrates, lipids, etc., present either in the biomass or in the environment i.e., biochemical structure that link the biotic and abiotic components of the ecosystem, the climate of the given region.

Nutrients, unlike energy are recycled in the ecosystem. There are about 40 chemical elements considered to be essential for living organisms. Materials are in limited quantity in the earth's system and to keep the system going continuously the only possibility is to regenerate the materials.

The macronutrients are C, H, O, P, K, I, N, S, Mg, Ca etc., which have cycles with atmosphere while micronutrients like Cu, Fe, Co etc are soil based form edaphic cycles. The biogeochemical cycles are of two varieties. Sedimentary cycles and Gaseous cycles. In Sedimentary cycles the main reservoir is the soil; the sedimentary and other types of rocks of earth's crust. The gaseous cycles have their main reservoir of nutrients in the atmosphere and oceans.

Biotic Components

Biotic component of an ecosystem has two subcomponents 1) Autotrophic and 2) Heterotrophic.

1) **Autotrophic Component :** In which fixation of light energy, use of simple in organic substances and build up of complex substances predominate. The component is constituted mainly by green plants, including photosynthetic bacteria. To some extent, chemosynthetic microbes also contribute to the build up of organic matter. Members of the autotrophic component are known as producers.

2) **Heterotrophic Component :** In this component the utilisation, rearrangement and decomposition of complex materials predominate. The organisms involved are known as consumers, as they consume the matter built up by the producers (autotrophs). These are categorized as

   i) **Macro Consumers** : These are the consumers, which in an order as they occur in a food chain are herbivores, carnivores. Herbivores are also known as primary, consumers. Secondary and tertiary consumers, if present, are carnivores or omnivores. They all are phagotrophs which include chiefly animals that ingest other organic and particulate organic matter.

ii) **Micro Consumers** : These are popularly known as decomposers. They are saprotrophs (Osmotrophs) and include chiefly bacteria, actinomycetes and fungi. They breakdown complex compounds of dead or living protoplasm absorb some of the decomposition or break down products and release inorganic nutrients in environment, making them available again to autotrophs.

The biotic component of any ecosystem may be thought of as the functional kingdom of nature, since they are based an the type of nutrition and the energy source used.

Q3. Explain about Food chains, food webs and ecological pyramids.

Ans :

The transfer of energy from the source in plants through a series of organisms, by eating and being eaten, constitutes food chains. A large proportion of energy is lost in the form of heat for each transfer. These food chains are interconnected with each other.

Food Chains

In the nature, the energy is passed from one living organisms to another. Plants are eaten by herbivorous animals and the energy is transferred from plants to the animals. In an ecosystem, some of the animals feed on other living organisms, which some feed on dead organic matter; the latter form the "detritus" food chain. At each link in the chain, a large part of the energy from the food is lost through daily activities. Each chain is linked to four to five such links.

Food Webs

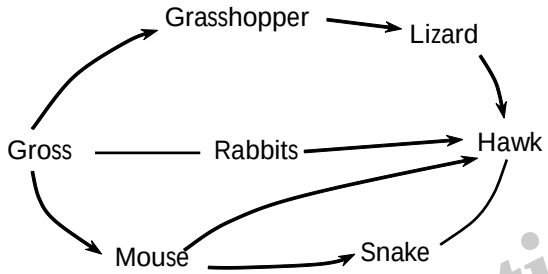
In an ecosystem there are a very large number of interlinked chains, together, these form a food web. If the links in the chains that make up the web of life are disrupted due to human activities that lead to loss or extinction of species, the web breaks down.

Ecological Pyramids

In an ecosystem green plants, the producers, utilize energy directly from sunlight and convert it into matter. A large number of these organisms form the most basic, or first "trophic level" of the food pyramid. The herbivores that eat plants are at the second

tropic level and are called primary consumers. The predators that feed on them form the third trophic level and are known as secondary consumers. Only a few animals form the third trophic level consisting of the carnivores at the apex of the food pyramid. This is how energy is used by living creatures and flows through the ecosystem from its base to the apex.

Food web in a grass land ecosystem



CHAPTER - III Function of an Ecosystem : Energy flow in the Ecosystem (Single channel energy flow model)

1.3 FUNCTION OF AN ECOSYSTEM : ENERGY FLOW IN THE ECOSYSTEM (SINGLE CHANNEL ENERGY FLOW MODEL)

Q1. How the Energy flow takes place in the ecosystem.

Ans :

Functions

Ecosystem has several interrelated mechanisms that affect human life, like water cycle, the carbon cycle, the oxygen cycle, the nitrogen cycle and the energy cycle.

The functions of the ecosystem are in same way related to the growth and regeneration of its plant and animal species. All these processes depend on energy from sunlight. During photosynthesis, carbon dioxide is absorbed by plants and oxygen is released into the atmosphere.

The energy cycle recycles nutrients into the soil on which plant life grows.

The Water Cycle

When it rains, the rainwater that falls on land percolates into ground and stored as underground throughout the rest of year. Water is drawn up from the ground by plants along with the nutrients from the soil. The Water is then transpired from the leaves as water vapor and returned to the atmosphere. As it is lighter than air, water vapor rises and forms clouds. The wind blow the clouds for long distances and when the clouds rise higher, the vapor condenses and changes into droplets, which fall on the land as rain.

Carbon Cycle

Carbon is a building block of both plant and animal tissues. In the presence of sunlight, plants take up carbon dioxide from the atmosphere through their leaves. The plants combine carbon dioxide with water, which is absorbed by their roots from the soil. In the presence of sunlight they are able to form carbohydrates that contain carbon plants use this complex mechanism for their growth and development and release oxygen into atmosphere on which animals depend for their respiration.

Herbivores feed on plant material, which is used by them for energy and for their growth. When plants and animals die, they return their carbon to the soil.

Oxygen Cycle

Oxygen is absorbed by plants and animals from the air during respiration. The plants return oxygen to the atmosphere during photosynthesis. This links the oxygen cycle to the carbon cycle.

Nitrogen Cycle

Carnivores feed on herbivores that, in turn, feed on plants. When animals defecate, this waste material is broken down by worms and insects, mostly beetles and ants. These small 'soil animals' break the waste material into smaller bits on which microscopic bacteria and fungi can act. This material is thus broken down further into nutrients that plants can absorb and use for their growth. In this manner, nutrients are recycled back from animals to plants. Similarly, the bodies of dead animals are also broken down into nutrients that are used by the plants for their growth. Thus, the nitrogen cycle, on which life is dependent, is completed.

Energy Cycle

The energy from sunlight is converted by the plants themselves into growing new plant material, which include the leaves, flowers, fruit, branches, trunks and roots of plants. Since plants can grow by converting the sun's energy directly into their tissues, they are known as producers in the ecosystem. The plants are used by the herbivores as food, which gives them energy. The carnivores, in turn, depend on the herbivores on which they feed. Different Plant and animal species are linked to one another through food chains.

The energy in the ecosystem can be depicted in the form of a food pyramid or energy pyramid.

Q2. Write about the concept of an ecosystem and Degradation and resource utilizatin of ecosystem.

Ans :

An 'ecosystem' is a region with a specific and recognizable landscape form, such as a forest, grassland, desert, wetland or coastal area. The nature of the ecosystem is based on its geographical features like hills, mountains, plains, rivers, lakes, coastal areas or islands. It is also controlled by climatic conditions – the amount of sunlight, the temperature and the rainfall in the region. the geographical, climatic and soil

characteristics form its non-living or abiotic component. These features create conditions that support a community of plants and animals that evolution has produced to live in these specific conditions. The living part of the ecosystem is referred to as its biotic component.

Ecosystems are divided into terrestrial land based ecosystems and aquatic ecosystems in water.

All the living organisms in an area live in communities of plants and animals. They interact with their abiotic environment and with each other at different points in time for a large number of reasons. Life can exist only in a small portion of the Earth's land, water and its atmosphere. At a global level, the thin skin of the earth on the land, the sea and the air, forms the biosphere.

The living community of plants and animals in any area together with the non–living components of the environment – such as soil, air and water – constitutes the ecosystem.

Natural ecosystems include the forests, grasslands, deserts and aquatic ecosystems like ponds, rivers, lakes and the sea. Man-modified ecosystems include agricultural land and urban or industrial land use patterns.

Ecosystem degradation & utilization

Ecosystems are frequently disrupted by human actions, leading to the extinction of species of plants and animals that can live only in the different natural ecosystems. Some species if eliminated, seriously affect the ecosystem.

These are called 'Keystone' species. Forests are deforested for timber, wetlands are drained to create more agricultural land, and semi–arid grasslands that are used as pastures are converted to irrigated fields. The pollution from industries and the waste from urban settings can also lead to the poisioning and extinction of several species.

Resource utilization

Most of the traditional societies used their environment fairly sustainably. Though inequality in resource utilization has existed in every society the number of individuals that used a large proportion of resources were extremely limited.

Q3. Write about the Single - Channel Energy Models.

Ans :

The principle of food chains and the working of the two laws of thermodynamics can be better made clear by means of energy flow diagrams. The total incoming solar radiations (118, 872g cal/cm^2/yr), 118, 76/g cal / cm^2 / yr remain unutilised, and thus gross production (net production plus respiration) by autotrophs is IIIg cal / cms^2/yr with an efficiency of energy capture of 0.10%. It may also be noted that 21 percent of this energy or 23g cal/cm^2 / yr is consumed in metabolic reactions of autotrophs for their growth, development, maintenance and reproduction.

It may be seen further that 15g cal/cm^2/yr are consumed by herbivores that graze or feed on Autotrophs – this amounts to 17 percent of net autotroph production.

Decomposition (3g cal/cm^2/yr) accounts for about 3.4 percent of net production. The remainder of the plant material, 70g cal/cm^2/yr or 79.5 percent of net production, is not utilized at all but becomes part of the accumulating sediments. It is obvious, then that much more energy is available for herbivory than in consumed. It may also be noted that various pathways of loss are equivalent to and account for energy capture of the autotrophs i.e., gross production. Also, collectively the three upper 'fates' (decomposition, herbivory and not utilized) are equivalent to net production of the total energy incorporated at the herbivores level, i.e., 15g cal/cm^2/yr, 30 percent or 4.5g cal/cm^2/yr is used in metabolic reactions. Thus, there is considerably more energy lost via respiration by herbivores (30 percent) than by autotrophs (21 percent)

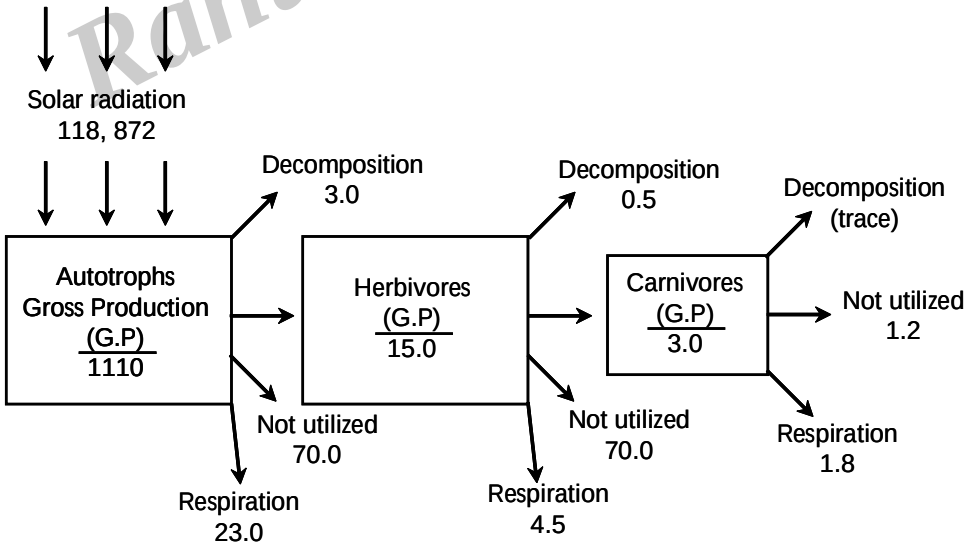
Again there is considerable energy available for the carnivores, namely 10.5g cal/cm^2/yr or 70 percent, which is not entirely utilized, infact only 3.0g cal/cm^2/yr or 28.6 percent of net production passes to the carnivores. This is more efficient utilization of resources than occurs at autotroph-herbivore transfer level. At the carnivore level about 60 percent of the carnivores' energy intake is consumed in metabolic activity and the remainder becomes part of the not utilised sediments, only an insignificant amount is subject to decomposition yearly. This high respiratory loss compares with 30 percent by herbivores and 21 percent by autotrophs in this ecosystem. From the energy flow diagrams, it becomes clear. Firstly, there is (unidirectional flow of energy). The energy that is captured by the autotrophs does not revert back to solar input, that which passes to the herbivores does not pass back to the autotrophs. As it moves

progressively through the various trophic levels it is no longer available to the previous level. Thus due to one-way flow of energy, the system would collapse if the primary source, the sun, were cut off.

Secondly, these occurs a progressive decrease in energy level at each trophic level. This is accounted largely by the energy dissipated as heat in metabolic activities and measured here as respiration coupled, with unutilised energy. Energy inflows balance outflows as required by the first law of thermodynamics, and energy transfer is accompanied by dispersion of energy into unavailable heat (i.e., respiration) as required by the second law. At each transfer of energy from one level to another, major part of energy is lost as heat or other form. There is a successive reduction in energy flow whether we consider it in terms of total flow (i.e., total energy input and total assimilation) or secondary production and respiration components. Thus, of the 3,000 k cal of total light falling upon the green plants, approximately 50 percent (1500k cal) is absorbed, of which only percent (15k cal) is converted at first trophic level. Thus net primary production is merely 15k cal. Secondary productivity tneds to be about 10 percent at successive consumer trophic levels i.e., herbivores and the carnivores, although efficiency may be sometimes higher, as 20 percent, at the carnivore level.

There is a successive reduction in energy flow at successive trophic levels. Thus shorter the food chain, greater would be the available food energy as with an increase in the length of food chain there is a corresponding more loss of energy.

Energy flow diagram for a lake (flush water ecosystem) in g Cal/ cm^2 / year.



CHAPTER - IV	Definition of Biodiversity , Genetic, Species & Ecosystem diversity, Hot-spots of Biodiversity, Threats to Biodiversity, Conservation of Biodiversity (Insitu & Exsitu)

1.4 DEFINITION OF BIODIVERSITY , GENETIC, SPECIES & ECOSYSTEM DIVERSITY, HOT-SPOTS OF BIODIVERSITY, THREATS TO BIODIVERSITY, CONSERVATION OF BIODIVERSITY (INSITU & EXSITU)

Q1. Define Biodiversity. What are the different levels of biodiversity in nature ?

Ans :

Definition

Biological diversity or biodiversity is that part of nature which includes the differences in genes among the individuals of a species, the variety and richness of all the plant and animal species at different scales in space – locally, in a region, in the country and the world, and the types of ecosystems, both terrestrial and aquatic, within a defined area.

Genetic Diversity

Each member of any animal or plant species differs widely from other individuals in its genetic makeup, owing to the large number of combinations possible in the genes that give every individual specific its characteristics. This genetic variability is essential for a healthy breeding population of a species. If the number of breeding individuals is reduced, the dissimilarity of genetic makeup is reduced and in breeding occurs. This leads to genetic anomalies and, eventually, to the extinction of that particular species. The diversity in wild species forms the 'gene pool' from which our crops and domestic animals have been developed over thousands of years.

Species Diversity

The number of species of plants and animals that are present in a region constitutes its species diversity. This diversity is seen both in natural ecosystems and in agricultural ecosystems. A natural forest ecosystem provides a large number of non–timber forest products (NFTPs) that local people depend on such as fruit, fuelwood, fiber, gum, resin and medicines.

Ecosystem diversity

There are a large variety of different ecosystems on earth, each having their own complement of distinctive interlinked species based on the differences in the habitat. Ecosystem diversity can be described for a specific geographical region, or a political entity such as country, a state or a taluka. Distinctive ecosystems include landscapes like forests, grasslands, deserts, mountains etc., as well aquatic ecosystems like rivers, lakes and seas.

An ecosystem is referred to as 'natural' when it is relatively undisturbed by human activities or 'modified when it is changed to other types of uses, such as farmland or urban areas. Ecosystems are most natural in wilderness areas.

Q2. What are the Hotspots of biodiversity ?

Ans :

The Earth's biodiversity is distributed in specific ecological regions. There are over a thousand major ecoregions in the world of these, 200 are said to be the richest, rarest and most distinctive natural areas. These areas are referred to as the 'Global 200'.

It has been estimated that 5,000 endemic plants which comprise 20% of global plant life, probably occur in only 18 'hotspots' in the world.

Countries which have a relatively large proportion of these biodiversity hotspots are referred to as 'mega-diversity nations'.

The rate at which the extinction of species is occuring throughout our country remains obscure. It is likely to be extremely high, as our wilderness areas are shrinking rapidly. Our globally accepted national 'hotspots' are in the forests of the North - east and Western - Ghats, which are included in the world's most bio - rich areas. The Andaman and Nicobar islands are extremely rich in special and many subspecies of different animals and birds have evolved. Among the endemic species, ie., those species found only in India, a large proportion are concentrated in these three areas. The Andaman and nicobar islands alone have as many as 2200 species of flowering plants and 120 species of ferns. Out of 135 genera of land mammals in India, 85 (63%) are found in the North - east. The North -eastern states also have 1,500 endemic plant species. A major proportion of amphibian and reptile species, especially snakes are concentrated in the Western Ghats, which is also a habitat for 1,500 endemic plant species.

Coral reefs in Indian waters surround the Andaman and Nicobar island, the Lakshadeep islands, and the Gulf areas of Gujarat land Tamil Nadu. They are nearly as rich in species as tropical evergreen forests.

Q3. Discuss about the threats to biodiversity.

Ans :

Man has began to overuse or misuse most of these natural ecosystems. Due to this unsustainable resource - use, once productive forests and grasslands have been turned into deserts and wastelands have increased all over the world. Mangroves have been cleared for fuelwood and prawn farming, which has led to a decrease in the habitat essential for the breeding of marine fish. Wetlands have been drained to increase agricultural land. These changes have grave economic implications in the longer term.

The current destruction of the remaining large areas of Wilderness habitats, especially in the marvelous diverse tropical forests and coral reefs, is the most important threat world wide to biodiversity. Scientist have estimated that human activities are likely to eliminated approximately 10 million species by the year 2050.

The present rate of extinction, about 25% of the worlds species will undergo extinction fairly rapidly. This may occur at the rate of 10 - 20,000 species per year, at a 1000 - 10,000 fast rate than the expected natural rate. Human actions could well exterminate 25% of the world's species within the next twenty or thirty years. Much of this mega extinction spasm is related to human population growth, industrialization and changes in landuse patterns. A major part of these extinctions will, of course, occur in bio - rich areas such as tropical forests, wetlands and coral reefs. The loss of wild habitat, due to rapid human population growth and short - term economic development, is the contributor to the rapid global destruction of biodiversity.

Island flora and fauna, which have high endemism in small isolated areas surrounded by the sea on all sides, have so far been most seriously affected by human activity. This has already led to extinction of many island plants and animals. Habitat loss also results from man's introduction of species from one area into another, disturbing the balance in existing communities.

The loss of species occurs due to the distinction of natural ecosystems either for conversion to agriculture or industry, or by over - extraction of their resources, or through pollution of air, water and soil.

