KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University Established under Section 3 of UGC Act 1956)

Pollachi Main Road, Eacharani Post, Coimbatore-641 021

DEPARTMENT OF COMPUTER APPLICATIONS

Semester – I

18AEC101 **ENVIRONMENTAL STUDIES** **4H – 4C**

Instruction Hours / week: L: 4 T: 0 P: 0 Marks: Int : 40 Ext : 60 Total: 100

SCOPE

The study creates awareness among the people to know about various renewable and nonrenewable resources of the region, enables environmentally literate citizens (by knowing the environmental acts, rights, rules, legislation, etc.) to make appropriate judgments and decisions for the protection and improvement of the earth.

OBJECTIVES

- Creating the awareness about environmental problems among people.
- Developing an attitude of concern for the environment.
- Motivating public to participate in environment protection and improvement.

UNIT-I: Environment Definition, scope and importance, components, Ecosystem Definition, Concept, Scope, importance, Structure and functions of ecosystem. Energy flow, Ecological succession Food chains and food webs. Classification of ecosystem.

Unit II: Natural Resources - Renewable and Non-renewable Resources: Natural resources and associated problems. Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources : Use and over-utilization, exploitation. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. Ill-effects of fire works.

Unit III: Biodiversity and Its Conservation: Introduction, definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

Unit IV: Environmental Pollution - Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution , Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management: Causes, effects and control measures of urban and

industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: Foods, earthquake, cyclone and landslides.

Unit V: Social Issues and the Environment: From unsustainable to sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Population growth, variation among nations. Population explosion—Family Welfare Programme. Environment and human health. Human rights. Value education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in environment and human health.

Suggested Readings

T1: Tripathy. S.N., & Sunakar Panda. (2004). Fundamentals of Environmental Studies (2nd ed.) . New Delhi: Vrianda Publications Private Ltd.

T2: Arvind Kumar. (2004). A Textbook of Environmental Science. New Delhi: APH Publishing Corporation.

T3:Verma, P.S., & Agarwal V.K. (2001). Environmental Biology (Principles of Ecology) . New Delhi: S.Chand and Company Ltd.

T4: Anubha Kaushik., & Kaushik, C.P. (2004). Perspectives in Environmental Studies. New Delhi: New Age International Pvt. Ltd. Publications.

R1: Singh, M.P., Singh, B.S., & Soma, S. Dey. (2004). Conservation of Biodiversity and Natural Resources. New Delhi: Daya Publishing House.

R2: Daniel, B. Botkin., & Edward, A. Keller. (1995). Environmental Science New York: John Wiley and Sons, Inc.,.

R3: Uberoi, N.K. (2005). Environmental Studies. New Delhi: Excel Books Publications.

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DEPARTMENT OF COMPUTER SCIENCE, APPLICATIONS

AND INFORMATION TECHNOLOGY

SUBJECT NAME: ENVIRONMENTAL STUDIES **CLASS : I BCA**

SUBJECT CODE: 18AEC101 **SEMESTER: I**

S.No.	Lecture Duration (Period)	Topics to be Covered	Support Materials
Unit – I			
1.	1	Environment Definition, scope and importance	T4 : 1-4,T2:1,
2.	1	Components of environment	T1:1,2
3.	1	Ecosystem Definition, Concept, Scope, importance	T4 :65-66,T2:55,56, T4:52,53
4.	1	Structure of ecosystem	T4 :66-68
5.	1	Functions of ecosystem, Energy flow through the ecosystem	T4 :68,76-78
6.	1	Ecological succession	T4 :84-87
7.	1	Food chains and food webs	T4 :69-72
8.	1	Classification of ecosystem.	T4 :76
9.	1	Recapitulation and Discussion of important questions	
Total No. of Hours Planned for Unit-I			**9**
Unit – II			
1.	1	Natural resources and associated problems. Forest resources	T4:6-11

2.	1	Water resources	T4 : 13-22,T2:37-40
3.	1	Mineral resources	T4 : 23-28, T2:43-48
4.	1	Food resources	T4:30-36
5.	1	Energy resources	T4 :38-52,T2:32-35
6.	1	Land resources : Use and over-utilization, exploitation	T4 : 40-43
7.	1	Role of an individual in conservation of natural resources.	T4 : 59-61
8.	1	Equitable use of resources for sustainable lifestyles. Ill-effects of fire works	T4 : 62-63
9.	1	Recapitulation and Discussion of important questions	
Total No. of Hours Planned for Unit-II			**9**
Unit – III			
1.	1	Introduction, definition: genetic, species and ecosystem diversity.	T4 : 98,99
2.	1	Biogeographical classification of India. Value of biodiversity: consumptive use, productive use	T4:100-102
3.	1	Value of biodiversity:social, ethical, aesthetic and option values.	T4 :102,103
4.	1	Biodiversity at global, National and local levels	T4 :104-107
5.	1	India as a mega-diversity nation. Hot-spots of biodiversity.	T4 :107-111

6.	1	Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts	T4:111-114
7.	1	Endangered and endemic species of India	T4 :115-118
8.	1	Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.	T4 :119-121
9.	1	Recapitulation and Discussion of important questions	
		Total No. of Hours Planned for Unit-III	**9**
Unit – IV			
1.	1	Definition, Causes, effects and control measures of Air pollution	T4:123-127
2.	1	Water pollution, Soil pollution	T4: 132-135,141-143
3.	1	Marine pollution, Noise pollution	T4:140,141,127-132
4.	1	Thermal pollution, Nuclear hazards,	T4:136-139.143,144
5.	1	Solid waste management: Causes, effects and control measures of urban and industrial wastes	T4:145-148
6.	1	Role of an individual in prevention of pollution	T4:148-150
7.	1	Pollution case studies	T4:150-153
8.	1	Disaster management: Foods, earthquake, cyclone and landslides.	T4:154-158
9.	1	Recapitulation and Discussion of important questions	
		Total No. of Hours Planned for Unit-IV	**9**

Unit – V			
1.	1	From unsustainable to sustainable development. Urban problems related to energy.	T4:161-165
2.	1	Water conservation, rain water harvesting, watershed management.	T4: 165-171
3.	1	Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions.	T4:171-177
4.	1	Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation.	T4:178-189
5.	1	Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act	T4:192-201
6.	1	Issues involved in enforcement of environmental legislation, Public awareness. Population growth, variation among nations.	T4:204-213
7.	1	Population explosion—Family Welfare Programme. Environment and human health. Human rights	T4:216-223
8.	1	Value education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in environment and human health.	T4:225-233
9.	1	Recapitulation and Discussion of important questions	
10.	1	Recapitulation and Discussion of previous semester	

		question papers	
11.	1	Recapitulation and Discussion of previous semester question papers	
12.	1	Recapitulation and Discussion of previous semester question papers	
Total No. of Hours Planned for Unit-V			**12**

Textbook

T1: Tripathy.S.N. and Sunakar Panda. 2004. Fundamentals of Environmental Studies; 2nd Edition, Vrianda Publications Private Ltd., New Delhi.

T2: Arvind Kumar, 2004. A Textbook of Environmental Science; APH Publishing Corporation, New Delhi.

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UNIT-I

Environment – Definition – components - Ecosystem -Definition, Concept, Scope, importance, structure and functions of ecosystem. Energy flow, Ecological succession. Food chains and food webs. Classification of ecosystem. Environmental pollution –Causes, effects and preventive measures of air, water, soil, noise and thermal pollution

ENVIRONMENT

DEFINITION

- Environment is the sum total of what is around something or someone. It includes living things and natural forces. The environment of living things provides conditions for development and growth, as well as of danger and damage. Living things do not simply exist in their environment.
- Environment is derived from the French word Environner which means to encircle or surround.
- All the biological and non-biological things surrounding an organism are thus included in environment.
- Thus environment is sum total of water, air and land, inter-relationships among themselves and also with the human beings, other living organisms and property.
- The above definition given on Environment (Protection) Act, 1986 clearly indicates that environment includes all the physical and biological surroundings and their interactions.

COMPONENTS

- The natural environment of a living organism can be divided into three components.
    - Biotic components
    - Abiotic components
    - Energy components

Biotic Components

- It consists of all the living organisms present within the environment.
- Biotic factors are the living parts of an ecosystem---the animals, plants and microorganisms.

Abiotic components

- All other substances except living organisms are known as abiotic components.
- The abiotic components broadly consist of atmosphere (air), Hydrosphere (water) and Lithosphere (soil).

Energy components

- The energy component may be solar energy, geo-chemical energy, thermo-electrical energy, hydro-electrical energy, atomic energy and energy due to radiation.

ECOSYSTEM

Definition

- Tansley (1935) – self regulating group of biotic communities of species interacting with one another and with their non-living environment exchanging energy and matter

CONCEPT OF ECOSYSTEM

- Living organisms cannot be isolated from their non-living environment because the later provides materials and energy for the survival of the farmer.
- An ecosystem is therefore defined as a natural functional ecological unit comprising of living organisms and their non-living environment that interact to form a stable self supporting system.

  Eg. Pond, lake, desert, grassland, forest, etc.

Ecosystem characteristics

- Structural features - composition and organization of biological communities and abiotic components constitute- structure of Ecosystem.
- Biotic structure – Plants, animals, microorganisms – form biotic components – nutritional behavior and status in the ecosystem – producers or consumers – how do they get their food.

SCOPE OF ECOSYSTEM

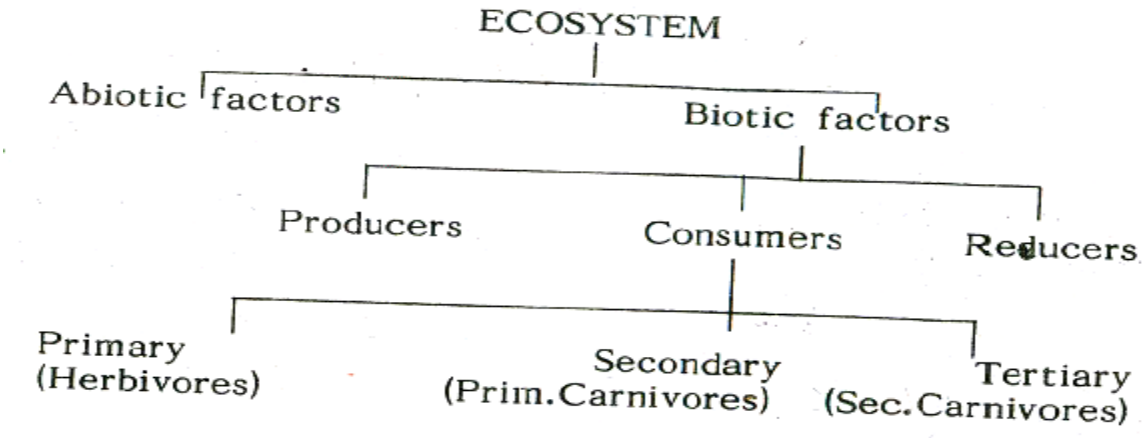
- Modern ecology focuses on the basic functional ecological unit the ecosystem.
- An ecosystem is any spatial or organizational unit which includes a community of living organisms and non-living substances of environment interacting to produce an exchange of materials between the living and non-living parts.
- It may be as small as a puddle or as large as the entire earth (biosphere or ecosphere).
- Further, an ecosystem may be natural as a pond, a lake, a river, an estuary, an ocean, a forest, etc., or it may be man-made or artificial like an aquarium, a dam, a cropland, a garden, an orchard, a city and so on.
- The term ecosystem was coined by A.G. Tansely (1935) – its 'eco' part means environment and the 'system' part implies, a complex of coordinated units.