Specific threats to certain animals are related to large economic benefits. The skin and bones from tigers, ivory from elephants, horns from rhinos and perfumes from the must deer are extensively used abroad. Bears are killed for their gall bladders. Corals and shells are also collected for export or sold on the beaches of Chennai, Kanyakumari and the Andaman & Nicobar islands.

Q4. Write about the In-Situ Conservation of biodiversity.

Ans :

In – Situ Conservation

Biodiversity at all its levels, as genetic species and as intact ecosystems, can be best preserved insitu by setting aside an adequate representation of wilderness as protected areas. These should consists of a network of national parks and wildlife sanctuaries with each distinctive ecosystem included in the network. Such a network would preserve the total diversity of life of a region.

In the past, national parks and sanctuaries in India were notified to preserve major wildlife species, such as tigers, lions, elephants and deer. The objective of these areas should be expanded to the preservation of relatively intact natural ecosystems where biological diversity from microscopic unicellular plants and animals, to the giant trees and large mammals – can all be preserved as rare endemic species are found only in a small area, these easily became extinct due to human activity. Such areas must be given an added importance as their biodiversity is a special feature of the region.

- Project tiger – Tiger was launched by the Government of India with the support of WWF – International in 1973 and was the first such initiative aimed at protecting this key species and all its habitats.
- Crocodile Conservation – Crocodiles have been threatened as their skin is used for making leather articles. A crocodile breeding and conservation program was initiated in 1975 to protect the remaining population of crocodilians in their natural habitat and by creating breeding centers
- Project Elephant – Project elephant was launched in 1992 to ensure the long-term survival of a viable population of elephants in their natural habitats in North and north-eastern India and South India.
- Wildlife Sanctuaries and national parks of India – There are 589 protected areas in India of which 89 are national parks and 500 are wildlife sanctuaries. They include a variety of ecosystems and habitats. Some have been created in order to protect highly endangered species of wild plants and animals found nowhere else in the world.

Q5. Explain about the Ex–situ conservations.

Ans :

The conservation of a species is best done by protecting its habitat along with all the other species that live in it in nature. This is known as in-situ conservation.

The conversation of an endangered species which is so close to extinction that unless alternate methods are instituted, the species may be rapidly driven to extinction. This strategy is known as ex-situ conservation i.e., conserving the species outside its natural habitat in a carefully controlled situation such as botanical garden for plants or a zoological park for animals, where there is expertise to multiply the species under artificially – managed conditions.

When an animal is on the brink of extinction, it must be carefully breed so that inbreeding does not lead to the genetic composition becoming weak. Breeding from the same stock can lead to poorly - adapted progeny or even an inability to be get enough offspring.

Modern breeding programs are done in zoos that provide for all the animals needs, including enclosures that stimulate their wild habitats. There may also be a need to assist breeding artificially.

In India, successful ex-situ conservation programs have been done for all our three species of crocodiles; this has been highly successful. The most successful example is the Madras Crocodile Trust Bank, which has grown from 10 to 8,035 crocodiles and the crocodiles here lay two clutches of eggs a year, compared to one in the wild another recent success has been the breeding to the very rare pygmy hog in the Gauhati Zoo. The Delhi zoo has successfully bred the rare Manipur brow - antlered deer.

The most important step of a successful breeding program is the reintroduction of a species into its original wild habitat. This requires re-habilitation of the degraded habitat and removal of the other causes such as poaching, disturbances, or other man-mde influences that have been the primary cause of reducing the population of the species.

- **Conservation of cultivars and livestock breeds**

  There were an estimated 30,000 varieties of rice grown in India till about 50 years ago. now, only a few these are still grown. If all the tradtitional varities vanish completely, it will be difficult to develop new disease – resistant variaties of rice in the future. Several varieties have been preserved in gene - banks.

CHAPTER - V	Renewable & Non – renewable resources, Brief account of Forest, Mineral & Energy (Solar Energy & Geothermal Energy) resources

1.5 RENEWABLE & NON – RENEWABLE RESOURCES, BRIEF ACCOUNT OF FOREST, MINERAL & ENERGY (SOLAR ENERGY & GEOTHERMAL ENERGY) RESOURCES

Q1. What are Renewable resources and its associated problems ?

Ans :

Water and biological living resources are considered renewable resources. Ecosystems act as resource producers and processors. Solar energy is the main driving force of ecological system, providing energy for the growth of plants in forests, grasslands and aquatic ecosystems. A forest recycles its plant material slowly by continuously returning its dead material, leaves, branches etc., to the soil. Grasslands recycle material much faster than forests, as the grass dries up after the rains are over every year. All the aquatic ecosystems are also depend on solar energy and have cycles of growth when plant life spreads up and aquatic animals breed, the sun also drives the water cycle.

Our food comes from both natural and agricultural ecosystems. Traditional agricultural ecosystems that depended on rainfall have been modified in recent times to produce more and more food by the addition of extra chemicals and water from irrigation systems, but they still depend on solar energy for the growth of crops.

Natural resources and associated problems

- The unequal consumption of natural resources – Currently, a major part of our natural resources are consumed in the technologically advanced or 'developed' world, usually termed as 'the North'. The consumption of resources per capita (per individual) of the developed countries is upto 50 times greater than in most developing countries.

Energy from fossil fuel is consumed in much greater quantities in developed countries. The USA, for example with just 4% of the worlds population consumes about 25% of the world's resources.

- Planning landuse – It is essential to evolve a rational landuse policy that examines how much land must be made available for different purposes and where it must be situated. Scientists today believe that at least 10% of the land and water bodies of each ecosystem must be kept as wilderness for the long-term needs of protecting nature and natural resources.

  Land as a resource is now under serious pressure due to an increasing 'land hunger' – to produce sufficient quantities of food for an exploding human population.

- The need for sustainable life-styles – The quality of human life and the quality of ecosystems on earth are indicators of the sustainable use of resources – increased longevity, an increase in knowledge and an enhancement of income are three together are known as the 'Human Development Index'.

Q2. Write about Non-renewable resources.

Ans :

These are minerals that have been formed in lithosphere over millions of years and constitute a closed system.

Non-renewable resources include fossil fuels such as oil and coal, which if extracted at the present rate, will soon be totally used up

- Mineral Resources – A mineral is a naturally - occuring substance of definite chemical composition and identifiable physical properties. An ore is a mineral or combination of minerals from which a useful substance, such as a metal, can be extracted and used to manufacture useful products.

Minerals are formed over a period of millions of years in the Earth's crust. Iron, aluminium, zinc, manganese and copper are important raw materials for industrial use. Important non - metallic resources include coal, salt, clay cement and silica. Stone used for building material, such as granite, marble, limestone, constitute another category of minerals. Minerals with special properties that humans value for their aesthetic and ornamental value are gems such as diamonds, emeralds and rubies.

Minerals in the form of oil, gas and coal were formed when ancient plants and animals were converted into underground fossil fuels.

- Non - renewable energy sources – These consists of the mineral - based hydrocarbon fuels – coal, oil and natural gas – that were formed from ancient prehistoric forests. These are called 'fossil fuels'.
- Oil – Most of our natural gas is linked to oil and because there is no distribution system, it is just burnt off.
- Coal – Many coal - based power generations plants are not fitted with devices such as electrostatic precipitators to reduce emissions of suspended particulate matter (SPM), which is a major air pollutes.

Thermal power stations use coal, which produce waste in the form of 'fly–ash and efforts have been made to use it for making bricks.

Q3. Give a brief account on Forest and Water Resources ?

Ans :

Forest Resources

According to an estimate India should ideally have 53% of its land under forests, but now its only 12%. Thus, we need not only to protect our existing forests but also to increase our forest cover.

The water we use depends on the existence of forests on the watersheds around river valleys. Our homes, furniture and paper are made from wood from the forest. We use many medicines that are based on forest produce and we depend on plants for the oxygen they emit and to remove the carbon dioxide we breathe out from the air.

Consumption of forest produce by local people who collect it for subsistence (consumptive use).

Food

Gathering plants, fishing, hunting from the forest

Fooder for cattle and fuelwood and charcoal for cooking and heating are obtained from the forests. Poles for building homes especially in rural and wilderness areas, timber for household articles and construction. Fiber for weaving baskets, ropes, nets, string etc., are collected from the forests.

- Sericulture for silk, Apiculture or rearing bees for honey, forest bees also pollinate crops.

- Medicinal plants for traditional medicines, investigating them as potential source for new modern drugs.

Water Resources

Wetlands are the intermediate forms between terrestrial and aquatic ecosystems and contain species of plants and animals that are highly moisture - dependent. All aquatic ecosystems are used by a large number of people for their daily needs such as drinking water, washing, cooking, watering animals and irrigating fields - However, the world depends on a limited quantity of freshwater. Water covers 70% of the earth's surface, but only 3% of this is fresh water of this, 2% is present as polar ice caps and only 1% is usable water in rivers, lakes and subsoil aquifers. At a global level, 70% of water is used for agriculture, about 25% for industry, and only 5% for domestic use.

In years when the monsoon is adequate, we use the good supply of water without trying to conserve it and use the water judiciously. India's increasing demand for water for intensive irrigated agriculture, for generating electricity, and for consumption in urban and industrial centers, has been met by creating large dams.

'Save Water' campaigns are essential to make people everywhere aware of the dangers of water scarcity.

Building several small reservoirs, developing small catchment dams and protecting wetlands. Soil management, micro-catchment development and afforestation permits recharging of underground acquifiers, thus reducing the need for large dams.

Q4. Explain about the Mineral Resources.

Ans :

A mineral is a naturally - occuring substance of definite chemical composition and identifiable physical properties. An ore is a mineral or combination of minerals from which a useful substance, such as a metal, can be extracted and used to manufacture useful products.

Minerals are formed over a period of millions of years in the earth's crust. Iron, aluminium, zinc, manganese and copper are important raw materials, for industrial use. Important non-metalic resources include coal, salt, clay cement and silica. Stone used for building material, such as granite, marble, limestone, constitute another category of minerals.

Minerals with special properties that humans value for their aesthetic and ornamental values are gems such as diamonds, emaralds and rubies. The luster of gold, silver and platinum is used for ornaments. Minerals in the form of oil, gas and coal were formed when ancient plants and animals were converted into underground fossil fuels.

Minerals are their ores need to be extracted from the earth's interior so that they can be used and this precess is known as mining.

Mineral deposits were discovered by prospectors in areas where mineral deposits in the form of veins were exposed on the surface. Prospecting and exploration is done by teams of geologists, mining engineers, geogphysicists and geochemists, who work together todiscover new deposits.

The method of mining has to be determined depending on whether the ore or mineral deposit is nearer the surface or deep within the earth.

Mines are of two types – surface or deep mines. Coal, metals and non-metalliferous minerals are all mined differently depending on the above criteria.

Most minerals need to be processed before they become usable. Thus, 'technology' is dependent on both the presence of resources and the energy necessary the energy necessary to make them 'usable'.

The Forest Department has leased land for mining in the Sariska Tiger Reserve area by denotifying the protected forest areas.

Mining operations are considered one of the main sources of environmental degradation. The depletion of available land due to mining, the waste from industries, conversion of land to industry and pollution of land, water and air by industrial wastes are environmental side effects of the use of these non-renewable resources.

Q5. Write about the Energy resources by specifying about the solar energy resource.

Ans :

The sun is the primary energy source in our lives. We use it directly for its warmth and through various natural processes that provide us with food, water, fuel and shelter. The suns rays power the growth of plants which form our food material, give off oxygen which we breath in and take up carbon dioxide that we breath out.

The chemical energy present in chemical compounds is released when they are broken down by animals in the presence of oxygen.

Nuclear energy is held in the nucleus of an atom and is now harnessed to develop electrical energy.

We use energy for household use, agriculture, production of industrial goods and for running transport. Modern agriculture uses chemical fertilizers, which require large amounts of energy during their manufacture. The industry uses energy to power manufacturing units and the urban complexes that support it Energy – demanding roads and railway lines are built to transport products from place to place and to reach raw materials in mines and forests.

There are three main types of energy : those classified as non - renewable, renewable and the nuclear energy.

Solar Energy

The sun pours as much energy onto the earth as we use in a whole year. If it were possible to harness their colossal quantum of energy, humanity would need no other source of energy. We have developed several methods of collecting this energy for heating water and generating electricity.

- Solar heating for homes – Modern houses that use air conditioning or heating are extremely energy dependent. A passive solar home or building is designed to collect the sun's heat through large, south - facing glass windows. In solar - heated buildings, sunspaces are built on the south side of the structure and act as large heat absorbers.

In energy - efficient architecture, the sun, water and wind are used to heat a building when the weather is cold and to cool it in summer.

- Solar Water heating – Most solar water - heating systems have two main parts the solar "Collector" and the "Storage Tank".
- Solar Cookers – The heat produced by the sun can be directly used for cooking by means of solar cookers. A solar cooker is a metal box, which is black on the inside to absorb and retain heat.

  India has the world's largest solar cooker program and an estimated 2 lakh families that use solar cookers.

- Other solar – powered devices – Solar desalination system (for converting saline or brackish water into pure distilled water) have been developed.
- Photovoltaic energy – The solar technology that has the greatest potential for use throughout the world is that of solar photovoltaic cells, which directly produce electricity from sunlight using photovoltaic (also called solar) cells.

  Solar cells use the sunlight, not its heat, to make electricity.
- Solar thermal electric power (STE) – Solar radiation can produce high temperature, which can generate electricity. Areas with low cloud levels of cover with little scattered radiation, as in the desert, are considered the most suitable sites.

CHAPTER - VI	Water Conservation, Rain water harvesting & Watershed management.

1.6 WATER CONSERVATION, RAIN WATER HARVESTING AND WATERSHED MANAGEMENT

Q1. Explain about the conservation of water.

Ans :

Conserving water has become a prime environmental concern clean water is becoming increasingly scarce globally. With deforestation, surface run-off increases and the sub-soil water table drops as water has no time to seep slowly into the ground once the vegetation is cleared.

As many areas depend on wells, it has become necessary to go on digging deeper and deeper wells. This adds to the cost and further depletes underground stores of water. This could take years to recharge even if the present rate of extraction is reduced, which seems hardly possible in most situations.

As deforestation and desertification spreads due to extensive changes in landuse, the once - perennial rivers are becoming increasing seasonal. In many areas, the small streams run dry soon after the monsoon as the water table drops further and further below surface.

Traditional systems of collecting water and using it optimally have been used in India for many generations. These have been forgotten in the recent part. Conserving water in multiple small percolation tanks and 'jheels' was an important feature of traditional forms of agriculture. Villages all the over the country had one or more common 'talabs' or tanks from which people collected or used water carefully.

Many homes had a kitchen garden that was watered by the wastewater. Conservation of water was done in traditional homes through a conscious effort.

During the British period, many dams were built across the country to supply water especially to growing urban areas. After independence, India's policy on water changed towards building large dams for expanding agriculture to support the green

revolution. While this reduced the need to import food material and mitigated food shortages in the country, the country began to see the effects of serious water shortages and problems related to its distribution.

- Saving water in agriculture – Drip irrigation supplies water to plants near its roots through a system of tubes, thus saving water. Small percolation tanks and rainwater harvesting can provide water for agriculture and domestic value. Rain water collected from rooftops can be stored or used to effectively recharge sub-soil aquifers.
- Saving water in urban settings – Urban people waste large amounts of water. Leaking taps and pipes are a major source of water loss. Canals and pipes carrying water from dams to the consumes contribute nearly 50% of water loss during transfer. Reducing the demand for water by saving it is more appropriate then trying to meet growing demands.

Q2. How do the Rainwater harvesting takes place ?

Ans :

As our world faces serious water shortages, every drop of water we can use efficiently becomes of great values, one method is to manage rainwater in such a way that it is used at the source. If as much water as possible is collected and stored, this can be used after the rainy season is over. The stored water has to be kept pollution – free and clean. So that it can be used as drinking water. Stored water can grow algae and zoo – plankton. This can be pathogenic and cause infections. Thus, keeping the water uncontaminated is of great importance.

Current technologies of rainwater harvesting require that all roof and terrace water passes down into a covered tank where it can be stored for use after the monsoon. This is most advantageous in arid areas where clean water is very scarce.

Another way of using rooftop rainwater harvesting is to collect it so that it percolates into the ground to recharge wells instead of flowing over the ground into rivers. Thus, by recharging the groundwater by water harvested from rooftops, the water table rises and the surrounding wells retain throughout the year.

The Mewar region of Rajasthan has a rich legacy of traditional water – harvesting systems to share the available water for cultivation.

Hembar

These are small temporary dams constructed with stones, twigs and mud over a seasonal stream, when water flows in it is reduced to a point that it cannot be taken directly to the fields for irrigation.

Chak

Chak is a big plot of land, usually a charnot or village pasture land, enclosed by stone boundary wall called a kot. Tree plantations, seeding of grass for fodder, contour bunds with trenches and loose stone check - dams are developed in chak.

Talab

The Mewar region is well-known for its built reservoirs. A small reservoir of less than five bighas is called talai, a medium - sized lake is called bandth or talab, and a bigger lake is called sages or samand.

Q3. Write about Watershed Management.

Ans :

The management of a single unit of land with its water drainage system is called watershed management. It is a technique that has several components. This includes soil and water management and developing vegetative cover. The natural drainage pattern of a watershed unity if managed properly, can bring about local prosperity by providing a year - round supply of water, thereby improving the quality of life in the area.

As it provides water throughout the year, this improves health in the community, as clean water becomes available. Watershed management enhances the growth of agricultural crops and even makes its possible to grow more than one crop in a year in dry areas.

Watershed management begins by taking control of a degraded site through local participation. People must appreciate the need to improve the availability of water both in quantity and quality for their own area.

Once this is adequately demonstrated the community begins to understand the project and people begin to work together to promote good watershed management.

The first technical step is to take appropriate soil conservation measures. This is done by constructing a series of long trenches and mounds along the contours of the hill to hold the rainwater and allow it to percolate into the ground. This ensures that

underground stores of water are fully recharged. This is enhanced by growing grasses and shrubs and planting trees, which hold the soil and prevents it from being washed away in the monsoon. Local grass cover can only increase if free grazing of domestic animals is regulated or replaced by stall feeding.

The next measure is to make nala plugs in the streams, so that the water is held in the stream and does not rush down the hillside. In selected sites, several small check-dams should be built, which together hold back larger amounts of water. All these measures constitute sound watershed management. It improves the water table and keeps the streams and nalas flowing throughout the year.

Short Question & Answers

1. Define Ecosystem.

Ans :

An ecosystem is a region with a specific and recognizable landscape form, such as a forest, grassland, desert, wetland or coastal area. The nature of the ecosystem is based on its geographical features like hills, mountains, plains rivers, lakes, coastal areas or islands.

2. What is biotic and abiotic component ?

Ans :

The geographical, climatic and soil characteristics form its non–living component known as abiotic component. This supports the community of plants and animals.

The living part of the ecosystem like plants and animals constitutes the biotic component.

3. What are producers ?

Ans :

Plants are the 'producers' in the ecosystems as they manufacture their food by using energy from the sun. They form communities. of plant life in the forest and tiny algal forms to large seaweed are in the sea.

4. Write about Primary Consumers and Secondary Consumers ?

Ans :

The herbivorous animals are 'primary consumers as they live on the producers, they are hare, deer and elephants, which graze on grass or feed on the foliage from trees.