IMPORTANCE OF ECOSYSTEM

- Ecosystem study indicates the available solar energy and the efficiency of an ecosystem to trap the same.
- It gives information about the available essential minerals and their recycling periods.
- Gross and net productivity of an ecosystem are known.
- It provides knowledge about the web of interactions and interrelations amongst the various populations as well as between populations and the abiotic environment.
- It helps human beings to know about conservation of resources, protection from pollution and inputs required for maximizing productivity.

STRUCTURE OF ECOSYSTEM

- The structure of any ecosystem is formed of two components, namely
  - Abiotic factors
  - Biotic factors.



Structure of an ecosystem.

Abiotic Factors : The abiotic factors of an ecosystem include the non-living substances of the environment.

Example

- Water, soil, air, light, temperature, minerals, climate, pressure etc.
- The biotic factors of the ecosystem depend on the abiotic factors for their survival.

Biotic Factors: The biotic factors include the living organisms of the environment.

Example : Plants, animals, bacteria, viruses etc.

- The biotic factors of an ecosystem are classified into three main groups
    - Producers
    - Consumers
    - Reducers or decomposers.

Producers

- The organisms which carryout photosynthesis constitutes the producers of an ecosystem.
    - **Eg.** Plants algae and bacteria.
- The producers depend on the abiotic factors of the ecosystem for producing energy.
- They are provided with chlorophyll.
- Chlorophyll is used in the synthesis of energy rich compounds with the utilization of abiotic factors like light, CO2, water and minerals
- A portion of the energy synthesized, is used by the producers for their growth and survival and the remaining energy is stored for future use.

Consumers

- Consumers are organisms which eat or devour other organisms.
- The consumers are further divided into three or more types.
- They are primary consumers, secondary consumers and tertiary consumers.

(i) Primary Consumers

- They eat the producers like plants, algae and bacteria.
- The primary consumers are also called herbivores.
- Elton referred the herbivores as key industry animals.
- Rabbit, deer, etc., are primary consumers in a terrestrial ecosystem.

(ii) Secondary Consumers

- They kill and eat the-herbivores.
- They are also called carnivores.

- As these carnivores directly depend on herbivores, they are specifically called primary carnivores.
- Fox, wolf, etc. are the secondary consumers in a terrestrial ecosystem.

(iii) Tertiary Consumers

- They kill and eat the secondary consumers.
- They are also called secondary carnivores.
    - **Eg**. Lion, tiger, etc.

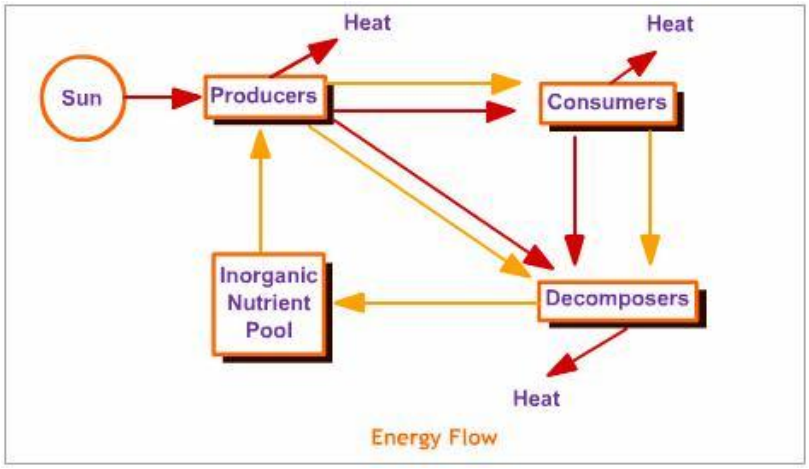
Reducers or Decomposers

- The decomposers are organisms that break up the dead bodies of plants and their waste products.
- They include fungi and certain bacteria.
- They secrete enzymes.
- The enzymes digest the dead organisms and the debris into smaller bits or molecules.
- These molecules are absorbed by the reducers.
- After taking energy, the reducers release molecules to the environment as chemicals to be used again by the producers.

FUNCTIONS OF ECOSYSTEMS

- Ecosystems have some functional attributes which keep the component parts running together.
- For example – green leaves prepare food and roots absorb nutrients from the soil.
- Herbivores feed on part of the plant production, and in turn serve as food for carnivores.
- Decomposers carry out the function of breaking down complex organic materials into simple inorganic product which can be used by the producers.
- All these functions in an ecosystem occur through delicately balanced and controlled processes.
- Thus, this cycle goes on and on, leading to efficient continuous functioning of the ecosystem.
- Food chain, food web and trophic structure.
- Energy flow
- Cycling of nutrients (biogeochemical cycles)
- Primary and secondary production
- Ecosystem development and regulation.

ENERGY FLOW IN ECOSYSTEM



- The diagram above shows how both energy and inorganic nutrients flow through the ecosystem.
- We need to define some terminology first.
- Energy "flows" through the ecosystem in the form of carbon-carbon bonds.
- When respiration occurs, the carbon-carbon bonds are broken and the carbon is combined with oxygen to form carbon dioxide.
- This process releases the energy, which is either used by the organism (to move its muscles, digest food, excrete wastes, think, etc.) or the energy may be lost as heat.
- The dark arrows represent the movement of this energy.
- Note that all energy comes from the sun, and that the ultimate fate of all energy in ecosystems is to be lost as heat. Energy does not recycle!!
- The other component shown in the diagram is the inorganic nutrients.
- They are inorganic because they do not contain carbon-carbon bonds.
- These inorganic nutrients include the phosphorous in your teeth, bones, and cellular membranes; the nitrogen in your amino acids (the building blocks of protein); and the iron in your blood (to name just a few of the inorganic nutrients).
- The movement of the inorganic nutrients is represented by the open arrows.
- Note that the autotrophs obtain these inorganic nutrients from the inorganic nutrient pool, which is usually the soil or water surrounding the plants or algae.
- These inorganic nutrients are passed from organism to organism as one organism is consumed by another.
- Ultimately, all organisms die and become detritus, food for the decomposers.
- At this stage, the last of the energy is extracted (and lost as heat) and the inorganic nutrients are returned to the soil or water to be taken up again.
- The inorganic nutrients are recycled, the energy is not.
- Many of us, when we hear the word "nutrient" immediately think of calories and the carbon-carbon bonds that hold the caloric energy.
- IT IS VERY IMPORTANT that you be careful in your use of the word nutrient in this sense.
- When writing about energy flow and inorganic nutrient flow in an ecosystem, you must be clear as to what you are referring.
- Unmodified by "inorganic" or "organic", the word "nutrient" can leave your reader unsure of what you mean.

- This is one case in which the scientific meaning of a word is very dependent on its context. Another example would be the word "respiration", which to the layperson usually refers to "breathing", but which means "the extraction of energy from carbon-carbon bonds at the cellular level" to most scientists (except those scientists studying breathing, who use respiration in the lay sense).

To summarize: In the flow of energy and inorganic nutrients through the ecosystem, a few generalizations can be made:

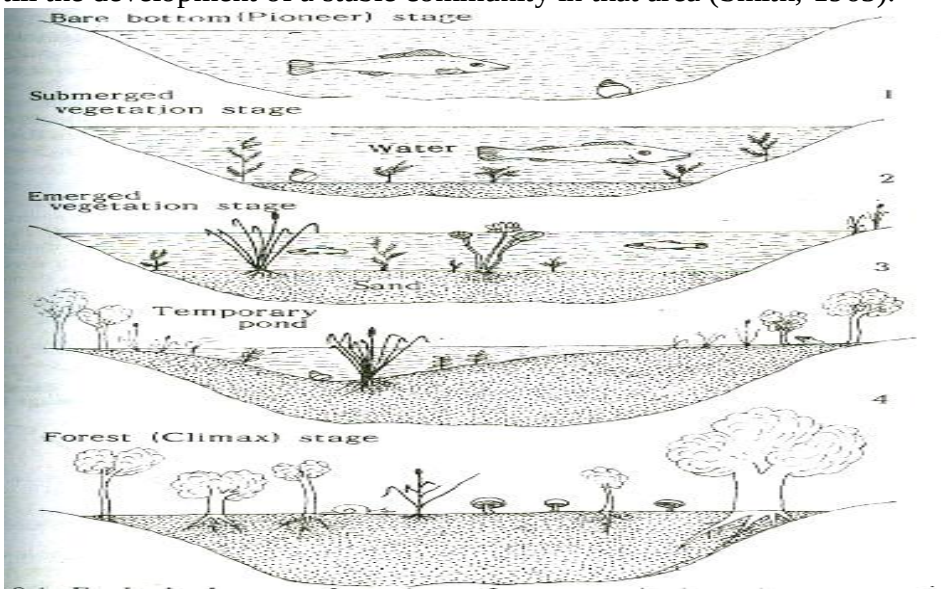
1. The ultimate source of energy (for most ecosystems) is the sun
2. The ultimate fate of energy in ecosystems is for it to be lost as heat.
3. Energy and nutrients are passed from organism to organism through the food chain as one organism eats another.
4. Decomposers remove the last energy from the remains of organisms.
5. Inorganic nutrients are cycled, energy is not.

ECOLOGICAL SUCCESSION

- The communities in any area are not stable.
- They are changing into other forms of communities from time to time.
- Thus in a particular area one community may be replaced by another community or by a series of communities.

For example

- A pond community can be transformed into a marshy land community, if he pond is gradually filled with sand and mud.
- The marshy land in the course of time may give rise to a grassland community or a forest community according to the environmental factors prevailing there.
- This process of development of new communities is called ecological succession.
- It can be defined as an orderly and progressive replacement of one community by another till the development of a stable community in that area (Smith, 1965).



Ecological succession. A pond community is replaced by a forest community through ecological succession

Significance of Succession

- Ecological succession creates a stable community in the fluctuating physical environment. The stable or climax community has the ability to buffer and control the physical forces like water, temperature etc.
- It plays an important role in the slow dispersal of animals.

FOOD CHAINS

- The biotic factors of the ecosystem are linked together by food.

For example

- The producers form the food for the herbivores.
- The herbivores the food for the carnivores.
- The sequence of the eaters being eaten is called food chain.

  Producers ----------> Herbivores ----------> Carnivores
- The various steps in a food chain are called trophic levels.
- Owing to repeated eating being eaten the energy is transferred from to another trophic level.
- This transfer of energy from one trophic level to another is called energy flow.
- A typical food chain can be seen in a pond ecosystem.
- The algae and phytoplankton are eaten by the zooplankton.
- The zooplankton are eaten by fishes which are eaten by snakes.