The carnivorous animals are ' Secondary Consumers' which live on herbivores, they are tigers, leapards, jackals, foxes and small wild cats. In the sea, carnivorous fish live on other fish and marine animals.

5. What are Decomposers ?

Ans :

Decomposers or detrivores are a group of organisms consisting of small animals like worms, insects, bacteria and fungi, which breakdown dead organic material into smaller particles and finally into simpler substances that are used by plants as nutirition.

6. What is biodiversity ?

Ans :

Biological diversity deals with the degree of natures variety in the biosphere. Their variety can be observed at three levels – the genetic variability within a species; the variety of species within a community; and the organization of species in an area into distinctive plant and animal communities.

7. What is meant by Forest Protection Committees (FPS) and Van Suraksha Samiti (VSSs) ?

Ans :

FPCs and VSSs are the Forest Department which supported the villagers in the forests. The benefits of involving local people in protection of their resources were obvious. Illegal felling was checked. The use of forests resources for local use was monitored.

8. Write about Biodiversity at national level.

Ans :

Geological events in the landmass of Indian have provided conditions for high levels of biological diversity. Among the bio-rich nations, India is among the top 10 or 15 countires for its great variety of plants and animals, many of which are not found elsewhere. India has 350 different mammals, 1,200 species of birds, 453 species of reptiles and 45,000 plant species, of which most are angiosperms.

9. Write about the value of biodiversity.

Ans :

Biodiversity provides a variety of environmental services from its species and ecosystems that are essential at the global, regional and local levels. The production of oxygen, reduction of carbon dioxide, maintaining the water cycle and protecting soil are some important services.

10. Write about the productive use value of bio diversity.

Ans :

The new species of plants and animals are being constantly discovered in the wild. These wild species are the building blocks for the better of human life and their loss is a great economic loss to mankind.

The preservation of biodiversity has now become essential for industrial growth and economic development. A variety of industries, like pharmaceuticals, are highly dependent on identifying compounds of great economic value from the wide variety of wild species of plants located in undisturbed natural forests.

11. What is meant by Geothermal energy ?

Ans :

It is the energy stored within the earth. Geothermal energy starts with hot, motten rock (called magma) deep inside the Earth, which surfaces at some parts of the Earth's crust. The heat rising from the magma warms underground pools of water known as geothermal reserviors.

Geothermal energy is nearly as cheap as hydropower and will thus be increasingly utilized in future.

12. What is Energy Conservation ?

Ans :

Conventional energy sources have a variety of impacts an nature and human society. India needs to rapidly move into a policy to reduce energy needs and use cleaner energy production technologies. We could develop thousands of mini-dams to generate electricity.

Energy - efficient cooking stoves or chulas help the movement of air through it, so that the wood is burnt more efficiently. Biomass can be converted into biogas or liquid fuels, ie., ethanol and methanol.

We can conserve energy by preventing or reducing energy waste and by using resources more efficiently.

13. Write about the utilization of Resources ?

Ans :

The use of a resource begins with its collection, its processing into a usuable product, and transport through a delivery system, to the consumer who uses it. It also involves disposal of the waste products produced at each step. Each step in resource use can effect the environment for better or worse. The control of these steps is known as environmental management.

14. What are the Forest functions ?

Ans :

Watershed Production – Reducing the rate of surface run-off of water. Preventing flash floods and soil erosion and prolonged gradual run–off and thus safeguarding against drought.

- Erosion Control – Holding soil (by preventing rain from directly washing soil away)
- Maintaining soil nutrients and structure
- Minor forest produce fuel woods, fruit, gum, fiber etc., which are collected and sold in local markets as a source of income for forest dwellers.
- Major timber extraction for construction, industrial uses, paper pulp etc.,

15. What is Mine – safety.

Ans :

Mining is a hazardous occupation and the safety to mine workers is an important environmental consideration of the inudstry. Surface mining is less hazardous than underground mining and metal mining is less hazardous them coal mining. In all underground mines rock - and roof - falls, flooding and inadequate ventilation are the greatest hazards. Most miners have suffered from disasters due to the use of explosives in metal mines. Radiation is a life – threatening hazard in uranium mines.

16. Write about the importance of conserving water ?

Ans :

Conserving water has become a prime environmental concern. Clean water is becoming increasingly scarce globally. With deforestation surface run-off increases and the sub-soil water table drops as water has no time to seep slowly into the ground once

the vegetation is cleared. As many areas depend on wells, it has become necessary to go on digging deeper and deeper wells. This adds to the cost and further deputes underground stores of water. Water has to be equitably and fairly distributed so that household use, agriculture and industry all get a share of the water. Thus, water conservation is linked closely with overall human well-being.

Traditional systems of collecting water and using at optimally have been used in India for many generations. Conserving water in multiple small percolation tanks and 'jheels' was an important features of traditional forms of agriculture.

17. Write about the principles of watershed management ?

Ans :

This is a land management program that looks at a region from the perspective of all its water - related issues. It can be used to manage a river from its source to its termination. Watershed management could also consider the management of a single valley as a unit, based on its small streams. Deforestation is a major cause of poor water supply. Afforesting such degraded areas is another important aspect of watershed management.

18. Mention few of rainwater harvesting programmes.

Ans :

Saza Kuva

This is an open dug well, which has several owners. In Mewari language saza means 'partner'. This is an important method for irrigation in the Aravalli hills.

Medhbandi

This is a stone embankment built on a hill – slope to help create a level field for cultivation. It controls erosion and conserves moisture.

Hembar

These are small temporary dams constructed with stones, twigs and mud over a seasonal stream, when water flows in it is reduced to a point that it cannot be taken directly to the fields for irrigation.

Q19. What is a biosphere.

Ans:

The term biosphere refers to the living components on the earth. It includes the lithosphere, hydrosphere, atmosphere, cryosphere, anthrosphere, etc. The earth's biosphere is made up of different types of ecosystems which support all life forms. The

continued functioning of the biosphere depends on the interaction and interdependency of the biotic and abiotic components in nature, all of which are crucial to the stability of communities and ecosystems.

Q20. What is species diversity?

Ans :

Species diversity refers to the number of species in a habitat or a region or an area along with their relative abundance. For example, a rainforest consists of many thousands of species of different animals and plants, whereas a boreal forest may support fewer number of species.

Q21. List the biogeographic regions in India.

Ans:

The biographic regions in India are,

(i) The Trans Himalayas

(ii) The Himalayas

(iii) The Indian Desert

Q22. What is wildlife poaching.

Ans:

Wildlife poaching refers to illegal hunting of wild animals and plants, generally for commercial trade. This has resulted in raising serious concerns for decline in wild flora and fauna worldwide, species loss and extinctions. The species endangered by illegal trade include leopard, sambar, spotted bear, antelopes, tortoises, some snakes, one-homed rhinoceros, antelopes, plant species including red sanders, agar wood, kuth roots, etc.

Q23. What are genetic banks?

Ans :

Genetic banks are the frozen vaults meant for preserving the genetic material of thousands of different types of organisms at cryogenic temperatures to increase the shelf life of the organism's genetic material. Researchers preserve genetic information cryogenically to enable future cloning. The types of specimens frozen are sperms, eggs, hair, skin, blood of animals etc.

Fill in the Blanks

1. _____ is a multidisciplinary approach that brings about an appreciation of our natural world and human impact on its integrity.

Ans : Environmental Studies

2. _____ non-renewable resources.

Ans : Mineral and Oil

3. Forests are vanishing very rapidly due to _____.

Ans : Deforestation

4. _____ causes the atmospheric levels of heat-trapping carbon dioxide and continue to rise high and higher.

Ans : Green House Effect

5. _____ may fall due to air pollution by the emissions of surplus dioxide and nitrogen oxide.

Ans : Acid Rain

6. The world environment is derived from an old french word _____ means encircle.

Ans : Environ

7. The sum of all physical, chemical, biological and social factors which compose the surroundings of man is referred to as _____.

Ans : Environment

8. _____ is defined as a form of energy / matter which is essential for functioning of organisms, populations & ecosystems.

Ans : Resource

9. Resources are classified as _____ and _____ resources.

Ans : Biotic and abiotic

10. _____ is a renewable resources on a human time scale as it is essentially in exhaustible.

Ans : Solar energy

11. _____ acts as a resource producers and processes.

Ans : Ecosystems

12. Water and biological living resources are considered as _____.

Ans : Renewable

13. The flow of energy in the ecosystem is _____ or _____.

Ans : Unidirectional, Non-cyclic

14. The biological community consists of a numbers of _____ and _____.

Ans : Organisms, Populations

15. Ecosystem may also be regarded as _____.

Ans : Energy processing unit

16. _____ provides organisms found within ecosystems with carbondioxide for photosynthesis and oxygen for respiration.

Ans : Atmosphere

17. _____ provides the energy for plant growth and metabolism and organic food for other forms of life.

Ans : Photosynthesis

18. Ecosystem consists of a variety of living organisms, which are classified as _____.

Ans : Producers, Consumers and Decomposes

19. _____ organisms can manufacture the food and as sources of energy and nutrients.

Ans : Producers / Autotrophs

20. Producers are _____ which prepare their food through photosynthesis.

Ans : Plants

21. _____ get this energy and nutrients by feeding directly or indirectly on producers.

Ans : Consumers / Heterotrophs

22. _____ are consumers that eat plants for their energy and nutrients.

Ans : Herbivores

23. Organisms that feed on herbivores are _____.

Ans : Carnivores

24. Consumer organisms that feed on organic matter or detritus are _____.

Ans : detrivores or decomposers

25. Members of autotrophic component are known as _____.

Ans : Producers

27. _____ and _____ are carnivores / omnivores.

Ans : Secondary and Tertiary Consumers

28. Bacteria, actinomycetes and fungi are _____.

Ans : Saprotrophs

29. In nature the two food chains are _____ and _____.

Ans : Razing and detritus

30. _____ food chain starts from living green plants $\rightarrow$ grazing herbivores $\rightarrow$ carnivores.

Ans : Grazing

31. Food chains which are interconnected with each other forming inter locking pattern is referred as _____.

Ans : Food web

32. _____ are basic units of ecosystem ecology.

Ans : Food web

33. The trophic structure and function at successive trophic levels, i.e., producers $\rightarrow$ herbivores $\rightarrow$ carnivores may be shown graphically by _____.

Ans : Ecological pyramids

34. Flow of energy can be explained by means of _____ and _____.

Ans : Single channel model and Y-shaped energy model

35. _____ indicates two food chains i.e., grazing and detritus food chain.

Ans : Y-shaped model

36. _____ is the basis of all organic molecules.

Ans : Carbon

37. _____ is critically important element for all life.

Ans : Nitrogen

38. _____ is an important nutrient for organisms.

Ans : Sulfur

39. The macro nutrients are _____.

Ans : C, H, O, P and N

40. _____ is a process through which ecosystems tend to change over a period of time.

Ans : Ecological succession

41. _____ is the part of nature which includes differences in genes among the individuals of a species.

Ans : Biological diversity

42. Animal or plant species that differes widely from other individuals in genetic makeup is _____

Ans : Genetic diversity

43. The diversity in wild species forms the _____ from which our crops and domestic animals developed.

Ans : Gene pool

44. NTFP's means _____.

Ans : Non-timber forest products

45. The number of species of plants and animals present in a region constitutes _____.

Ans : Species diversity

46. Globally - accepted national 'hotspots' are in the forests of _____ and _____.

Ans : North - east and Western Ghats

47. _____ in Indian waters surround the Andaman and Nicobar Islands.

Ans : Coral reefs

48. _____ is a network of insitu conservation.

Ans : National parks & Wildlife Sanctuaries

49. Conservation of species outside its natural habitat is _____.

Ans : Exsitu Conservation

50. The Andaman & Nicobar Islands alone have _____ of flowering plants and _____ firms.

Ans : 2200 species & 120 species

51. _____ is a naturally occurring substances of definite chemical composition and identifiable physical properties.

Ans : Mineral

52. Non-metallic resources are _____.

Ans : Coal, Salt, Clay

53. _____ primary energy source in our lives.

Ans : Sun

54. JFM means _____

Ans : Joint Forest Management

55. VFC is _____ .

Ans : Village Forest Committees

56. Mines are of two types _____ and _____.

Ans : Strip mines and Shaft mines

57. Energy is defined as capacity to do _____.

Ans : Work

58. Mineral resources are classified as _____, _____ and _____.

Ans : Metallic, Non-metallic and Atomic minerals

59. _____ is the kinetic energy of wind.

Ans : Wind power

60. _____ is composed of more than a hundred different hydro carbon compounds.

Ans : Crude oil

61. _____ has become a prime environmental contain.

Ans : Conserving water

62. _____ and _____ spreads due to extensive changes in landuse.

Ans : Deforestation and desertification

63. _____ was an important feature of traditional forms of agriculture.

Ans : Small percolation tanks and jheels

64. Villages all over the country had one or more common _____.

Ans : Talabs or tanks

65. _____ is the method to manage rain water to used as the source.

Ans : Rainwater harvesting

66. The management of a single unit of land with its water drainage system is _____.

Ans : Watershed management

67. The first technical step in watershed management is _____.

Ans : Soil conservation measures

68. _____ supplies water to plants near its roots through a system of tubes.

Ans : Drip irrigation

69. Rain water collected from rooftops can be stored or used to effectively recharge _____.

Ans : Sub-soil aquifers

70. _____ increases the surface run-off and the sub-soil water table drops.

Ans : Deforestation

Multiple Choice Questions

1. Plants are food for [b]

   (a) Carnivores (b) Herbivores

   (c) Decomposes (d) None

2. Plants are [a]

   (a) Producers (b) Consumers

   (c) Both (a) and (b) (d) None

3. Carnivorous animals are [b]

   (a) Primary consumers (b) Secondary consumers

   (c) Decomposes (d) None

4. Small animals like worms, insects, bacteria and fungi are included in [d]

   (a) Producers (b) Carnivores

   (c) Herbivores (d) Detrivores

5. The plants, animals and non-living components of environment like soil, air and water together constitute. [b]

   (a) Ecology (b) Ecosystem

   (c) Environment (d) None

6. Carbon dioxide is absorbed by plants and oxygen is released into atmosphere during [c]

   (a) Respiration (b) Digestion

   (c) Photosynthesis (d) All above

7. Both the abiotic and biotic parts of ecosystems includes the element. [a]

   (a) Carbon (b) Nitrogen

   (c) Sulphur (d) None

8. _____ is absorbed by plants and animals from air during respiration. [b]
   (a) Nitrogen (b) Oxygen
   (c) Carbon dioxide (d) All

9. Nitrogen fixing bacteria and fungi in the soil absorb by plants as [c]
   (a) Nitrogen (b) Nitrous oxide
   (c) Nitrates (d) All above

10. _____ is based on the flow of energy through the ecosystem. [b]
   (a) Ecology (b) Energy cycle
   (c) Both (a) and (b) (d) None

11. The different plant and animal species are linked to one another through. [a]
   (a) Food chains (b) Energy flow
   (c) Water (d) None

12. The thousands of interrelationships in nature through interlinked chains is [a]
   (a) Food web (b) Food pyramid
   (c) Both (a) and (b) (d) None

13. Energy in ecosystem is depicted in the form of [a]
   (a) Food pyramid (b) Food chains
   (c) Food web (d) None

14. _____ are considered are the secondary consumers [a]
   (a) Predators (b) Producers
   (c) Carnivores (d) None

15. Each step of food web is _____. [b]
   (a) Energy level (b) Trophic level
   (c) Both (a) and (b) (d) None

16. In presence of sunlight, plants synthesis _____ from carbon. [a]
   (a) Carbohydrates (b) Vitamins
   (c) Proteins (d) All

17. _____ are a part of plant's metabolism to form new plant proteins. [b]

(a) Carbon (b) Nitrates

(c) Sulfur (d) Oxygen

20. _____ is a renewable resource [a]

(a) Solar energy (b) Electrical

(c) Chemical (d) All

21. Non renewable energy resources are [a]

(a) Coal, oil and natural gas (b) Sun

(c) Crops (d) None

22. In exhaustible resources are [c]

(a) Unlimited and Unending (b) Quantity may not be degraded

(c) Both (a) and (b) (d) None

23. Exhaustible resources are [c]

(a) Limited

(b) Quantity and Quantity may be degraded

(c) Both (a) and (b)

(d) None

24. Crude oil is composed of more than a hundred different _____ compounds. [a]

(a) Hydrocarbons (b) Fertilizers

(c) Natural gas (d) All

25. The protective layers of trophosphere [a]

(a) Ozone (b) Biosphere

(c) Stratosphere (d) None

26. Heat from within the earth. [a]

(a) Geothermal energy (b) Thermal energy

(c) Biomass (d) All the above

27. _____ uses renewable biomass resources to produce an array of energy related products like electricity [a]

(a) Bioenergy (b) Geothermal energy

(c) Both (a) and (b) (d) None

28. From flowing or falling water the _____ energy is formed [a]

(a) Hydroelectric energy (b) Solar energy

(c) Thermal energy (d) All

29. Geothermal and tidal power comes from [a]

(a) Sun (b) Earth

(c) Stars (d) None

30. Energy from waves, tides or temperature differences in the ocean is [a]

(a) Ocean energy (b) Solar energy

(c) Bio energy (d) None

31. The most distinctive richest, rarest natural areas are referred as [a]

(a) Global 200 (b) Global 201

(c) Both (a) and (b) (d) None

32. Globally - accepted national _____ are in forests of North - East and Western Ghats, which are one of world's most bio-rich areas [a]

(a) Hotspots (b) Mega Diversity

(c) Minor diversity (d) None

33. Countries having a relatively large proportion of biodiversity hotspots are referred as [a]

(a) Mega - diversity nations (b) Hot spots

(c) Global 200 (d) None

34. There are about _____ million species of plant and animals known in world. [b]

(a) 2 million (b) 1.8 million

(c) 1.9 million (d) 2.1 million

35. _____ includes the variety of industries like pharmaceuticals in identifying compounds of great economic value. [a]

(a) Biological prospecting (b) Biodiversity

(c) Both (a) and (b) (d) None

36. _____ manipulates genes into better medicines and a variety of industrial products. [a]

(a) Modern biotechnolgoy (b) Diversity

(c) Ecology (d) None

37. _____ is described as a specific geographical region or a political entity. [b]

(a) Ecology (b) Ecosystem diversity

(c) Biodiversity (d) None

38. _____ are spaces left due to extinction of species. [a]

(a) Niches (b) Generations

(c) Changes (d) None

39. Long Western and Eastern Coastal belt are with _____ and _____. [a]

(a) Forests and Mangrooves (b) Coral reefs

(c) Both (a) and (b) (d) None

40. Conservation of a species done by protecting its habitat of all species is [b]

(a) Ex-situ conservation (b) In-situ conservation

(c) Both (a) and (b) (d) None

41. Forests are home to _____ of earth's species. [a]

(a) 50% – 90% (b) 60% – 70%

(c) 80% – 90% (d) None

42. Forests play crucial role in regulation of _____ and _____. [a]

(a) Global climate and temperature

(b) Photosynthesis and resperation

(c) Both (a) and (b)

(d) None

43. _____ are one of the most productive and biological ecosystems in world providing habitat. [a]

(a) Mangroove forests (b) Terrestrial forests

(c) Both (a) and (b) (d) None

44. The total forest cover of the country has been estimated to be _____. [b]

(a) 57 million ha (b) 63.73 million ha

(c) 60 million ha (d) None

45. _____ are obtained from the earth through the process of mining [c]

(a) Water (b) Food

(c) Minerals (d) All

46. _____ is mineralized rock containing a valued metal such as gold, copper or other mineral [c]

(a) Sound (b) Rock

(c) Ore (d) All

47. _____ is the unit of energy in the conventional SI system. [c]

(a) Gram (b) Kilogram

(c) Joule (d) Micro gram

48. _____ is defined as the rate at which work is done. [b]

(a) Energy (b) Power

(c) Both (a) and (b) (d) None

49. Combustion of _____ is the main source of energy and responsible for pollecting natural environment. [a]

(a) Fossil fuels (b) Biomass

(c) Coal (d) None

50. Coral limestone for industrial use are mined from sea bed at _____ and _____. [b]

(a) AP and MP (b) Tamilnadu & Gujarat

(c) Kerala & Karnataka (d) UP and MP

51. _____ and _____ are often more economical and environmentally sound ways to prevent flood damage. [a]

(a) Watershed management and conservation

(b) Forest conservation and deforestation

(c) Both (a) and (b)

(d) None

52. A series of _____ on tributory streams can hold back water before it becomes a great flood. [c]

(a) Rivers (b) Nalas

(c) Small dams (d) None

53. _____ and _____ practices reduce runoff water. [a]

(a) Sound farming and forestry (b) Forestry

(c) Sound farming (d) None

54. _____ is a land-based programme to increase agricultural productivity. [b]

(a) Rainwater harvest (b) Watershed management

(c) Conservation (d) None

55. _____ is the term applied to water that flows away from the catchment area after falling an its surface in form of rain. [a]

(a) Run-off (b) Drain off

(c) Evaporate (d) None

56. A _____ or _____ is all the land drained by a stream or river. [a]

(a) Watershed, Catchment (b) Rainwater, River water

(c) Streams of lakes, River (d) None

57. _____ is a finite and non-renewable resource. [c]

(a) Water (b) Heat

(c) Soil (d) None

58. _____ formed by the dams provide useful wildlife habitat and stock-watering facilities. [c]

(a) Rivers (b) Ocean

(c) Ponds (d) None

59. _____ is naturally soft, contains almost no dissolved miners or salts. [a]

(a) Rain water (b) Ocean water

(c) River water (d) All of the above

60. ICRISAT is [a]

(a) International Crop Research Institute for Semi Arid Tropics

(b) Indian Crop Research Institute for Semi - Arid Trophies

(c) International Cultural Research Institute for Social - Activities & Traditions

(d) None

UNIT - II

Environmental Pollution, Global Issues and Legislation

Chapter - 1

Causes, Effects & Control measures of Air Pollution, Water Pollution.

Chapter - 2

Solid Waste Management

Chapter - 3

Global Warming and Ozone layer depletion.

Chapter - 4

Ill-Effects of Fire-works

Chapter - 5

Disaster management - floods, earthquakes and cyclones

Chapter - 6

Environmental legislation : - (a) Wild life Protection Act

(b) Forest Act (c) Water Act (d) Air Act

Chapter - 7

Human Rights

Chapter - 8

Women and Child Welfare

Chapter - 9

Role of Information technology in environment and human health

CHAPTER - I Causes, Effects and Control measures of Air Pollution, Water Pollution

2.1 CAUSES, EFFECTS AND CONTROL MEASURES OF AIR POLLUTION, WATER POLLUTION

Q1. Describe in detail about the Air Pollution.

Ans :

The origin of air pollution on the earth can be traced back to the times when man started using firewood as a means of cooking and heating. With the discovery and increased use of coal, air pollution became more pronounced especially in urban areas.

Air pollution began to increase in the beginning of the 20th century with the development of transportation systems and large - scale use of petrol and diesel. The severe air quality problems due to the formation of petrochemical smog from the combustion residues of diesel and petrol engines were felt for the first time in Los Angels. Pollution due to auto-exhaust remains a serious environmental issue in many developed and developing countries, including India.

The Air Pollution Control Act in India was passed in 1981 and the motor vehicle act for controlling air pollution was passed very recently.

These laws are intended to prevent the air from becoming ever – polluted.

The greatest industrial disaster leading to serious air pollution took place in Bhopal, where the extremely poisonous methyl isocyanide gas was accidentally released from the union Carbide's pesticide manufacturing plant, on the night of December 2nd, 1984. The effects of this disaster on human health and the soil are felt even today.

Air pollution occurs due to the presence of undesirable solid or gaseous particles in the air, in quantities that are harmful to human health and the environment. The air may became polluted by natural causes such as volcanos, which release ash, dust, sulphur and other gases or by forest fires that are occasionally naturally caused by lightening. However, unlike pollutants tend to remain in the atmosphere for a short time and do not lead to permanent atmosphere change.

Pollutants that are emitted directly from identifiable sources are produced both by natural events (eg – dust storms and volcanic eruptions and human activities (emission from vehicles, industries etc.,) These are called primary pollutants. There are five primary pollutants that together contribute to about 90% of the global air pollution.

The pollutants that are produced in the atmosphere when certain chemical reactions take place among the primary pollutants are called secondary pollutants. Eg – Sulfuric acid, nitric acid, carbonic acid etc.,

Lead is major air pollutant that remains largely unmonitored and is emitted by vehicles. High lead levels have been reported in the ambient air in metropolitan cities. Leaded petrol is the primary source of air - borne lead emissions in Indian cities.

Pollutants are also found indoors from the infiltration of polluted outside air and from various chemicals used for produced inside buildings. Both indoor and outdoor air pollution are equally harmful.

Q2. What are the sources and effects of air pollution?

Ans :

The air may become polluted by natural causes like volcanos that release ash, dust, sulphur and other gases or by forest fires that are occasionally naturally caused by lightening.

Sources of Air Pollution

- Carbon monoxide is a colorless, odorless and toxic gas produced when organic materials, like natural gas, coal or wood are incompletely burnt. Vehicular exhausts are the single largest source of carbon monoxide. The number of vehicles has been increasing over the years all over the world. Many vehicles are also poorly maintained and several have inadequate pollution control equipment resulting in the release of greater amounts of carbon monoxide.
- Sulphur oxides are produced when sulfur containing fossil fuels are burnt.
- Nitrogen oxides are found in vehicular exhausts. Nitrogen oxides are significant, as they are involved in the production of secondary air pollutants such as ozone.
- Hydro carbons are a group of compounds consisting of carbon and hydrogen atoms. They either evaporate from fuel supplies or are remnants of fuel that did not burn completely. Hydrocarbons are washed out of the air when it rains and run into surface water. They cause an oily film on the surface and do not as such cause a serious issue until they react to form secondary pollutants.

- Particulates are small pieces of solid material (eg – smoke particles from fires, bits of asbestos, dust particles and ash from industries) dispersed into the atmosphere. The effects of particulates range from soot to the carcinogenic effects of asbestos, dust particles and ash from industrial plants that are dispersed into the atmosphere.
- Lead is a major air pollutant that remains largely unmonitored and is emitted by vehicles. High lead levels have been reported in the ambient air in metropolitan cities. Leaded petrol is the primary source of air – borne lead emissions in Indian Cities.

Effects of Air Pollution

Once pollutants enter the troposphere they are transported downwind, diluted by the large volume of air, transformed through either physical or chemical changes

Effects on living organisms

Our respiratory system has a number of mechanisms that help in protecting us from air pollution.

Effects on living organisms

Our respiratory system has a number of mechanisms that help in protecting us from air pollution. Prolonged smoking or exposure to air pollutants can overload or breakdown the natural defenses causing or contributing to diseases such as lung cancer, asthma, chronic bronchitis and emphysema. Carbon monoxide in heavy traffic causes headaches, drowsiness and blurred vision, in large doses, it can even cause death by carbon monoxide poisoning. Sulphur dioxide irritates the respiratory tissues, chronic exposure to it causes a condition similar to bronchitis.

Effects on plants

When some gaseous pollutants enter the leaf pores they damage the leaves of crop plants. Chronic exposure of the leaves to air pollutants can break down the waxy coating that helps prevent excessive water loss and lead to damage from diseases, pests, drought and frost. Prolonged exposure to high levels of several air pollutants from iron smelters, coal – burning power plants and industrial units as well as from vehicles, can damage trees and other plants.

Effects on materials

Air pollutants break down the exterior paint on cars and houses. All over the world, air pollutants have discolored irreplaceable monuments, historic buildings, marble statues and other heritage and natural beauty sites.

Effects on Stratosphere

Ozone is a form of oxygen with three atoms instead of two. It is produced naturally from the photo dissociation of oxygen gas molecules in the atmosphere. The ozone, thus formed, is constantly broke down by naturally – occurring processes that maintain its balance in the ozone layer. In the absence of pollutants the creation and breakdown of ozone are purely governed by natural forces, but the presence of certain pollutants can accelerate the breakdown of ozone.

Q3. Describe in detail about the water pollution.

Ans :

Water is the essential element that makes life on earth possible. Without water there would be no life. We usually take water for granted.

Although 71% of the earth's surface is covered by water, only a tiny fraction of this water is available to us as freshwater.

The water that is found in streams, rivers lakes, wetlands and artificial reservoirs is called surface water. Water that percolates into the ground and fills the pores in soil and rock is called ground water. Any pollutant that is discharged onto the land above is also pulled into the pores of soil and pollutes the ground water resulting in polluted water in the nearby wells.

When the quality or composition of water changes directly or indirectly as a result of man's activities such that it becomes unfit for any purpose it is said to be polluted.

Points sources of pollution

When a source of pollution can be readily identified because it has a definite source and place where it enters the water it is said to come from a point source. Eg – municipal and industrial discharge pipes.

When a source of pollution cannot be readily identified, such as agricultural runoff, acid rain, etc., they are said to be non – point sources of pollution.

- Ground water pollution – While oil spills are highly visible and often get a lot of media attention, a much greater threat to human life comes from our ground water, which is used for drinking and irrigation, being polluted. Ground water flows are slow and not turbulent, thus, the contaminants are not as effectively diluted and dispersed as by surface water.
- Urban run–off of untreated or poorly treated waste water and garbage.
- Industrial waste storage located above or near aquifers.
- Poorly designed and inadequately maintained septic tanks.
- Mining wastes.

Severe cases of arsenic poisoning from contaminated ground water have been reported from West Bengal in what is known today as the worst case of groundwater pollution.

Indians have always had a tradition of venerating their rivers. Urbanization, industrialization, excess withdrawal of water, agricultural run-off, improper agricultural practices and various religious and social practices all contribute to river pollution in India.

Q4. What are the causes of water pollution ?

Ans :

There are several classes of common water pollutants. These are disease – causing agents (pathogens), which include bacteria, viruses, protozoa and parasite worms that enter water from domestic sewerage and untreated human and animal wastes. Large amounts of human waste in water increases the number of these bacteria, which cause gastrointestinal diseases.

Another category of water pollutants is oxygen – depleting wastes. These are organic wastes that can be decomposed by aerobic (oxygen–requiring) bacteria, large populations of bacteria use up the oxygen present in the water in order to degrade these wastes. In the process, this degrades the water quality. The amount of BOD in the water is an indicator of the level of pollution.

The third class of pollutants is in organic plant nutrients. These are water soluble nitrates and phosphates that cause the excessive growth of algae and other aquatic plants. This may interfere with the use of the water by clogging up water - intake pipes, changing the taste and smell of the water and causing a building of organic matter. As the organic matter decays, the oxygen levels decrease and fish and other aquatic species die.

The chemicals in fertilizers and pesticides pollutes the soil and water. The pesticides that enter water bodies are introduced into the aquatic food chains and then are absorbed by phytoplanktons and aquatic plants. These plants are eaten by the herbivorous fish, which are in turn eaten by the carnivorous fish, which are inturn eaten by the water birds.

One of the effects of accumulation of high levels of pesticides, such as DDT, is that bird lay eggs with shells that are much thinner than normal. This results in the premature breaking of these eggs, killing the immature chicks inside.

A fourth class of water pollutants is water soluble inorganic chemicals, which are acids, salts and compounds of toxic metals such as mercury and lead. High levels of these chemicals can make the water unfit to drink, harm fish and other aquatic life, reduce crop yields, and accelerate the corrosion of equipment that is in contact with this water.

Water - soluble radioactive isotopes are yet another source of water pollution. These can be concentrated in various tissues and organs as they pass through food chins and food webs. These ionizing radiation emitted by such isotopes can cause birth defects, cancer and genetic damage.

The hot water released by power plants and industries that use large volumes of water to cool the plant, results in a rise in temperature of the local water bodies, thermal pollution occurs due to this.

Oil is washed into the surface water in the run-off from roads and parking lots which also pollutes groundwater. The leakage from underground tanks is another source of pollution Accidental oils spills from large transport tankers at sea have been causing significant environmental damage.

Though accidents such as the exxon valdez get worldwide attention, much more oil pollution takes place as a result of small, regular releases from other less visible source. Nearly two - thirds of all marine oil pollution comes from three sources : run-off from the streets, improper discharge of lubricating oil from machines or automobile crankcases, and intentional oil discharges that occur during the loading and unloading of tankers. Oil tankers often use seawater as ballast to stabilize the ship after they have discharged their oil. This oil contaminated water is then discharged back into the sea when the tanker is refilled.

Q5. What are the control measures of air pollution.

Ans :

Air pollution can be controlled by two fundamental approaches : Preventive techniques and effluent control.

One of the effective means of controlling air pollution is to have proper equipment in place. This includes devices for removal of pollutants from the flue gases through scrubbers, closed collection recovery systems, the use of dry and wet collectors, electrostatic precipitators etc.,

Building higher smoke – stacks facilitates the discharge of pollutants as far away from the ground as possible. Industries should be carefully located so as to mining the effects of pollution after considering the topography and the wind directions. The substitution of raw materials that cause more pollution with those that cause less pollution will also help.

The world health organization (WHO), which rates only the mega - cities of the world, has rated New Delhi as the fourth most to other cities in India, Delhi is not at the top of the list of polluted cities. Our country has several pollution hotspots.

When air quality monitoring began in India in the late 1960's planners focused only a few pollutants namely sulfur dioxide nitrogen oxides and SPM other pollutants such as carbon monoxide and lead were monitored only a limited scale. The threat from other air toxins like benzene, ozone and other small particulates is unknown as these are not monitored at all. A database on ambient air quality in Indian cities has been prepared by the monitoring networks of the national Environmental Engineering Research Institute (NEERI), Nagpur. The CPCB initiated its own national Ambient Air quality Monitoring (NAAQM) program in 1985. Data to the NAAQM is supplied by the respective state pollution control Boards (SPCBs), which is then transmitted to the CPCB. Experts feel that the present air quality – monitoring network cannot capture the true profile of urban air pollution due to the lack of adequate monitoring stations.

Legal aspects air pollutions control in India

The Air (Prevention and Control of Pollution) Act was legislated in 1981. The Act provided for the prevention, control and abatement of air pollution. In the areas notified under this Act, no industrial pollution - causing activity could come up without the

permission of the concerned SPCB. But this Act was not strong enough to play a precautionary or a corrective role. After the Bhopal disaster, a more comprehensive Environment Protection Act (EPA) was passed in 1986. This Act, for the first time, conferred enforcement agencies with necessary punctive powers to restrict any activity that can harm the environment. To regulate vehicular pollution, the Central Motor Vehicles Act of 1939 was amended in 1989. following this amendment the exhaust emission rules for vehicles owners were notified in 1990 and the mass emission norms have been further revised for 2000.

Some of the suggestions include;

- Putting a greater emphasis on pollution prevention rather than control.
- Reducing the use of fossil fuels.
- Improving the quality of vehicular fuel.
- Increasing the use of renewable energy.

CHAPTER - II Solid Waste Management

2.2 SOLID WASTE MANAGEMENT

Q1. What are the causes and characteristics of Solid Waste ?

Ans :

In ancient cities, food scraps and other wastes were simply thrown into the unpaved streets where they accumulated. Around 320 B.C. in Anthens, the first known law forbidding this practice was established and a system of waste removal began to evolve in several eastern Mediterranean cities. The initial disposal methods were very crude and were often pits outside the city walls. As populations increased, efforts were made to transport, the wastes out further away from cities, thus creating city dumps. Disposal of municipal solid waste did not attract much public attention.

Around most towns and cities in India, the approach roads are littered with multicolored plastic bags and other garbage.

The lack of space for dumping solid waste has become a serious problem in several cities and towns all over the world. The disposal of solid waste should be part of an integrated waste management plan. The method of collection, processing resource recovery and the final disposal should be synchronized to achieve a common objective.

Characteristics of municipal solid waste

Solid wastes are grouped or classified in several different ways. These different classifications are necessary to address the complex challenges of solid waste management in an effective manner. The term Municipal Solid Waste (MSW) is generally used to describe most of the non - hazardous solid waste from a city, town or village that require routine collection and transport to a processing or disposal site. Source of MSW include private homes, commercial establishments and institutions, as well industrial facilities. However, MSW does not include wastes from industrial processes, construction and demolition debris, sewage sludge, mining wastes or agricultural wastes.

Municipal solid waste contains a wide variety of materials. It can contain food waste (like vegetable and meat materials leftover food eggshells etc.,) which is classified as wet garbage as well as paper, plastic, tetrapacks, plastic cans, newspapers glass bottles, cardboard boxes, aluminium foil, metal items, wood pieces etc., which is classified as dry garbage.

Q2. What is meant by Hazardous wastes ? What are the various types of hazardous wastes ?

Ans :

Modern society produces large quantities of hazardous waste that are generated by chemical manufacturing companies, petroleum refineries, paper mills smelters and other industries.

Hazardous wastes are those that can cause harm to humans or the environment.

Features and Types of hazardous wastes

A waste is classified as a hazardous waste if it exhibits any of four primary characteristics based on the physical or chemical properties of toxicity, reactivity, ignitability and corrosivity. In addition to this, waste products that are either infectious or radioactive are also classified as hazardous.

Toxic wastes are those substances that are poisonous even in very small or trace amounts. Some may have acute or immediate effect causing death or violent illness and others may have a chronic or long - term effect slowly causing irreparable harm to the exposed persons.

- Reactive wastes are those that have a tendency to react vigorously with air or water, are unstable to shock or heat, generate toxic gases, or explode during routine management. Eg : gunpowder, nitroglycerine, etc.,
- Ignitable wastes are those that burn at relatively low temperatures and are capable of spontaneous combustion during storage, transport or disposal. Eg : gasoline, paint thinners and alcohol
- Corrosive wastes are those that destroy materials and living tissue by chemical reaction. Eg : acids and bases.

- Infectious wastes include human tissue from surgery, used bandages and hypodermic needles, microbiological materials etc.,
- Radioactive waste is basically the output from the nuclear power plants and can persist in the environment for thousands of years before it decays appreciably.

Q3. Discuss about the control measures of urban and industrial wastes.

Ans :

It includes three main components :

- Source reduction
- Recycling
- Disposal

Source reduction is one of the fundamental ways to reduce waste. This can be done by using less material when making a product, reusing products on site, designing products or packaging to reduce their quality. We can reduce the use of unnecessary items while shopping, buy items with minimal packaging, avoid buying disposable items and also avoid asking for plastic carry bags.