Pond Ecosystem

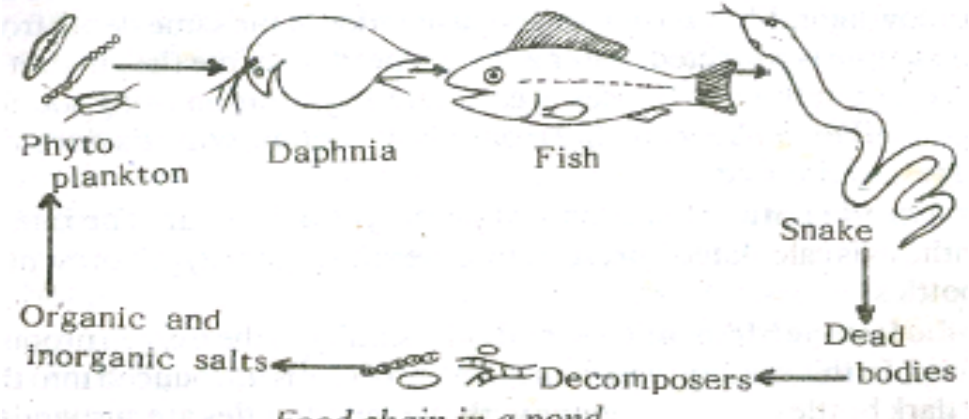
Phytoplankton ----------> Zooplankton ----------> Fishes ---------> Snakes

Grassland Ecosystem

Plants ----------> Mouse ----------> Snake ----------> Hawk

Forest Ecosystems

Plants ----------> Goat ----------> Man ----------> Lion



Food chain in a pond.

Types of food chains

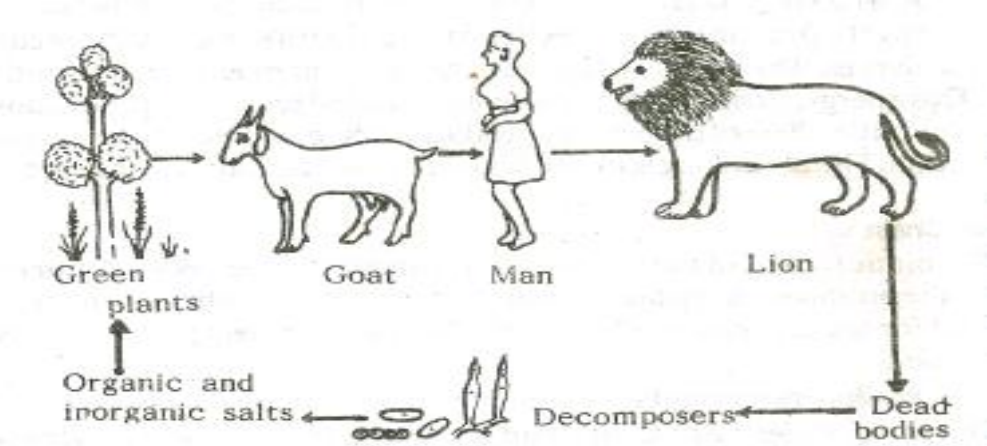
- The food chains are of two types, namely
  - Grazing food chain
  - Detritus food chain

Grazing food chain

- This food chain starts from plants, goes through herbivores and ends in carnivores.

  Plants-----> Herbivores ------> Primary carnivores-----> secondary carnivores

- This type of food chain depends on the autotrophs which capture the energy from solar radiation.



Food chain in a forest.

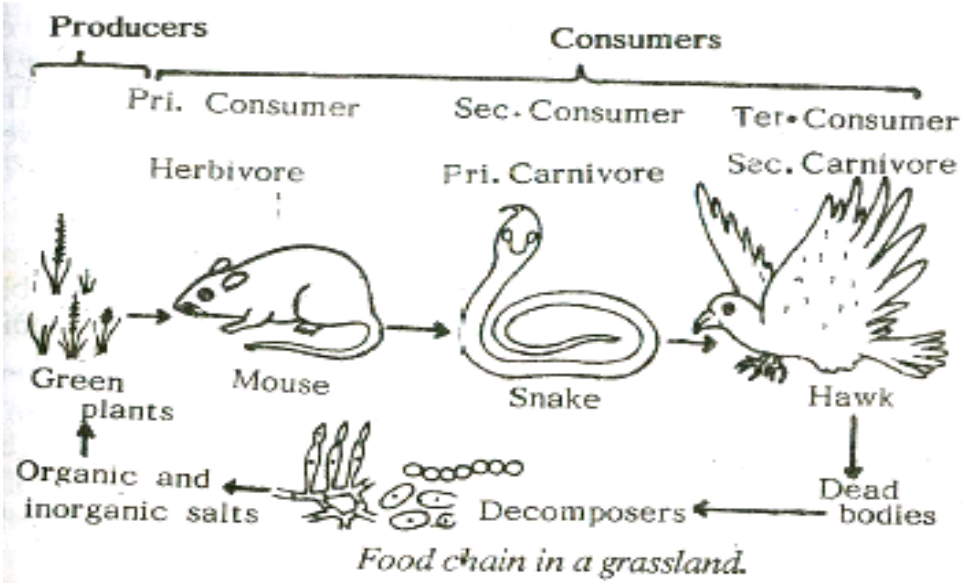
A few chains are given below

Grass --------> Grasshopper --------> Lizard --------> Hawk
Grass --------> Mouse ----------> Snake ---------> Hawk
Phytoplankton ----------> Zooplankton ----------> Fishes ---------> Snakes

- The grazing food chain is further divided into two types, namely
  - Predator chains
  - Parasitic chains

Predator chains

- In predator food chains one animal capture and devours another animal.
- The animal which is called prey and the animal which eats other animals is called predator.
- The predator food chain is formed of plants, herbivores, primary carnivores, secondary carnivores and so on.