Recycling is reusing some components of the waste that may have some economic value. Recycling has readily visible benefits like conserving resources, reducing energy used during manufacture and reducing pollution levels. Some materials, such as aluminium and steel can be recycled many times. Metal, paper, glass and plastics are recyclable paper recycling can also help pressure forests, as it takes about 17 trees to make one ton of paper. Crushed glass (cullet) reduces the energy required to manufacture new glass by 50%. Cullet lowers the temperature requirement of the glass making process thus conserving energy and reducing air pollution.

The problems associated with recycling are either technical or economical. Plastics are difficult to recycle because of the different types of polymer resins used in their production. Since each type has a distinct chemical composition, different plastics cannot be recycled together. Thus, separation of different plastics before recycling is necessary.

In recycled paper, the fiber is banned for use in food containers to prevent the possibility of contamination.

Disposal of solid waste is done most commonly through a sanitary landfill or through incineration. A modern sanitary landfill is a depression in an impermeable soil layer that is lined with an impermeable membrane. The three key characteristics of a municipal sanitary landfill that distinguish it from an open dump are :

- Solid waste is placed in a suitably selected and prepared landfill site in a carefully prescribed manner.
- The waste material is spread out and compacted with appropriate heavy machiner.
- The waste is covered each day with a layer of compacted soil

The problems with older landfills are usually associated with ground water pollution.

Q4. Discuss about the Health risks and environmental problems associated with hazardous wastes.

Ans :

As most of the hazardous wastes are disposed of on or in land, the most serious environmental effect is contaminated groundwater.

Pesticides are used increasingly to protect and increase food production. They form the residues in the soil that are washed into stream which then carry them forward. The residues may persist in the soil or in the bottom of lakes and rivers. Exposure can occur through ingestion, inhalation and skin contact, resulting in acute or chronic poisioning. We have an alternative to the excessive use of pesticides through the use of Integrated Pest Management (IPM) the IPM system uses a wide variety of plants and insects to create a more natural process.

Lead, Mercury and arsenic are hazardous substances, which are often referred to as heavy metals. Lead is an abundant heavy metal and is relatively easy to obtain. It is used in batteries, fuel, pesticides, paints, pipes and other places where resistance to corrosion is required. Most of the lead absorbed by people and wildlife is stored in the bones. LEad can affect red blood cells by reducing their ability to carry oxygen and shortening their lifespan. Lead may also damage nerve tissue, resulting in brain disease.

Mercury occurs in several different forms. Mercury is used in the production of chlorine and as a catalyst in the production of some plastics. Industrial processes, such as the production of chlorine and plastics, are responsible for most of the environmental

damage resulting from mercury. Our body has a limited ability to eliminate mercury. In the food web, mercury becomes more concentrated as it is taken up by various organisms. In an aquatic environment, mercury can be absorbed by plankton, which are then consumed by fish. In addition fish absorb mercury through their gills and by eating other fish contaminated with mercury. Generally, the older the fish, the greater the mercury concentration in its body. Birds that eat the fish concentrate even more mercury in their bodies. It is a cumulative poison and is known to cause brain damage.

Thousands of chemicals are used in industries everyday. When used incorrectly or inapproriately they can become health hazards. PCBs (Polychorinated Biphenyls) are resistant to fire and do not conduct electricity very well, which makes them excellent materials for several industrial purposes. Rainwater can wash PCBs out of disposal areas in dumps and landfills thus contaminating the water. PCBs do not break down very rapidly in the environment and thus retain their toxic characteristics. They cause long-term exposure problems to both humans and wildlife. PCBs are concentrated in the kidneys and liver and cause damage; they cause reproductive failure in birds and mammals.

Q5. What is Vermicomposting.

Ans :

The biogeochemical cycles are designed to clear the waste material produced by animals and plants. We can Mimic the same methods that are present in nature. All dead and dry leaves and twigs decompose and are broken down by organisms such as worms and insects, and finally by bacterial and fungi, to form a dark rich soil - like material called compost.

These organisms in the soil use the organic material as food, which in turn provides them with nutrients for their growth and activities. These nutrients are returned to the soil to be used again by trees and other plants. This process recycles nutrients in nature.

This soil can used as a manure for farms and gardens

Steps for Vermi composting

- Dig a pit about half a meter square, one meter deep.
- Line it with straw or dried leaves and grass.
- Introduce the disposal of organic waste into the pit as and when generated.

- Introduce a culture of worms that is now produced commercially.
- Ensure that the contents are covered with a sprinkling of dried leaves and soil everyday.
- Water the pit once or twice a week to keep it moist.
- Turnover the contents of the pit every 15 days.
- In about 45 days the waste will be decomposed by the action of the micro organisms.
- The soil derived is fertile and rich in nutrients.

CHAPTER - III Global Warming and Ozone Layer Depletion

2.3 GLOBAL WARMING AND OZONE LAYER DEPLETION

Q1. Describe about Global Warming ?

Ans :

About 75% of the solar energy reaching the earth is absorbed by the earth's surface, which increases its temperature. The rest of the heat radiates back to the atmosphere. Some of the heat is trapped by greenhouse gases (GHGs) mostly carbon dioxide. As carbon dioxide is released by various human activities, it is rapidly increasing. This is causing global warming.

The average surface temperature is about 15°C. This is about 33°C higher than it would be in the absence of the green house effect. Without such gases, most of the earths surface would be frozen with a mean air temperature of –18°C.

Human activities during the last few decades of industrialization and population growth have polluted the atmosphere to the extent it has begun to seriously affect the climate. The carbon dioxide in the atmosphere to the extent that it has begun to seriously affect the climate. The carbon dioxide in the atmosphere has increased by 31%. Since pre-industrial times, causing more heat to be trapped in the lower atmosphere. There is evidence to show that carbon dioxide levels are still increasing. Many countries have signed a convention to reduce GHGs under the United Nations Framework Convention on Climate Change (UNFCC). However, the current international agreements are not still effective enough to prevent the significant changes is climate and a rise in sea levels.

Q2. What are the effects of Acid rain ?

Ans :

Acid rains dissolves and washes away nutrients in the soil, which are needed by plants. It can also dissolve naturally occurring toxic substances like aluminium and mercury, freezing them to pollute water or poison plants.

- Acid rain indirectly affects plants by removing nutrients from the soil in which they grow. It affects trees more directly by creating holes in waxy coating of leaves, causing brown dead spots which affect the plant's photosynthesis.
- Acid rain that falls or flows as ground water to reach rivers, lakes and wetlands causes the water in them to become acidic. This affects plants and animal life in aquatic ecosystems.
- Acid rain also has far reaching effects on wildlife. By adversely affecting one species, the entire food chain is disrupted, ultimately endangering the entire ecosystem. Land animals that are dependent on aquatic organisms are also affected.
- Acid rain and dry deposition damages buildings, automobiles and other structures made of stone or metal. The acid corrodes the materials causing extensive damage and ruins historic buildings

  For instance the parthenon in Greece and the Taj Mahal in India have been affected by acid rain.
- Acid, along with other chemicals in the air, produces urban smog, which causes respiratory problems.

Q3. How does the depletion of Ozone layer take place ?

Ans :

Ozone is formed by the action of sunlights on oxygen. It forms a layer 20 to 50 kms above the surface of the earth. This action takes place naturally in the atmosphere, but is very slow. Ozone is a highly poisonous gas with a strong odor. It is a form of oxygen that has three atoms in each molecule. It is considered a pollutant at ground level and constitutes a health hazard by causing respiratory ailments like asthma and bronchities. It also causes harm to vegetation and leads to deterioration of certain materials like plastic and rubber. Ozone in the upper atmosphere however, is vital to all forms of life as it protects the earth from the sun's harmful UV radiation. The ozone layer in the upper atmosphere absorbs the sun's UV radiation, preventing it from reaching the earth's surface.

In the 1970s, scientists discovered that chemicals called chlorofluorocarbons or CFCs which are used as refrigerants and aerosol spray propellants, pose a threat to the ozone layer. The CFC molecules are virtually indestructible until they reach the

stratosphere, where UV radiation breaks them down into oxygen molecules. These oxygen molecules do not absorb UV radiation. Since the early 1980s scientists have detected a thinning of the ozone layer in the atmosphere above Antarctica. This phenomenon is now being detected in other places as well including Australia.

The destruction of the ozone layer causes increased incidence of skin cancer and cataracts. It also causes damage to certain crops and plankton, thus affecting natural food chains and food webs. This decrease in vegetation leads to an increase in carbon dioxide.

CHAPTER - IV | Ill - Effects of Fire - Works

2.4 ILL - EFFECTS OF FIRE - WORKS

Q1. Write about the Harmful effects of Fireworks ?

Ans :

The SPM (Suspended Particulate Matter) levels rise to a large extent during Diwali.

- It can cause throat, nose and eye related problems which can later develop into adverse health hazards.
- It can lead to headaches and reduced mental acuity when it reaches the level of 100gm.
- It has much more severe effects in people with heart, respiratory or nervous system disorders.
- It can aggravate problem for people suffering from cold, allergies or coughs and can also cause congestion of throat and chest.
- Increase amount of noise has harmful effects on animals as well as humans. Standard decibel level for humans is 60dB.
- Increase in the decibel level can lead to : Restlessness, Temporary or permanent hearing loss, fidgetiness, high blood pressure, anger, heart attack sleep disturbance, impulsivness, can lead to withdrawal behaviour or hyper activity in pregnant women, children and those suffering from respiratory problems.
- Fire works can also cause health problems like Chronic bronchitis, common cold, Allergic Bronchitis, bronchial Asthma, Sinusitis, Chronic Obstructive Pulmonary Disease (COPD) E physumo, Pineumonia, Laryngitis.
- It results in smog which can reduce visibility thereby leading to accidents as well as is toxic if inhaled.
- It is said that one big firecracker like “1000 walas” and “hydrogen bombs” can produce upto 250cc of smoke.

- It can also cause water contamination and acid rains.
- It results in air pollution that creates carcinogenic sulphur compounds and air borne arsenic effect.
- Use of “rockets” near houses give rise to many injuries each year. There is no law pertaining to the same.
- Harmful effects of fireworks displays:

1) Green light produced in fireworks displays comes from Barium that is radio-active and poisonous.
2) Blue colour produced from copper compounds comes from dioxins linked to cancer.
3) Different effects are produced by using different chemicals that are linked to a lost of health and respiratory problems.

CHAPTER - V Disaster Management - Floods, Earthquakes and Cyclones

2.5 DISASTER MANAGEMENT - FLOODS, EARTHQUAKES AND CYCLONES

Q1. Write about the causes of Disaster.

Ans :

Among all the disasters that occur in the country, floods are the most frequently occurring natural disasters due to the irregularities of the Indian monsoon. About 75% of the annual rainfall in India is concentrated in three to four months of the monsoon season. As a result there is a very heavy discharge from the rivers during this period causing widespread floods. The major floods are mainly caused in the Ganga - Brahmaputra - Meghana basin, which carries 60% of the total river flow of our country.

India has a long coastline of 5700 km, which is exposed to tropical cyclones arising in the Bay of Bengal and the Arabian Sea. The Indian ocean is one of the six major cyclone – prone regions of the world. In India, cyclones occur usually between April and May and also between October and December. The eastern coastline is more prone to cyclones as it is hit by about 80% of the total cyclones generated in the region.

Droughts are a perennial feature in some states of India, 16% of the country's total area is drought - prone. Drought is significant environmental problem as it is caused by a lower - than - average rainfall over a long period of time.

Earthquakes are considered to be one of the most destructive natural hazards. The impact of this phenomenon occurs with so little warning that is almost impossible to make preparations against damages and collapse of buildings.

The term 'Tsunami' comes from the Japanese language, meaning harbor (Tsu) and wave (nami). A tsunami can be generated by any disturbance that rapidly displaces a large mass of water, like an undersea earthquake, volcanic eruption or submarine land slide. The wave travels across the ocean at speeds of 500 – 1000 km/h as the wave approaches the land, it 'Compresses' – sometimes upto a height of 300 meters – and the sheer weight of the water is enough to crush objects in its path, often reducing buildings to their foundations and scouring exposed ground to the bedrock.

Q2. Discuss about the main elements of a mitigation strategy.

Ans :

Risk assessment and Vulnerability analysis

This involves the identification of hotspot areas of prime concern collection of information an past natural hazards, information of the natural ecosystems and information on the population and infrastructure. Once this information is collected, a risk assessment should be done to determine the frequency, intensity, impact and the time taken to normalcy after the disaster. The assessment of risk and vulnerabilities will need to be revised periodically. The use of Geographical Information System (GIS), a computer program, can be a valuable tool in this process as the primary data can be easily updated and the corresponding assessments can be made.

Applied research and technology transfer

There is a need to establish or upgrade observation equipment and networks, monitor the hazards properly, improve the quality of forecasting and warning, disseminate informations quickly through the warning systems and undertake disaster simulation exercises.

Thus, space technologies such as remote sensing, satellite communications and Global Positioning Systems (GPSs) have a very important role to play. Government Organisations like the ISRO (Indian Space Research Organization) can play a vital role. Similarly, other Government Organisations like the National Building Research Organization, the Meteorological Department, Irrigation Department, etc., can undertake applied research for devising local – specific mitigation strategies in collaboration with educational institutions or universities.

Public awareness and training

One of the most critical components of a mitigation strategy is the training to be imparted to the official and staff of the various departments, involved at the state and the district level. This enables the sharing of information and methodology.

Land use planning and regulations

Long - term disaster reduction efforts should aim at promoting appropriate landuse in the disaster - prone areas. The separation of industrial areas from residential areas,

maintenance of wetlands as buffer zones for floods, creation of public awareness of proper land practices and formation of land-use policies for long - term sustainable development are all imperative.

Hazard - resistant design and construction

In areas that are prone to disasters, protection can be enhanced by the careful selection of sites and building technologies.

Q3. Write about the floods and mitigation measures.

Ans :

The lower plain regions of India, in particular Bihar, Uttar Pradesh and West Bengal with respect to river ganga and Assam with respect to the Brahmaputra, suffer from the adverse effects of floods every year. The Ganga – Brahmaputra basin receives the maximum run-off within the three monsoon months. Based on hydrological studies carried out, it is estimated that only 18% of rainwater can be stored in dams, reservoirs etc., while 82% of rainwater flows through rivers ultimately into the sea. Floods will, therefore, be a recurring phenomenon in our country.

Floods can be caused by natural, ecological or anthropogenic factors, either individually or as a combined results. Anthropogenic activities, such as deforestation and shifting cultivation, can also contribute to floods. Forests on the hill - slopes normally exert a 'sponge effect', soaking up the abundant rainfall and storing it before releasing it in small amounts over a period of time. However, when the forests are cleared the rivers turn muddy and swollen during the wet monsoon season and run dry later on in the year during the drier periods. An increasing proportion of the rainfall is, therefore , released shortly after precipitation in the form of floods.

Structural mitigation measures :

- Reservoir for impounding monsoon flows to be released in a regulated manner after the peak flood flow passes.
- Prevention of over - bank spilling by the construction of embankments and floodwalls.
- Improved drainage

Non–structural Measures

- Flood - plain management such as flood plain zoning and flood proofing, including disaster preparedness.
- Maintaining Wetlands
- Flood forecasting and warning services.
- Disaster relief, flood fighting and public health measures
- Flood insurance.

Q4. Explain about Earthquakes and its mitigation measures.

Ans :

It has been several years since the earthquake struck Gujarat in these years, rehabilitations has been done on a massive scale. Gujarat's experience has taught that building shelters with less vulnerability to earthquakes should also take into consideration the specific needs of the victims instead of being a top-down approach. The role of NGOs in this is very important.

Their strength lies in their manpower, informality in operations and valuable human resources. Their ability to reach out to the community and sensitivity to local traditions is an asset in such situations. A report on the various initiatives in Gujarat, in Down to Earth by Mihir Bhatt, throws light on the various developments that have taken place after the earthquake.

According to the report, the initiatives of the International Fund for Agriculture development in supporting the Self- Employed Women's Association (SEWA) and the Government initiative in community - based livelihood security for earth quakes and drought victims have the potential to shape furture disaster response and development projects in Gujarat. Similarly, the Gujarat Women's Economic Development Corporation (GWEDC) initiative in reviving women's businesses after the calamity also provides many practical lessons in regenerating local economies and artisan markets.

This project supported by the Asian Development Bank, put a premium on investments in income generation and asset building after a natural disasters. The farming kits provided to affected farmers by Gujarats agriculture ministry is also showing promising results after two seasons.

Q5. What are the measures taken to reduce the effects of cyclones ?

Ans :

Tropical cyclones are the worst natural hazards in the tropics. They are large revolving vortices in the atmosphere extending horizontally from 150 – 1000 km and vertically from the surface from 12 – 14 km.

These are intense low – pressure areas. Strong winds spiraling anti – clockwise in the northern Hemisphere blow around the cyclone Center at the lower level. At the higher levels, the sense of rotation is just opposite to that at the lower level. They generally move 300 – 5000 km per day over the ocean. While moving over the ocean, the pick up energy from the warm of the ocean and some of them grow into a devastating intensity. On an average, about 5 – 6 tropical cyclones form in the Bay of Bengal and the Arabian Sea every year out of which 2 – 3 may be severe. More cyclones form in the Bay of Bengal than in Arabian sea. The main dangers from cyclones are very strong winds, torrential rains and high storm tides. Most of the causalities are caused by coastal inundation by storm tides. This is often followed by heavy rainfall and floods. Storm surges cause the greatest destruction.

Although one cannot control cyclones, the effects of cyclones can be mitigated through effective and efficient mitigation policies and stratigies.

Installation of early warning systems

Such systems fitted along the coastlines can greatly assist forecasting techniques, then helping in early evacuation of people in the storm surge areas.

Developing communication infrastructure

Communication plays a vital role in cyclone disaster mitigation and yet this is one of the first services that get disrupted during cyclones. Amateur Radio has today emerged as a second line unconventional systems and is an important tool for disaster mitigation.

Developing shelter belts

Shelter belts with plantations of trees can act as effective wind – and tide – breakers.

Developing community cyclone shelters

Cyclone shelters at strategic locations can help in minimizing the loss of human life.

Training & education

Public awareness programs that inform the population about their response to cyclone warnings and preparedness can go a long way in reducing casualities.

CHAPTER - VI	Environmental Legislation : - (a) Wild life Protection Act (b) Forest Act (c) Water Act (d) Air Act

2.6 ENVIRONMENTAL LEGISLATION : (A) WILD LIFE PROTECTION ACT (B) FOREST ACT (C) WATER ACT (D) AIR ACT

Q1. Write about the Air Act.

Ans :

The government passed this Act in 1981 to clean up our air by controlling pollution. It states that sources of air pollution such as industry, vehicles, power plants etc. are not permitted to release particulate matter, lead carbon monoxide, sulfur dioxide, nitrogen oxide, volatile organic compounds or other toxic substances beyond a prescribed level. To ensure this, pollution control Boards (PCBs) have been set up by government to measure pollution levels in the atmosphere and at certain sources by testing the air.

This act is created to take appropriate steps for the preservation of the natural resources of the earth which among other things includes the preservation of high quality air and ensures controlling the level of air pollution. The main objectives of the Act are :

- To provide for the prevention, control and abatement of air pollution.
- To provide for the establishment of Central and State Boards with a view to implement the Act.
- To confer on the Boards the powers to implement the provisions of the Act and assign to the Boards functions relating to pollution.

Powers and Functions of the Boards

Central Board

The main function of the Central Board is to implement legislation created to improve the quality of air and to prevent and control air pollution in the country. The Board advises the Central Government on matters concerning the improvement of air quality and also coordinates activities, provides technical assistance and guidance to state boards and lays down standards for the quality of air.

State Pollution Central Boards

The state boards have the power to advise the state government on any matter concerning the prevention and control of air pollution. They have the right to inspect at all reasonable times any control equipment industrial plant, or manufacturing process and give orders to take the necessary steps to control equipment, industrial plant or manufacturing process and give orders to take the necessary steps to control equipment, industrial plant or manufacturing process and give orders to take the necessary steps to control pollution. They are expected to inspect air pollution control areas at intervals or whenever necessary. They are empowered to provide standards for emissions to be laid down for different industrial plants with regard to quantity and composition of emission of air pollutants into the atmosphere. A State Board may establish or recognize a laboratory to perform this function.

Penalties

The persons managing industry are to be penalized if they produce emissions of air pollutants in excess of the standards laid down by the state board. The board also makes applications to the court for restraining persons causing air pollution. Whoever contravenes any of the provision of the act or any order or direction issued is punishable with imprisonment for a term which may extend to three months or with a fine Rs. 10,000 or with both and in case of continuing offence with an additional fine which may extend to Rs. 5,000 for every day during which such contravention continues after conviction for the first contravention.

Q2. What is water act and mention its functions.

Ans :

The government formulated this act in 1974 to prevent the pollution of water by industrial, agricultural and household wastewater that can contaminate our water sources. Wastewaters with high levels of pollutants that enter wetlands, rivers, lakes wells as well as the sea are serious health hazards. Controlling the point sources by monitoring levels of different pollutants is one way to prevent pollution, by punishing the pollutes. Individuals can also do several things to reduce water pollution such as using biodegradable chemicals for household use, reducing the use of pesticides in gardens and identifying polluting sources at work places and in industrial units where oil or other petroleum products and heavy metals are used. Excessive organic matter, sediments and infecting organisms from hospital wastes can also pollute our water.

The main objectives of the water act are to provide for prevention, control and abatement of water pollution and the maintenance or restoration of the wholesomeness of water. It is designed to assess pollution levels and punish polluters. The Central government and State Government have set up pcbs to monitor water pollution

Functions of the Pollution Central Boards

The Government has given the necessary powers to the PCBS to deal with the problems of water pollution in the country. The Government has also suggested penalties for violation of the provisions of the Act. Central and State water - testing laboratories have been set up to enable the Boards to assess the extent of water pollution and standards have been laid down to establish guilt and default. The Central and State Boards are entitled to certain power and functions which are as follows.

Central Board

It has the power to advise the Central Government on any matters concerning the prevention and control of water pollution. The Board coordinates the activities of the State Boards and also resolves disputes. The Central Board can provide technical assistance and guidelines to State Boards to carry out investigations and research relating to water pollution and organizes training for people involved in the process. The Board organizes a comprehensive awareness program on water pollution through mass media and also publishes data regarding water pollution. The Board lays down on modifies the rules in consultation with the State Boards on standards of disposal of waste. The main function of the Central Board is to promote the cleanliness of rivers, lakes, streams and wells in the country.

State Boards

They have the power to advise the State government on any matters concerning water pollution. It plans a comprehensive program for the prevention of water pollution. It collects and disseminates information on water pollution and participates in research in collaboration with the Central Board in organizing training of people involved in the process. The Board inspects sewage or trade effluents, treatment plants, purification plants and the systems of disposal and also evolves economical and reliable methods of treatment of sewage and other effluents. It plans the utilization of sewage water for agriculture. It ensures that if effluents are to be discharge on land, then the waste is diluted. The state board advises state governments with respect to location of industries. Laboratories have been established to enable the board to perform its functions.

The State Boards have the power to obtain information from officers empowered by it who make surveys, keep records of flow volume and other characteristics of the water. The Board has the power of inspecting any plant record, register, document or any material object and conducting a search in any place in which there is reason to believe on offense has been committed under the act.

Q3. Write about the Wildlife Protection Act.

Ans :

This Act, passed in 1972, deals with the declaration of national parks and Wildlife sanctuaries and their notification. It establishes the structure of the states wildlife management and the posts designated for wildlife management. It provides for setting up Wildlife. Advisory Boards. It prohibits hunting of all animals specified in Schedules I to IV of the Act. These are notified in order of their danger of extinction. Plants that are protected are included in Schedule VI.

The amendment to the Wildlife protection Act in 2002 is more stringent and prevents the commercial use of resources by local people. It has brought in new concepts such as the creation of community Reserves. It has also attered several definitions. For instance, under animals, fish are now included. Forest produce has been redefined to ensure the protection of ecosystems.

While there are several changes the new Act still has serious issues concerned with its implementation. Laws are only as good as the ones that can be enforced. The Act is expected to deter people from breaking the law. However, there are serious problems due to poaching. One cannot expect to use the Act to reduce this without increasing Forest Staff, providing weapons, jeeps, radio equipment etc., to establish a strong deterrent force.

Penalties

A person who breaks any of the conditions of any license or permit granted under this Act shall be guilty of an offence against this Act. The offence is punishable with imprisonment for a term which may extend to three years or with a fine of Rs. 25,000 or with both. An offence committed in relation to any animal specified in Schedule I or part II of Schedule II, like the use of meat of any such animals, or animal articles like a trophy, shall be punishable with imprisonment for a term not less than one year and may extend to six years and a fine of Rs. 25,000.

In case of a second or subsequent offence of the same nature mentioned in this sub-section, the term of imprisonment may extend to six years and not less than two years with a penalty of Rs. 10,000.

Q4. Explain about forest conservation Act.

Ans :

The Forest Conservation Act of 1980, was amended in 1988, it is essential to underground its historical background. The Indian forest Act of 1927 consolidated all the previous laws regarding forests that were passed before the 1920s. The Act gave the Government and Forest Department the power to create Reserved forests, and the right to use reserved forests for government use alone.

The Act remained in force till the 1980's when it was realised that protecting forests for timber production alone was not acceptable. The other values of protecting the services that forests provide and its valuable assets such as biodiversity began to over shadow the importance of their revenue earnings from timber. This led to the forest Conservation Act of 1980 and its amendment in 1988.

The new policy framework made conservation of forests into other uses much less possible. Conservation of the forests as a natural heritage finds a place in the new policy, which includes the preservation of its biological diversity and genetic resources.

In 1992, the 73rd and 74th Amendments to the constitution furthered governance through panchayats.

The Forest Conservation Act of 1980 was enacted to control deforestation. It ensured that forestlands could not be de – reserved without prior approval of the Central Government. Some of the States had regularized encroachments and resettled 'Project Affected People' from development projects such as dams in these de - reserved areas. The need for a new legislation became urgent. The Act made it possible to retain a greater control over the frightening level of deforestation in the country and specified penalties for offenders.

Penalties for offences in Reserved Forests

No person is allowed to make clearings or set fire to a reserved Forest. Cattle are not permitted to trespass into the Reserved Forest. Felling, collecting of timber, bark or leaves, quarrying or collecting any forest product is punishable with imprisonment for a term of six months, or with a fine which may extend to Rs. 500 or both.

Penalties for offenses in Protected Forests

A person who commits any of the following offences like felling trees, stripping the bark or leaves of trees setting fire to such forests, kindling a fire without taking precautions to prevent its spreading dragging timber, or permitting cattle to damage any trees shall be punishable with imprisonment for a term which may extend to six months or with a fine which may extend to Rs. 500 or both.

Q5. Discuss about the laws, rules and orders issued by government to support the Forest Conservation Act.

Ans :

Restrict rules against destructive activities in local green areas such as Reserved Forests and Protected Forests, and in Protected Areas are followed. Report any such act to the forest Department as well as press reports of violations can be made to the conservator of Forest District Forest Officer, Range Forest Officer Forest Guard or the District Commissioner or local civic body.

- Acquaint with the laws, detailed rules and orders issued by the Government
- Creating awareness about the existence and value of national parks and sanctuaries and build up a public opinion against illegal activities in the forests or disturbance to wildlife.
- Pressurize the authorities to implement the forests and wildlife laws and rules to protect green areas.
- Take legal action if necessary and if possible through a Public Interest Litigation (PIL) against the offending party.
- NGO's are given the powers to take legal actions if necessary.
- Creating Public pressure to change rules, laws and procedures when necessary.
- Use better, ecologically sensitive public transport and bicycle tracks. Do not litter in a forest area.
- Participation in preservation of greenery, by planting, watering and caring for plants.

CHAPTER - VII Human Rights

2.7 HUMAN RIGHTS

Q1. Explain about the Equity

Ans :

One of the primary concerns in environmental issues is how wealth, resources and energy must be distributed in a community. We can think of the global and regional community issues, national family and individual concerns. While economic disparities remain a fact of life, we as citizens of a community must appreciate that a widening gap between rich and poor, between men and women or between the present and future generations must be minimized if social justice is to be achieved. Today, the difference between the economically – developed world and the developing countries is unacceptably high. The access to a better lifestyle for men as against women is inherent in many cultures. Last but not least, we in the present generations cannot greedily use up all our resources leaving future generations impoverished. Rights to land, water, food and housing are all a part of the environment that we all share. In a developing country like India, there are enormous economic inequalities. This requires an ethic in which an equitable distribution becomes a part of everyone's thinking.

The right to the use of natural resources that the environment holds is an essential component of human rights. It is related to disparities in the amount of resources available to different sectors of society. People who live in wilderness communities are referred to as 'ecosystem people'. They collect food, fuel wood, NTFPs, catch fish in aquatic ecosystems or hunt for food in forests and grasslands. When landuse patterns change from natural ecosystems to more intensively used farmland and posture land the rights of these indigenous people are usually sacrified. The rights of small traditional fishermen who have to contend against mechanized troubles that deprive them of their catch and over - harvest fish in the marine environment. These people's right to a livelihood conflicts with the powerful economic interests of large - scale organized fisheries.

There are serious conflicts between the rights of rural communities for even basic resources, such as water, and the industrial sector that requires large amounts of water for sustaining its productivity. The right to land or common property resources of tribal people is infringed upon by large development projects such as dams and mining. Movements to protect the rights of indigenous peoples are growing worldwide.

Q2. What is the relationship between the Human rights, health and nutrients ?

Ans :

There are links between the environment, nutrition and health that must be seen from a human - rights perspective. Proper nutrition and health are fundamental human rights. The right to life is a fundamental right in our constitution. As a deteriorating environment shortens life-spans this in effect has an impact an our fundamental constitutional right.

Nutrition affects and defines the health of all people, rich and poor. It is linked to the way we grow, develop, work, play, resist infection, and realize our aspirations as individuals, communities and societies. Poverty, hunger, malnutrition and poorly - managed environments together affect health and weaken the socioeconomic development of a country. Nearly 30% of humanity, especially those in developing countries are affect by this problem. A human rights approach is needed to appreciate and support millions of people left behind in the 20th century's health revolution. We must ensure that our environmental values and our vision are linked to human rights and create laws to support those that need a better environment, better health and a better lifestyle.

Health and sustainable human development are equity issues. In our globalized 21st century, equity must begin at the bottom, hand in hand with a healthy environment improved nutrition, and sustainable lifestyles. Putting first things first, we must also realize that resources allocated to preventing and eliminating disease will be effective only if the underlying causes such as malnutrition and environmental concerns, as well as their consequences, are successfully addressed.

Q3. Write about the Intellectual Property Rights (IPRs).

Ans :

Especially tribals living in forests have used local plants and animals for generations. This storehouse of knowledge leads to many new 'discoveries' for modern pharmaceutical industry that has done the research and patented the product. This

leaves the original tribal user with nothing, while the industry could earn billions of rupees. To protect the rights of indigenous people who have used these products, a possible tool is to create a CBR of local products and their uses so that their exploitation by the pharmaceutical industry would result in a royalty to the local community. Mechanisms have to be worked out so that the local traditional uses rights are protected. This mechanisms protecting the traditional users are known as Intellectual Property Rights.

Q4. Write about the Community Biodiversity Registers (CBRs).

Ans :

Traditional medicine refers to health practices approaches, knowledge and beliefs that incorporate plant, animal and mineral - based medicines, frequently of local or regional origin. It may be linked to spiritual therapies, manual techniques and exercises.

Traditional medicine has maintained its popularity in all regions of the developing world and its use is rapidly spreading in industrialized countries. In India, some of our primary health care needs are taken care of entirely by traditional medicine, while in Africa, upto 80% of the population uses it for primary health care. In Industrialized countries, adaptations of traditional medicine are termed 'complementary or 'Alternative' Medicine (CAM).

While there are advantages to traditional medicine as it is cheap and locally available, there are also diseases which it cannot treat effectively. This is a risk, as patients who use these alternative medicinal practices may rely on ineffective measures. There is a need to carefully research the claims of traditional practices to ensure that they are effective.

In addition to patient - safety issues, there is the risk that a growing herbal market and its great commercial benefit poses a threat to biodiversity through the over - harvesting of the raw material for herbal medicines and other natural health - care products. If their extraction from the wild is not controlled, this can lead to the extinction of several endangered plant species and the destruction of the natural habitats of several species.

Another related issue is that at present the requirements for protection provided under international standards for patent law and by most national conventional patent laws are inadequate to protect traditional knowledge and biodiversity.

CHAPTER - VIII	Women and Child Welfare

2.8 WOMEN AND CHILD WELFARE

Q1. Describe in detail about various factors involved in women and child welfare.

Ans :

There are several environmental factors that are closely linked to the welfare of women and children. Seven out of ten childhood deaths in developing countries can be attributed to five main causes, or a combination of them. These are – pneumonia, diarrhea, measles, malaria and malnutrition.

Pneumonia

Acute respiratory infections (ARI), most frequently pneumonia, is a major cause of death in children under five years, killing over two million children annually. Upto 40% of children seen in health centers suffer from respiratory conditions and many deaths attributed to other causes are, in fact 'hidden' ARI deaths.

- **Diarrhea** : Diarrhea is caused by a wide variety of infections. Quick diagnosis and treatment of diarrhea is a priority for saving a child's life.
- **Measles :** It is a rash that appears with fever and body ache in children and is caused by a virus. It infects over 40 million children and kills over 8,00,000 children under the age of five. Its preventions includes wider immunization coverage, rapid referral of serious cases, prompt recognition of conditions that occur in association with measles, and improved nutrition, including breast feeding and vitamin A supplement.
- **Malaria :** Never drug therapies have been developed for use in sub – Saharan Africa. Young children and particularly vulnerable because they have not developed the partial immunity that results from surviving repeated infections.

- **Poverty - environment - Malnutrition :** There is a close association between poverty, a degraded environment and malnutrition. This is further aggravated by lack of awareness on how children become malnourished.
- **Malnutrition :** Lack of access to food, poor feeding practices and infection, or a combination of the two, are the major causes of mortality.

Infection, particularly frequent or persistent diarrhea, phenomena, measles and malaria, undermines nutritional status. Poor feeding practices – inadequate breast feeding, providing the wrong food, or insufficient food - contribute to malnutrition. Promoting breast feeding, improving feeding practices and providing micronutrient supplements routinely for children who need them are measures that reduce mortality.

Q2. Write about the women welfare.

Ans :

Women tend to have fever and healthier children and live longer when they have accuse to education and to paying jobs outside the home and when they live in societies in which their individual rights are not suppressed. Women do almost all of the world's domestic work and child care, and provide more health care with little or no pay than all the world's organized health services combined.

Poor village women are the worst sufferers of environmental destructions. Every morning they have to go an long march in search of fuel, fodder and water. The women may be old, young or pregnant. Environmental destruction exacerbates women's already acute problems in away. They do not get any worthwhile health care due to shyness, overwork and inferior status of women in that society.

Although women work two - thirds of all hours worked, they receive only one - tenth of the world's income and own a more 0.01% of the world's property. In most developing nation women don't have the legal right to own land or borrow money to increase agricultural productivity. About 1 million women, 95% of them in developing countries, die annually from mostly preventable pregnancy related causes – a figure that is expected to rise to atleast 2 million by 2000.

Women also make up almost two – thirds of the more than 950 million adults who can neither read nor write. In many developing countries, literacy rates for women are only half those for men, and girls are routinely taken out of school to help with family chores while their brothers stay in school.

Many Analysts believe that women everywhere should have full legal rights and the opportunity to become educated and earn income outside the home, not only as a way to slow population growth, but also to promote human rights and freedom. However, empowering women by seeking gender quality will require some major social changes that will be difficult to achieve in male - dominated societies.

Q3. Discuss about the child welfare.

Ans :

Until the middle of the 19th century, only half of the children born in the US reached their fifth year, and as recently as 1900 a newborn infant in the U.S had less chance of surviving a week than did a man of 90. Today, in the economically developed nations, 97 percent of new born live to adulthood. Few children suffer the effects of hunger. Few are infested with worms or other debilitating parasites. In developing countries like India, despite the advances made in the field of health, the infant and mother deaths rate is still very high and so is the incidence of preventable - communicable disease.

The situation today is that nearly one thousand million people are trapped in the vicious circle of poverty, mal nutrition, disease and despair that saps their energy, reduces their work capacity and limits their ability to plan for the future. For most part of they live in the rural areas and urban slums of the developing countries. Whereas the average life expectancy at birth is about 70 – 75 years in the developed countries it is only 45 – 55 in most developing countries of every 1,000 children born into poverty in the least developed countries, 200 die within a year, another 100 die before the age of five and only 500 survive to the age of 40. Health for all is the attainment by all the people of the world of a level of health that will permit them to lead a socially and economically productive life.

CHAPTER - IX Role of Information Technology in Environment and Human Health

2.9 ROLE OF INFORMATION TECHNOLOGY IN ENVIRONMENT AND HUMAN HEALTH

Q1. Discuss about the issues involved in usage of IT tools in environmental management.

Ans :

Institutional Capacity

The receivers institutional capacity, organisation, management and decision systems should be sufficiently well developed to utilize the IT tools efficiently. In any environmental management system, and in particular in developing countries, there will never be enough data and information to fill the demand. It may be more important to support management systems that utilize whatever information that is available, rather than to spend the resources on providing information that the management system is unable to use.

Conflicts of Demand-driven and Technology-drivers Issues :

Development of co-operation projects in environmental management should be based on a well-documented need and priority in the receiving country, institution. With the very advanced and dynamic information technology sector, there may be a tendency that the demand for technical development becomes self propelling and overshadows the considerations of the user's actual needs.

The Impact

Internet is the fastest growing medium in the developed world, all pervasively available by the telecom network, cable net, satellites etc. The internet will impact our societies through sharing of information, acquiring of knowledge and new opportunities for work and entertainment, from the most profound to the profane.

UNEPnet provides a large number of environmental decision - makes and also environmentally conscious citizens in the developing world, access to information currently only available to their rich counterparts in the north. UNEPnet also serve as UNEP's internal communication system in the developing world.

The Infrastructure

Linking information spaces on the internet, opportunities exist to create local, regional and national information highways, spanning across communities interacting within themselves, or with other regions.

Global Responsibilities

Developed nations, including the Nordic Countries, are preventing ambitions plans for the information society all include strong recommendations of equal access, independent of location, and an differences based on social conditions, sex, race, etc.,

Q2. What is the role of information technology in Human Health ?