Food chain in a grassland.

Parasitic chain

- The plants and animals of the grazing food chain are infected by parasites.
- The parasitic chain within the grazing food chain is formed.

Detritus food chain

- It starts with dead organic matter and ends in inorganic compounds.
- There are certain groups of organisms which feed exclusively on the dead bodies of animals and plants.
- These organisms are called Detritivores.
- The Detritivores include algae, bacteria, fungi, protozoans, insects, millipeds, centripeds, crustaceans, mussels, clams, annelid worms, nematodes, ducks, etc.
- These organisms ingest and digest the dead organic materials.
- Some amount of energy is trapped and the remainder is excreted in the form of simple organic compounds.
- These are again used by another set of Detritivores until the organic compounds are converted into CO2 and water.

Dead organic materials ----------> Detritivores ----------> CO2 + H2O

Linking of Grazing and Detritus Food Chains

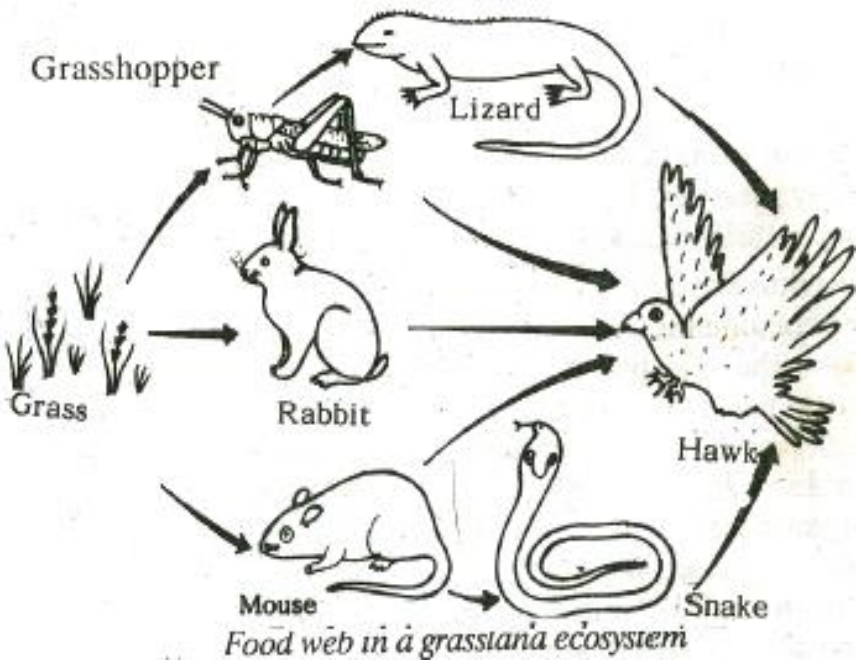
- The two main food chains cannot operate independently.
- They are interconnected at various levels.
- According to Wilson and Bossert (1971) the stability of the ecosystem directly proportional to the number of such links.
- The detritus feeders obtain energy form the dead bodies of animals and plants which are components of the grazing food chain.
- Again some of the detritus feeders are eaten by the consumers of the grazing food chain.
- For example, in a pond ecosystem earthworms belonging to the detritus food chain are eaten by fishes belonging to the grazing food chain.

FOOD WEB

- In an ecosystem the various food chains are interconnected with each other to form a net work called food web.
- The interlocking of many food chains is called food web.
- Simple food chains are very rare in nature.
- This is because each other organisms may obtain food from more than one trophic level.
- In other words, one organism forms food for more than one organisms of the higher trophic level.

Examples

- In a grassland ecosystem, grass is eaten by grasshopper, rabbit and mouse.
- Grasshopper is eaten by lizard which is eaten by hawk.
- Rabbit is eaten by hawk.
- Mouse is eaten by snake which is eaten by hawk.
- In addition hawk also directly eats grasshopper and mouse.
- Thus there are five linear food chains which are inter interconnected to form a food web.
- This is a very simple food web.
- But in any ecosystem the food web is more complex.
- For example, in the grassland itself, in addition to hawk, there are many other carnivores such as vulture, crow, wolf, fox, man, etc.



Food web in a grassland ecosystem

Significance of Food Web

- Food webs are very important in maintaining the stability of an ecosystem.
- For example, the deleterious growth of grasses is controlled by the herbivores.
- When one type of herbivores becomes extinct, the other types of herbivores increase in number and control the vegetation.
- Similarly, when one type of herbivores animal becomes extinct, the carnivores predating on this type may eat another type of herbivore.

CLASSIFICATION OF ECOSYSTEMS

- The ecosystem may be large, as large as the world or small, as small as a cow dung ecosystem.
- The biosphere (the total life content of the world) is the major ecosystem.
- It comprises all other ecosystems.

Mega Ecosystem

- The biosphere is formed of four mega ecosystems.

(i) Marine Ecosystem

- It includes saline-water ecosystems like oceans, seas, estuaries, brackish waters, etc.

(ii) Limnic Ecosystem

- It includes all fresh water ecosystems like pond, pools, lakes, rivers, streams, etc.

(iii) Terrestrial Ecosystems

- It includes the ecosystems of air, forests, grasslands, deserts, etc.

(iv) Industrial Ecosystems

- These are man-made ecosystems. Eg. Cropland, city town, etc.

Macro Ecosystems

- The mega ecosystem is further divided into sub units called macro ecosystems.