Ans :

Electronic Health Information Sources

An enormous amount of health information is now available in electronic form. Until recently, most of these resources were accessible through dial-up bulletin board systems or, if the files resided on a computer connected to the internet, through a number of different means of transferring copies of the files from the source computer to a remote user's computer.

A new graphical interface to the internet, known as the World Wide Web (www), has made it possible to rapidly retrieve, arrange, and display on web pages the contants of files on health information rather than just their names - and for users to transfer from resources to resource along a virtually endless web of hyperlinks with the click of a mouse button.

Bringing Health Care Online

Health care contains informations about Medicare and Medicaid and various related web sites guide consumers to a wide variety of health information available through agencies such as the Food and Drug Administration and the National Institute on Aging etc including the full text of chemical practice guidelines, quick-reference guides for clinicians, and consumer brochures developed with the support of the Agency

for Health Care Policy and Research. A number of centers for Disease Control and prevention and the public health service maintain WWW sites with information about communicable diseases, epidemics, and population - based health care. Many institutions such as the World Health Organization, maintain websites with information on international health issues.

Medical Images

The new version of web browsers are capable of displaying photographic images and video clips have been developed and World Wide Web has become an ideal medium for distributing medical images for instructional and historic purposes. Documentation and display of human anatomy in a series of magnetic resonance, photographic and computerized images of cross – sections of a human body are now possible through internet. Telemedicine and distance medicine is far - reaching and available to many people with the advent of Information Technology

Q3. Write about the Role of Information Technology in Environmental Health.

Ans :

UNEP has developed the mercure satellite communication system and UNEP net – the green global internet. Information Technology has revolutionized the whole concept of environmental management. With case one can access and monitor the world environment from any where in the world, one can supply more upgraded environmental information earlier to more people, and the best of all – one can make another effort for a better world on behalf of the United Nations. Eventhough we live in the age of the information revolution, the major challenge is to make the new technology available for all. If this fails, it may contribute to new divisions not between the "haves and have-nots" – but between the "can and cannots". This should also be kept in mind in a broader context to assure that the developing countries get equal occurs to this 'New World of possibilities', which is opened up through Information Technology.

The major advantage of IT is even those who lack of highly developed infrastructure can also access scientific knowledge about the environment. This is achieved by two - way communication. The input of data from developing countries is made available to the global warehouse of knowledge, and gain access to the best management practices of developed nations which provides scientific and validated basis for sound environmental management and political decisions, supporting sustainability in developing nations.

Q4. What is UNEP.

Ans :

Developing countries should give high priority to improved environmental management and achievement of this goal can be stimulated by assistance with the establishment of electronic networking capabilities in developing countries and the strengthening of existing national and international mechanisms of information processing and exchange.

The UNEP / Mercure Programme was initiated in response to these needs. It addresses questions of improved information availability through reliable, dedicated, efficient and standard internet tools and modern information management, with particular emphasis on the needs of developing countries.

UNEP has the potential to provide low cost communication and information management services to its partners in the pursuit of better environmental management. In the case of developing countries and regions cooperating bodies can give priority to national and regional management issues with minimal investment in resources and infrastructure while increasing dramatically access to channels of information exchange. But this can only be realised if the UNEP / Mercure systems are totally reliable in an operational or service providing manner. The information requirements for decision – making and awareness raising are integrated into most international, regional and national programmes.

Q5. Forest Ecosystem.

Ans :

Forests occupy roughly 40 percent of the land. In India, the forests occupy roughly one - tenth of the total land area. The various components of a forest ecosystems are

Abiotic Component

These are the inorganic as well as organic substances present in the soil and atmosphere. In addition to the minerals present in forests we find the dead organic debric – the litter accumulation, chielfly in temperature climate. Thermal stratification also prevails at canopy, sub-canpy, middle zone, ground flora zone, litter zone and rhizosphere zone.

Biotic Component

The living organisms present in the food chain occur in following.

Procedures

These are mainly trees that show much species diversity and greater degree of stratification especially in tropical moist deciduous forest. The trees are of different kinds depending upon the kind of the forest formation developing in that climate. Besides trees, there are also present several climbers, epiphytes, shrubs and a ground vegetation. In these forests, dominant members of the flora, the producers are such trees as Tectona grandies, Butea frandosa, Shorea rubusta and Anogeissus Latifolia, Adina Cordifolia etc., In temperate confierous forests, shrubs and ground flora are insignificant. In temperate deciduous forests the dominant trees are species of quercus, Acer, Betula dn conifers such as Abies, Pinus Thuja, Picea etc., whereas in a temperate coniferous forests, the dominent produces trees are gymnosperms.

Consumers

a) Primary Consumers – These are herbivoires the include the animals feeding on tree leaves as ants, flies, beetles, leaf hoppers, bugs and spiders etc., and larger grazing animals.

b) Secondary Consumers – These are the top carnivores like snakes, birds, lizards, fox etc., feeding on the herbivores.

c) Teritiary Consumers – They are the top carnivores like lion, tiger, etc., that eat carnivores of secondary consumers level.

Q6. Pond Ecosystem.

Ans :

A pond as a whole serves a good examples of a fresh water ecosystems. It exhibits a self sufficient and self-regulating system. Not only the pond is a place where plants and animals live, but plants and animals make the pond. (Physico-chemical environment). some larger forms of life are also present in pond. Pond ecosystem is divided into basic components.

Abiotic Compound

- The chief substances are heat, light, pH value of water and the basic inorganic and organic compounds such as water itself carbon-dioxide, oxygen, calcium, nitrogen, phosphates, amino acids, humic acid etc.,
- The light intensity is measured by lux-photometer and turbidity index of water at different depths is obtained by a secchi disc.

Biotic Component

- **Producers**

These are autotrophic, green plants and some photosynthetic bacteria. The producers fix radiant energy and with the help of minerals derived from water and mud, they manufacture complex organic substances as carbohydrates, proteins, Lipids etc.,

a) Macrophytes

They are large rooted plants which include partly or completely submerged, floating and emergent hydrophytes.

b) Photoplankton

They are minute, floating or suspended lower plants. Majority of them are filamentous algae such as Zygnema, Ulothrix, Spirogyra etc.,

- Consumers – They are heterotrophs which depend on the organic food manufactured by green plants for their nutrition. Consumers are divided into:

a) Primary Consumers

They are herbivores feeding directly on living plants (producers) or plant remains. These are again classified as

b) Benthos

These are (i) animals associated with living plants and (ii) bottom forms which feed upon the plant remains lying at the bottom of pond. These are known as detritivores.

a) Zooplankton

These are the rotifers as Brachionus, Asplancha, Lecane etc., some protozoans as Euglena, coleps Dileptus etc., and crustaceans like cyclops, stenocyupris etc.,

b) Secondary Consumers (arnivores)

They feed on the primary consumers herbivores. They are insects and fish, which feed on zooplankton.

c) Tertiary Consumers (Carnivores)

Some large fish - "a game fish" feed on the smaller fish and thus become the teritiary (top) consumers. In a pond, fish may occupy more than one trophic levels. The small fish (herbivores) feed on phytoplankton while some fish feed on zooplankton at carnivore level.

Micro Consumers or Decomposers

They are also known as micro consumers , since they absorb only a fraction of the decomposed organic matter. They bring about the decomposition of complex dead organic matter of both plants and animals to simple forms.

Short Question & Answers

1. Define Pollution.

Ans :

Pollution is the effect of undesirable changes in our surroundings that have harmful effects on plants, animals and human beings. This occurs when only short - term economic gains are made at the cost of long - term ecological benefits of humanity.

Pollutants include solid, liquid or gaseous substances present in greater than natural abundance, produced due to human activity. The nature and concentration of a pollutant determine the severity of its detrimental effects on human health.

2. What are the different types of pollutants ?

Ans :

Degradable or non - persistent pollutants :

These can be rapidly broken down by natural processes. eg : domestic sewage, discarded vegetables etc.

- Slowly - degradable or persistent pollutants – These are pollutants that remain in the environment for many years in an unchanged condition and take decades or longer to degrade.

  Eg : DDT (Pesticides) and most plastics

- Non – degradable Pollutants – These cannot be degraded by natural processes. Once they are released into the environment they are difficult to eradicate and continue to accumulate. Eg : toxic elements like lead or mercury and nuclear wastes.

3. How do the changes takes place due to pollutants in the atmospher ?

Ans :

Once pollutants enter the troposphere they are transported downwind, diluted by the large volume of air, transformed through either physical or chemical changes. Or are removed from the atmosphere by rain during which they are attached to water vapor that subsequently forms rain or snow that falls to the earth's surface. The atmosphere normally disperses pollutants by mixing them in very large volume of air that covers the earth.

4. Explain the changes that occurs due to ozone depletion.

Ans :

In humans sunburn, cataract, aging of the skin and skin cancer are caused by increased UV radiations.

- UV radiation affects the ability of plants to capture light energy during the process of photosynthesis.
- Plant and animal planktons are damaged by UV radiation. In zooplanktons, the breeding period is shortened by changes in radiations.
- Increased UV radiation damages paints and fabrics, causing them to fade faster.
- Atmospheric changes induced by pollution contribute to global warming, a phenomenon which is caused due to the increase in concentration of certain gases like carbon dioxide, nitrogen oxides, methane and CFCs.

5. Write the control measures for preventing water pollution ?

Ans :

While the foremost necessity is prevention, setting up efficient treatment plants to treat waste can reduce the pollution load in the receipient water. The treated of effluent can be reused for either gardening or cooling purposes, wherever possible. A few years ago a new technology, called the Root Zone process, has been developed by Thermax. This systems involves running contaminated water through the root zones of specially – designed reed beds. The reeds, which are essentially wetland plants, have the capacity to absorb oxygen from the surroundings air through their stomatal openings. The oxygen is pushed through the porous stem of the reeds into the hollow roots where it enters the root zone and creates conditions suitable for the growth of humerous bacteria and fungi. These micro organisms oxidize impurities in the wastewaters, so that the water which finally comes out is clean.

6. What measures are taken to protect ozone layer ?

Ans :

Montreal protocol in 1987, a treaty for the protection of the ozone layer, banned the use of CFCs after which the ozone layer is expected to slowly recover a period of years. Although the use of CFCs has been reduced and now banned in most countries other chemical and industrial compounds such as bromine, halocarbons and nitrous oxides from fertilizers continue to attack the ozone layer.

7. How do the acid rains are prevented ?

Ans :

The formation of acid rain is to reduce the emissions of sulfur dioxide and nitrogen oxides into the atmospher. This can be achieved by using less energy from fossil fuels in power plants, vehicles and industries. Developing more efficient vehicles will reduce pollutants from being released into the air. If pollutants have already been formed by burning fossil fuels, they can be prevented from entering the atmosphere by using scrubbers in the smoke-stacks of factories.

8. What are the consequences of Global Warming in the nature ?

Ans :

Global Warming is accelerating faster then what climatologists had calculated a few years ago. In 1995, the IPC predicted that global warming would raise temperatures by 3.5° – 10°C during the 21st century, if the present trends continue. This would lead to not only to changes in temperature but also in the amount of rainfall. India may see great annual fluctuations in rainfall leading to floods and droughts.

9. Explain guidelines followed of a mitigation program.

Ans :

- Pre – disaster mitigation can help in ensuring faster recovery from the impacts of disasters.
- Mitigation measures must ensure protection of the natural and cultural assets of the community.
- Hazard reduction methods must take into account the various hazards faced by the affected community and their desires and priorities.
- Any mitigation program must also ensure an effective partnership between the Government, scientific, private sector, NGO's and the community.

10. What are the various types of Disasters ?

Ans :

Floods are the most frequently occurring natural disasters, due to the irregularities of the Indian monsoon.

- India has a long coastline of 5700 km, which is exposed to tropical cyclones arising in the Bay of Bengal and the Arabian Sea.
- Droughts are a perennial feature in some states of India, 16% of country's total area is drought prone.
- Drought is a significant environmental problem as it is caused by a low - than - average rainfall over a long period of time.
- Earthquakes are considered to be one of the most destructive natural hazards.
- A tsunami can be generated by any disturbance that rapidly displaces a large mass of water, like an undersea earthquake volcanic eruption or submarine landslide.

11. Write about the incentives and resources for mitigation.

Ans :

To a very large extent, the success of mitigation programs will depend upon the availability of continued finding. So there is a need to develop mechanisms to provide stable sources of funding for all mitigation programs. This will include incentives for the relocation of commerical and residential activities outside the disaster prone areas. The introduction of disasters - linked insurance should be explored and should cover not only life but also household goods, cattle, structures and crops.

12. What measures are taken to deal with natural disasters ?

Ans :

The approach towards dealing with natural disasters has been post - disaster management involving problems such as evacuation, warnings communications, search and rescue, fire - fighting medical and psychiatric assistance, provision of relief, shelter etc., After the initial trauma and the occurrence of the natural disaster are ores and reconstruction and rehabilitation is done by people, NGO's and the Government its memories are relegated to history.

13. Write about the Disaster Management.

Ans :

Disaster management is a multi-disciplinary area in which a wide range of issues that range from forecasting, warning, evacuation, search and rescue relief, reconstruction and rehabilitation are included. These roles and activities span the pre - disaster during disaster and post disaster plans.

14. Write about the measures in prevention of water pollution.

Ans :

Do not dump wastes into a household or industrial drain which can directly enter any water body, such as stream, river, pond, lake or the sea.

- Making a Complaint against any offender to PCB who is polluting water and ensure that appropriate action is taken.
- Do not use toilets for flushing down waste items as they do not disappear but reappear at other places and cause water pollution.
- Avoid the use of pesticides at home like DDT, Malathion, Aldrin, and use alternative methods like a paste of boric acid mixed with gram flour to kill cockroaches and other insects. Use dried neem leaves to help keep away insects.

15. How to control the air pollution ?

Ans :

Informing to the PCB in writing about an industry polluting air and ascertain if action is taken

- By giving a letter to the Road Transport Office (RTO) and PCB about the polluting Vehicle with its numbers.
- Use cars only when absolutely necessary, work cycle as much as possible instead of using fossil fuel powered vehicles.
- Do not smoke in a public place. It is illegal and endangers not only your own health but also that of others.
- Use of public transport to travel in a single large vehicle rather than using multiple small vehicles which add to pollution.

16. Write about certain important points involved in protection Act of Wildlife.

Ans :

Reduce the use of wood and wood products wherever possible.

- Avoid misuse of paper because it is made from bamboo and wood, which destroys wildlife habitat. Paper and envelopes can always be reused.

- Create a pressure group and ask government to ensure that the biodiversity of our country is conserved.
- Do not harm animals and dissuade others from inflicting cruelty to animals.
- Do not disturb birds nests and fledglings.
- Create awareness about biodiversity conservation in your own way to family and friends.
- Joining of organizations, which are concerned with protection of biodiversity, such as Worldwide Fund for nature – India (WWF - I), Bombay Natural History Society (BNHS), a local conservation NGO.

17. Human Rights

Ans :

Human rights are rights inherent to all human beings, regardless of race, sex, nationality, ethnicity, language, religion, or any other status. Human rights include the right to life and liberty, freedom from slavery and torture, freedom of opinion and expression, the right to work and education, and many more. Everyone is entitled to these rights, without discrimination.

Fill in the Blanks

1. Hippocrates has mentioned air pollution in _____.

Ans : 400 BC

2. Air pollution control act in India was passed in _____.

Ans : 1981

3. The union carbide's pesticide manufacturing plant, industrial disaster lead to serious air pollution on _____.

Ans : Night of Dec. 2nd, 1984

4. The atmosphere is normally composed of _____.

Ans : Nitrogen, Oxygen and Mixed Carbondioxide

5. The inner most layer of atmosphere is _____.

Ans : Troposphere

6. Air pollution occurs due to presence of _____.

Ans : Undesirable solid or gaseous particles

7. _____ is the essential element that makes life on earth possible.

Ans : Water

8. Earth's surface is covered by _____ % of water.

Ans : 70%

9. The largest-ever river clean-up operation is _____.

Ans : Ganga Action Plan

10. MoEF is _____.

Ans : Ministry of Environment and Forest

11. Waste is burnt to reduce its _____.

Ans : Volume

12. MSW is _____.

Ans : Municipal Solid Waste

13. _____ is the process of burning municipal solid waste in a properly - designed furnace.

Ans : Incineration

14. _____ is a chemical used widely, in the manufacture of plastic.

Ans : Vinyl Chloride

15. PCB's is _____

Ans : Polychlorinated biphenyls

16. _____ is used in the production of chlorine, and as a catalyst in production of some plastics.

Ans : Mercury

17. _____ is recursing some components of the waste that may have some economic value.

Ans : Recycling

18. Plastics are difficult to recycle because of _____.

Ans : Polymer Resins

19. The biogeochemical cycles designed to clear water materials by animals and plants is _____.

Ans : Vermicomposting

20. Source reduction is one of the fundamental ways to _____.

Ans : Reduce water

21. The solar energy reaching the earth is absorbed by earth's surface of about _____.

Ans : 75%

22. The carbon dioxide which is released by various human activities and increasing rapidly is _____.

Ans : Global warming

23. UNFCC is _____.

Ans : United Nations Framework Conventions

24. The average surface temperature is about _____.

Ans : 15°C

25. GAGs is _____.

Ans : Green house gases

26. _____ is formed by the action of sunlight an oxygen.

Ans : Ozone

27. _____ in the upper atmosphere is vital to all forms of life and protects earth from sun's harmful UV radiation.

Ans : Ozone

28. CFC's are discovered in _____.

Ans : 1970

29. The destruction of ozone layer causes incidence of _____ and _____.

Ans : Skin cancer & Cataracts

30. In 1995, the IPCC predicted that global warming would raise temperature by _____.

Ans : 3.5° – 10°C

31. The Indian subcontinent is very vulnerable to _____.

Ans : Floods, Cyclones, Earthquakes

32. Approximately _____ Ha of land in the country has been identifying as being prone to floods.

Ans : 40 mHa

33. India has a long coastline of _____ km.

Ans : 5700

34. The term 'Tsunami' comes from _____ language.

Ans : Japanese

35. After natural disaster _____ and _____ are done by people, NGO's and government.

Ans : Reconstruction, Rehabilitation

36. _____ are responsible for accelerating the frequency and severity of natural disasters.

Ans : Human activities

37. _____ basics receives the maximum run-off within the three monsoon months.

Ans : Ganga - Brahmaputra

38. Anthropogenic activities, such as _____ and _____ can contribute to floods.

Ans : Deforestation, shifting cultivation

39. SEWA is _____.

Ans : Self - employed women's association

40. GWEDC is _____.

Ans : Gujarat Women's Economic Development Corporation

41. The government passed air act is _____.

Ans : 1981

42. _____ is set up government to measure pollution levels in the atmosphere.

Ans : Pollution control boards

43. The government formulated water act is _____.

Ans :1974

44. The Wildlife protection act passed in _____.

Ans : 1972

45. Penalty of breaking wild life protection act is Rs. _____ fine.

Ans : 25,000

46. Forest conservation act was amended in _____.

Ans : 1988

47. India's first forest policy was enunciated in _____.

Ans : 1952

48. In 1992 _____ and _____ amendments to the constitution furthered governance through punchayats.

Ans : 73rd and 74th

49. Penalties for offences in reserved forests in extended to Rs. _____.

Ans : 500

50. SPCA is _____.

Ans : Society for the Prevention of Cruelty to Animals

51. IPRs _____.

Ans : Intellectual Property Rights

52. The difference between the _____ and _____ is unacceptably high.

Ans : Economically developed world and developing countries

53. The right to use of natural resources is an essential component of _____.

Ans : Human rights

54. Movements to protect the rights of indigenous peoples are growing _____.

Ans : World Wide

55. Proper nutrition and health are fundamental _____.

Ans : Human rights

56. _____ affects and defines the _____ of all people rich and poor.

Ans : Nutrition and health

57. Poverty, hunger, Malnutrition together affect health and weaken the _____ development of a country.

Ans : Socioeconomic

58. _____ and _____ human development are equity issues.

Ans : Health and Sustainable

59. CBRs is _____.

Ans : Community Biodiversity Registers

60. CAM is _____.

Ans : Complementary or Alterative Medicine

61. _____ are the worst sufferers of environmental destructions.

Ans : Poor village women

62. Empowering women by seeking _____ will require some major social changes.

Ans : Gender Equality

63. Women make up almost _____ of more than 950 million adults who can neither read or write.

Ans : 2/3rd

64. Many analysts believe that women should be promoted with _____ and _____.

Ans : Human rights and freedom

65. The average life expectancy at birth is about _____ in developed countries.

Ans : 70 – 75 yrs

66. The WHO estimates _____ early deaths annually from cooking stove pollution.

Ans : 1.6 billion

67. _____ smoke is the third - highest cause of disease and death.

Ans : Chula

68. ARI is _____.

Ans : Auto Respiratory Infections

69. _____ is caused by a world variety of infections.

Ans : Diarrhea

70. _____ condition is closely linked to pooling and stagnation of water in tropical environments.

Ans : Malaria

71. GIS is _____.

Ans : Geographical Information System

72. _____ can do several tasks extremely rapid.

Ans : IT

73. UNEP has developed the _____ and _____.

Ans : Mercury satellite communication system and UNBP net

74. _____ provides a large number of environmental decision makers.

Ans : UNEP net

75. _____ is the fastest growing mediums in the developed world.

Ans : Internet

76. _____ was established by UNEP in 1985.

Ans : Global Resource Information Database

77. GRID is _____.

Ans : Global Resource Information Database

78. Today the GRID network has grown into a global network of _____ centers.

Ans : D_1

79. The experience and capacities that UNEP has developed in areas of monitoring and assessment, through its _____ and _____ programmes.

Ans : GEMS and GRID

80. The _____ with give us access to the global knowledge and information society.

Ans : Open network

Multiple Choice Questions

1. The National River conservation plan was launched in _____. [b]
   (a) 1990 (b) 1995
   (c) 1994 (d) 1996
2. The environment protection act (EPA was passed in) [a]
   (a) 1986 (b) 1985
   (c) 1983 (d) 1952
3. National ambient air quality monitoring (NAAQM) program is initiated in [b]
   (a) 1987 (b) 1986
   (c) 1988 (d) 1989
4. India receives most of her rainfall (the monsoon) during the months of [c]
   (a) April to August (b) July to October
   (c) June to September (d) August to November
5. The sediment of suspended matter is another class of [c]
   (a) Soil pollutants (b) Air pollutants
   (c) Water pollutants (d) None
6. CFCs is [a]
   (a) Chlorofluorocarbons (b) Calcium fluoro carbons
   (c) Carbon fluro carbons (d) None
7. Destruction of ozone is called [a]
   (a) Ozone hole (b) Ozone gap
   (c) Ozone spoilage (d) None
8. The total column ozone is recorded in [c]
   (a) Units (b) Decibels
   (c) Dobson units (d) μg

9. Cigarette smoking is responsible for the greatest exposure to [d]

(a) Carbon dioxide (b) Sulphur dioxide

(c) Nitrous oxide (d) Carbon monoxide

10. Acid deposition has many harmful effects, when the pH falls below _____ for terrestrial systems and below _____ for aquatic systems. [c]

(a) 5.5 and 5.1 (b) 5.0 and 5.2

(c) 5.1 and 5.5 (d) None

11. Doubling atmosphere CO_2 cause global temperatures to rise _____ [a]

(a) 1.5°C to 4.5°C (b) 1.0°C to 4.0°C

(c) 2.0°C to 4.0°C (d) 1.5°C to 5.0°C

12. The natural tropping of heat in the troposphere is called [a]

(a) Green house effect (b) Global warming

(c) Both (a) and (b) (d) None

13. Gases responsible for warming of atmosphere [a]

(a) Methane, CFC's, Nitrous Oxide

(b) Oxygen, CO_2, Methane

(c) Both (a) and (b)

(d) None

14. Mean global temperatures are likely to rise by _____ by 2030 and by _____ by year 2050 [a]

(a) 1.4°C and 2.1°C (b) 1.5°C and 2.0°C

(c) Both (a) and (b) (d) None

15. _____ are fire fighting agents that were introduced into Australia in the early 1970. [a]

(a) Halons (b) Methyl Bronide

(c) Cel_n (d) None

16. _____ is an ozone depleting substance (ODs) [b]

(a) CFCs (b) Methyl Bronide

(c) Cel_n (d) Halons

17. WMO means [a]
    (a) World Meteorological Organisation
    (b) World Metallurgical Organisation
    (c) Whole Meteorological Organisation
    (d) Whole Mittal Organisation

18. Rapid are of fossil fuel causes [c]
    (a) Deforestation (b) Green House Effect
    (c) Global Warming (d) None

19. The use of CFC in applications decreases ozone causing _____ [b]
    (a) Global warming (b) Ozone depletion
    (c) Air pollution (d) None

20. Stormy Weather indicates [a]
    (a) Floods, Cyclones & Storm (b) Fire, Smoke & Pollution
    (c) Sunlight, Winds & Monsoon (d) None

21. World Bank estimates that about _____ lives are lost world wide every year as a result of natural disaster [a]
    (a) 2,50,000 (b) 2,70,000
    (c) 2,40,000 (d) 2,60,000

22. The system is referred to as _____ in the Indian ocean and south pacific. [b]
    (a) Hurricane (b) Cyclone
    (c) Typhoons (d) All

23. India suffer very often from _____ types of natural disaster. [c]
    (a) 20 (b) 10
    (c) 30 (d) None

24. The Major disaster in Gujarat due to cyclone took place in [d]
    (a) June 1999 (b) June 1997
    (c) June 1996 (d) June 1998

25. GAW is _____ [a]

(a) Global Atmosphere Watch (b) General Atmosphere Watch

(c) Global Anytime Watch (d) None

26. ECC is _____ [b]

(a) Efficient Control Center (b) Emergency Control Center

(c) Emergency Center of Control (d) Efficient Center for Control

27. OSCs is _____ [a]

(a) On Scene Commander (b) Only Social Commander

(c) One Scene Commencement (d) None

28. According to global statistics the natural disaster due to [b]

(a) Accidents (b) Weather and Climate

(c) Pollution (d) All

29. The system is referred to as Typhoon in [c]

(a) Indian Ocean (b) Western Atlantic

(c) Western Pacific (d) None

30. For the monitoring and prediction, _____ stations are operated by WMO and its member countries. [a]

(a) 342 (b) 340

(c) 280 (d) None

31. The main objectives of air act [d]

(a) Prevention, control and abatement of air pollution

(b) Establishment of control and state boards to implement the act.

(c) To implement the provisions of act

(d) All above

32. One can control air pollution by [d]

(a) Use cars only when absolutely necessary.

(b) Observe an industry polluting air, inform the PCB.

(c) Down the number and send a letter to RTO of a polluting vehicle.

(d) All the above

33. The powers of control boards are [c]
    (a) To advise control government concurring prevention and control of pollution
    (b) Can provide technical assistance and guidelines to state boards
    (c) Both (a) and (b)
    (d) None

34. State boards has the powers of [c]
    (a) Advising state government conserving pollution
    (b) Can plan a comprehensive program for preventing pollution
    (c) Both (a) and (b)
    (d) None

35. Role of join organizations [d]
    (a) Protection of Biodiversity
    (b) World Wide Fund for Nature - India
    (c) Bombay Natural History Society
    (d) All of the above

36. _____ are not permitted to trespass into the reserved forest [b]
    (a) Elephants (b) Cattle
    (c) Lions (d) None

37. The forest conservation act of 1980 was exacted to control _____. [a]
    (a) Deforestation (b) Destructive activities
    (c) Both (a) and (b) (d) None

38. Penalty for offences in protected forests shall be punishable with improvement of _____. [b]
    (a) 9 months (b) 6 months
    (c) 3 months (d) 10 months

39. Pesticides usage is avoided at home like [d]
    (a) DDT (b) Malathion
    (c) Alders (d) All of the above

40. Reports of violations can be made to [d]

(a) Conservator of forest (b) Range forest officer

(c) District forest offices (d) All of the above

41. A US Company was granted a patent for discovering extracts of _____.[a]

(a) Archar (b) Hybrid Vegetable

(c) Both (a) and (b) (d) None

42. The Archar is used in treatment of [d]

(a) Diabetes (b) Hypoglycemia

(c) Obesity (d) All the above

43. Over one third of the population in developing countries lack access to essential _____ medicines. [a]

(a) Allopathic (b) Homeopathy

(c) Ayurvedic (d) All

44. The storehouse of knowledge leads to many new _____ for modern pharmaceutical products. [a]

(a) Discoveries (b) Development

(c) Both (a) and (b) (d) None

45. _____ is known to reduce asthma attacks [c]

(a) Exercise (b) Medicine

(c) Yoga (d) All of the above

46. _____ has been found to be effective against several infections disease [a]

(a) Traditional medicine (b) Ayurvedic Medicine

(c) Medicines (d) All of the above

47. The right to land or common property resources of tribal people is infringed upon by large development projects such as _____ and _____. [c]

(a) Dams (b) Mining

(c) Both (a) and (b) (d) None

48. A deteriorating environment shortens _____. [c]
(a) Wealth (b) Environment
(c) Life Span (d) All

49. A _____ approach is needed to appreciate and support millions of people left behind in 20th century's health resolution. [a]
(a) Human rights (b) Equity
(c) Environment (d) None

50. Environmental issues includes the _____ distribution of environmental resources. [b]
(a) Unequal (b) Equitable
(c) Approximate (d) None

51. Womens, especially in lower income groups, both in _____ and _____ sector, work longer hours than men. [d]
(a) Rural & Urban (b) Rural
(c) Urban (d) All of the above

52. _____ is observed due to indequate nutrition. [c]
(a) Malnutrition (b) Anemia
(c) Both (a) and (b) (d) None

53. _____ and _____ are often last to eat, in traditional society. [a]
(a) Women & Girls (b) Mens
(c) Boys (d) None

54. _____ is a rash that appears with fewer and body ache in children. [a]
(a) Measles (b) Malaria
(c) Typhoid (d) None

55. "Very Sick" young infant condition is observed in [a]
(a) Pheumonia (b) Ear infection
(c) Anemia (d) None

56. Children between _____ and _____ of age are at increased risk of malnutrition. [a]
(a) 6 months and 2 years (b) 2 years
(c) 3 years (d) 8 months

FACULTIES OF ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCES & MANAGEMENT

B.A./B.Sc./B.Com./B.S.W/B.B.A

I Year I Semester Examination

Model Paper - I

ENVIRONMENTAL SCIENCE

Time: 1½ Hours] [Max. Marks : 40

Note: Answer all Questions from Part - A and Part - B

Section - A (2 × 5 = 10 Marks)
(Short Answer Type)

Note: Answer the following questions

ANSWERS

1. Write about primary consumers and secondary consumers. **(Unit - I, SQA-4)**

2. What measures are taken to protect ozone layer ? **(Unit - II, SQA-6)**

Section - B (2 × 15 = 30 Marks)
(Essay Answer Type)

3. (a) What are Renewable resources and its associated problems ? **(Unit - I, Chapter-V, Q.No. 1)**

OR

(b) How the Energy flow takes place in the ecosystem. **(Unit - I, Chapter-III, Q.No. 1)**

4. (a) Write about the Harmful effects of Fireworks ? **(Unit - II, Chapter-IV, Q.No. 1)**

OR

(b) Describe in detail about various factors involved in women and child welfare. **(Unit - II, Chapter-VIII, Q.No. 1)**

FACULTIES OF ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCES & MANAGEMENT

B.A./B.Sc./B.Com./B.S.W/B.B.A

I Year I Semester Examination

Model Paper - II

ENVIRONMENTAL SCIENCE

Time: 1½ Hours] [Max. Marks : 40

Note: Answer all Questions from Part - A and Part - B

Section - A (2 × 5 = 10 Marks)
(Short Answer Type)

Note: Answer the following questions

ANSWERS

1. What are the Forest functions ? **(Unit - I, SQA-14)**

2. What are the various types of Disasters ? **(Unit - II, SQA-10)**

Section - B (2 × 15 = 30 Marks)
(Essay Answer Type)

3. (a) What is meant by environment studies? Write on its study of importance in society. **(Unit - I, Chapter-I, Q.No. 1)**

OR

(b) Write about In-situ and Ex-situ conservations of biodiversity. **(Unit - I, Chapter-IV, Q.No. 4, 5)**

4. (a) What are the sources and effects of air pollution? **(Unit - II, Chapter-I, Q.No. 2)**

OR

(b) Write about pond ecosystem and forest ecosystem. **(Unit - II, Chapter-IX, Q.No. 5, 6)**

FACULTIES OF ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCE & MANAGEMENT

B.A./B.Sc./ B.Com. /B.S.W./B.B.A. (CBCS) I-Semester Examination

November / December - 2019

ENVIRONMENTAL SCIENCE

Time : 1½ Hrs] [Max. Marks : 40

PART - A (2 × 5 = 10 Marks)
[Short Answer Type]
Note : Answer all the questions

ANSWERS

1. Solar energy **(Unit-I, Chapter-V, Q.No. 5)**
2. Human Rights **(Unit-II, SQA-17)**

PART - B (2 × 15 = 30 Marks)
[Essay Answer Type]

Note: Answer all the questions using the internal choice.

3. a) Define Bio-Diversity. Explain the concept, hot-spots and threats in detail. **(Unit-I, Chapter-IV, Q.No. 1, 2, 3)**

OR

b) Explain the Water Resources, Conservation and Focus on Rain Water Harvesting. **(Unit-I, Chapter-VI, Q.No. 1, 2)**

4. a) Explain Disaster Management. Focus on the concept with a viable example. **(Unit-II, Chapter-V, Q.No. 1)**

OR

b) Wild Life Protection – Focus on increasing awareness and its implications on Society. **(Unit-II, Chapter-VI, Q.No. 3)**

FACULTIES OF ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCE & MANAGEMENT

B.A./B.Sc./ B.Com. /B.S.W./B.B.A. (CBCS) I-Semester (backlog) Examination,

May / June - 2019

ENVIRONMENTAL STUDIES

Paper - I

Time: 3 Hours Max. Marks: 40

PART – A (2 x 5 = 10 Marks)
(Short Answer Type)
Note: Answer any FIVE of the following questions

ANSWERS

1. Hot – spots **(Unit-I, Chapter-IV, Q.No. 2)**
2. Global warming **(Unit-II, Chapter-III, Q.No. 1)**

PART - B (2 × 15 = 30 Marks)
[Essay Answer Type]

Note: Answer all the questions using the internal choice.

3. (a) Explain in brief about genetic and species diversity. **(Unit-I, Chapter-IV, Q.No. 1)**

OR

(b) Write in brief about renewable and non-renewable Energy resources. **(Unit-I, Chapter-V, Q.No. 1, 2)**

4. (a) Write an essay on causes, effects and control measures of water pollution. **(Unit-II, Chapter-II, Q.No. 3)**

OR

(b) Write an account on disaster management. **(Unit-II, Chapter-IV, Q.No. 1)**

FACULTIES OF ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCE & MANAGEMENT

B.A./B.Sc./ B.Com. /B.S.W./B.B.A. (CBCS) I-Semester (backlog) Examination,

May / June - 2018

ENVIRONMENTAL STUDIES

Paper - I

Time: 3 Hours Max. Marks: 40

PART – A (2 x 5 = 10 Marks)
(Short Answer Type)

Note: Answer any FIVE of the following questions **ANSWERS :**

1. Decomposers **(Unit-I, Q.No.5)**

2. Wild life protection act **(Unit-II, Chapter-VI, Q.No.3)**

PART - B (2 × 15 = 30 Marks)
[Essay Answer Type]

Note: Answer all the questions using the internal choice.

3. (a) Write briefly about ex situ conservation of Biodiversity. **(Unit-I, Chapter-IV, Q.No.5)**

OR

(b) Write an account on definition scope and importance of environmental studies. **(Unit-I, Chapter-I, Q.No.1)**

4. (a) Describe briefly about causes and control measures of water pollution. **(Unit-II, Chapter-I, Q.No.4,5)**

OR

(b) Discuss the role of information Technology in environment and human health. **(Unit-II, Chapter-IX, Q.No.2,3)**

FACULTIES OF ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCE & MANAGEMENT

B.A./B.Sc./B.Com./ B.S.W./B.B.A. (CBCS) I-Semester Examination

December - 2017

ENVIRONMENTAL STUDIES

Paper - I

Time: 3 Hours Max. Marks: 40

PART – A (2 x 5 = 10 Marks)
(Short Answer Type)

Note: Answer any FIVE of the following questions **ANSWERS**

1. Hot spots **(Unit-I, Chapter-IV, Q.No.2)**

2. Global warming **(Unit-II, Chapter-III, Q.No.1)**

PART - B (2 × 15 = 30 Marks)
[Essay Answer Type]

Note: Answer all the questions using the internal choice.

3. (a) Write in brief about watershed management. **(Unit-I,Chapter-VI, Q.No.2)**

OR

(b) Write an account on species and ecosystem diversity. **(Unit-I, Chapter-IV, Q.No.1)**

4. (a) Discuss the role information technology in environment and human health. **(Unit-II, Chapter-IX, Q.No.2)**

OR

(b) Describe briefly the causes, effect and control measures of Air pollution. **(Unit-II, Chapter-I, Q.No.1,2)**

FACULTIES OF ARTS, SCIENCE, COMMERCE, SOCIAL SCIENCES & MANAGEMENT

B.A./B.Sc./B.Com./B.S.W/B.B.A

I Year I Semester Examination

December - 2016

ENVIRONMENTAL STUDIES

Time: 1½ Hours] [Max. Marks : 40

Note: Answer all Questions from Part - A and Part - B

Section - A (2 × 5 = 10 Marks)
(Short Answer Type)

Note: Answer the following questions

ANSWERS

1. Write briefly about decomposers. **(Unit - I, Chapter-II, Q.No. 1)**

2. What is global warming? **(Unit - II, Chapter-III, Q.No. 1)**

PART - B (2 × 15 = 30 Marks)
[Essay Answer Type]

Note: Answer all the questions using the internal choice.

3. (a) What is biodiveristy and write briefly about ex-situ conservation? **(Unit - I, Chapter-IV, Q.No. 1, 5)**

OR

(b) Write an account on rain water harvesting and watershed management. **(Unit - I, Chapter-II, Q.No. 1)**

4. (a) Write an account on causes and effects of air pollution? **(Unit - II, Chapter-VI, Q.No. 2, 3)**

OR

(b) Write about the role of information technology in environment and human health. **(Unit - II, Chapter-IX, Q.No. 2)**