Examples

- Forests.

- The terrestrial macro ecosystem is formed of many forest ecosystem.

Meso Ecosystems

- The macro ecosystem is further divided into meso ecosystems.

Examples

- The forest ecosystem is formed of many meso ecosystems like deciduous forest, coniferous forest, etc.

Micro Ecosystems

- The meso ecosystem is further divided into micro ecosystems.

Examples

- A low land in a forest, a mountain in a forest, etc.
- All ecosystems in the world are further divided into natural and artificial ecosystems.

Natural Ecosystems

- These are self-regulating systems without much direct human interference and manipulations.

Examples

- Ponds, lakes, rivers, seas, oceans, grasslands, deserts, etc.

Artificial Ecosystems

- These are man-made ecosystems.

Examples : Crop lands, cities, towns, villages, etc.

ENVIRONMENTAL POLLUTION

Definition

- Pollution may be defined as an undesirable change in the physical, chemical or biological characteristics of our air, water and land that may or will harmfully affect human life, the lives of the desirable species, our industrial processes, living conditions and cultured assets, or that may or will waste or deteriorate our raw material resources.

Types of environmental pollution

- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards

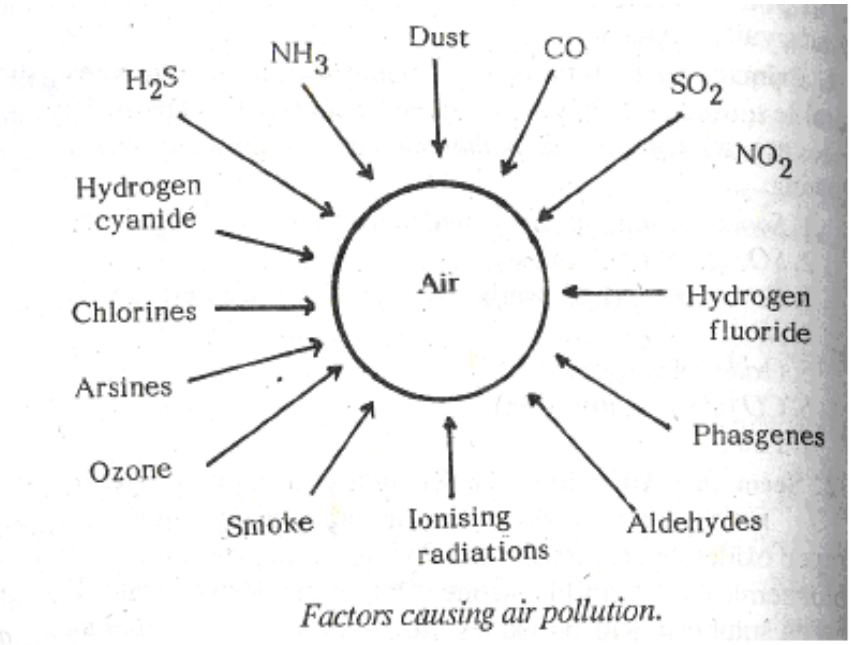
AIR POLLUTION

- Air pollution refers to the undesirable change occurring in air causing harmful effects on man and domesticated species.

Air pollutants

- Dust
- Smoke
- Sulphur oxides (CO)
- Nitrogen oxides (SO_2)
- Ammonia (NH_3)
- Nitrogen dioxide(NO_2)
- Hydrogen cyanide
- Hydrogen fluorides

- Hydrogen sulphide (H_2S)
- Chlorines
- Phosgenes
- Arsines
- Aldehydes
- Ozone
- Ionizing radiations
- CO_2



Factors causing air pollution.

Air pollutants are two types

- Primary air pollutants
- Secondary air pollutants

Primary Air Pollutants

- Air is polluted by poisonous gases and undesirable substances.
- They are released by burning fossil fuels.
- These substances are called primary air pollutants.

The primary pollutants are following

- Soot released from unburned fuel
- SO_2
- Benzopyrene (hydrocarbon) released from cigarette smoke.
- NH_3
- Oxides of nitrogen
- CO (carbon monoxide)
- Lead

Secondary Air Pollutants

- Secondary air pollutants are poisonous nitrogen oxides, hydrocarbons and O_2 interact to produce more powerful photochemical oxidants like ozone (O_3), peroxyacetyl nitrate (PAN), Aldehydes, sulphuric acid, peroxides, etc.
- All these constitute photochemical smog.

CAUSES OF AIR POLLUTION

Agriculture

- Hydrocarbons released by plants, pollen grains, insecticides etc. cause air pollution.

Dust

- Dust in the air is increased by dust storms, wind, volcanoes, automobiles, etc.

Industries

- The Combustion of fossil fuels like coal, petroleum, etc. in industries is the main source of pollution.

Automobiles

- The combustion of petrol and diesel in automobiles releases harmful gases into the air.
- They also produce dust.

Ionising Radiations

- Ionizing radiations include alpha particle, beta particles and gamma rays.
- They are released into the air from testing atomic weapons and atomic explosions.

Freons

- Use of freons and other chlorine-flourine-carbons as refrigerants, coolants and as filling agents in aerosol pachages cause pollution.

Aerosols

- Aerosols are small particles of all sorts of solid or liquid substances suspended in the air.
- They block the stomata of plants and prevent he gaseous exchanges between plants and atmosphere.
- They may also change the climate of an area.

Biological indicators

- Some plants are sensitive to certain air pollutants.
- These plants are used to indicate the presence of these substances.
- These plants are called biological indicators

Example

- The tissues present in the tip of dusheri mango turns black when they are exposed to sulphur dioxide (SO_2) fumes.
- Pinto beans and petunias are used to indicate the presence of peroxy acetyl nitrate (PAN).
- Tobacco and annual blue-grass plants are used to show the presence of ozone (O_3).

ECOLOGICAL EFFECTS OF AIR POLLUTION

Death

- When air is polluted with poisonous gases, death comes as a result immediately. Bopha episode is a good example.

Bhopal episode

- On 2nd December 1984about 3000 human beings died about 5000 paralysed and thousands of cattle, bird, dogs and cats died in one night at Bhopal.
- This mass death is due to the leakage of methyl isocyanate (toxic gas) into the air from art insecticide plant managed by Union Carbide.

Chlorosis

- The disappearance of chlorophyll is called Chlorosis.
- It is caused by SO_2 and fluorides present in the air.

Necrosis

- The breakdown of cells is called necrosis.
- It is caused by SO_2, nitrogen dioxide, ozone and fluorides.

Green house effect

- CO_2 is released into the air by the combustion of fuels.
- It is estimated that CO_2 content of the is increasing at the rated 0.4% per annum.

- This will result in an appreciable warming up of the ear.
- This is called green house effect.
- It is very likely that this will cause the melting of polar ice caps resulting in a rise of nearly 60 feet on the sea level.
- Coastal regions and low lying areas allover the world will be go under water.

Crop losses

- Heavy loss of crop plants is caused by smog.
- Smog denotes a combination of smoke and fog.
- The important components of s ozone and PAN (Peroxyacetyl nitrate).
- They damage leafy vegetables, cereals, textile crops, ornamental plants, fruits and forest trees.

Respiratory disorders

- Excessive ethylene accelerates respiration causing premature senescence (old age) and abscission (accumulation of yellow fluid (pus) in the body).
- Aldehydes irritate nasal and respiratory tracts.
- Chlorine and phosgenes (carbonyl chloride) cause pulmonary oedema.

Nausea

- H_2S smells like rotten eggs and nausea.

Vomiting

- SO_2 causes vomiting.

Jaundice

- Arsines induce RBC breakdown and jaundice.

Oxygen carrying capacity

- CO reduces O_2 carrying capacity of RBC by its permanent combination with haemoglobin.

Coughing

- Coughing is induced by phosgenes (carbonyl chloride).

Headache

- SO_2 causes headache.

Cancer

- Cancer is caused by air pollutants like ash, soot, smoke. chromium, nickel and radioactive elements.

Mutation

- Radioactive elements produce mutation.
- Ozone produces chromosomal aberrations.

Cardiac diseases

- Cadmium causes high blood pressure and heart diseases.

Pneumonia

- Pneumonia is caused by breathing in too much of manganese particles.

Depletion of Ozone Umbrella

- Intheatmosphere, about 30km above the surface of the earth, the ozone molecules (O_3) form an umbrella.
- It prevents the penetration of harmful ultra violet radiation from the sun and thus protects the life of the earth.
- It is now feared that there is danger of appearing holes on the ozone umbrella.

- This is caused by the use of freons and other chlorine-fluorine-carbons as refrigerents, coolants in domestic refrigerators and otter cold storage facilities, and as filling agents in foam plastics and in aerosol packages.
- Reaching ozone umbrella, they destroy ozone molecules as a result of photochemical reactions.
- Over the past 16 years, the density of the ozone layer has been diminishing at an average rate of 3%.
- It is calculated that the depletion of ozone layer by I% results in an increase in the incidence of skin cancer by 5% to 7%.

Acid Rains

- One of the major environmental issues facing human society at the National and International level is the problem of acid.
- The rainwater is always slightly acidic as CO_2 in the atmosphere gets dissolved in it.
- However during recent years, it has been noted a further lowering of pH of rainwater often as 2.4.
- This lowering of pH is due to the dissolution of acids in the rain water.
- Precipitation of oxides of sulphur and nitrogen with rain is termed acid rain.
- Acid rain is caused by air pollution.
- When atmospheric air contains sulphur dioxide (SO_2) and oxides of nitrogen such as nitrous oxide (N_2O) and nitric oxide (NO), they dissolve in rainwater forming sulphuric acid and nitric acid.
- The rain water falls as acid rain.
- The main source of oxides of sulphur and nitrogen is the burning of fossil fuels in power plants based on coal and oil contribute more than 60% of all sulphur oxides and 25 to 20% of nitrogen oxides in the atmosphere.
- Automobiles make a sustainable contribution in large cities.
- Ozone is now recognized as a major factor in the formation of acid rain.
- Acid rain affects both materials and organisms.
- It attacks building materials principally sandstone, limestone, marble, steel and nickel.
- In plants, it leads to Chlorosis (gradual yellowing in which the chlorophyll making mechanism is impeded) or depigmentation of leaves.
- Acid rain increases the acidity of lakes and rivers.
- Vast tracts of forests and lakes in Europe and North America have been destroyed by acid.
- Acidity kills fish, bacteria and algae and the aquatic ecosystem collapses into sterility leaving a crystal clear but ultimately a dead lake.

CONTROL OF AIR POLLUTION

- The emission of exhaust from automobiles can be reduced by devices, such as positive crankcase ventilation valve and catalytic converter.
- Electrostatic precipitators can reduce smoke and dust from industries.
- Gaseous pollutants arising from industries can be removed by differential solubility of gases in water.
- A finepray of water in the device called scrubber can separate many gases like NH_3, SO_2, etc. from the emitted exhaust.
- Certain gases can be removed by filtration or absorption through activated carbon.
- Certain gases can be made chemically inert by chemical conversion.

- At the Government level pollution can be controlled by framing legislations.

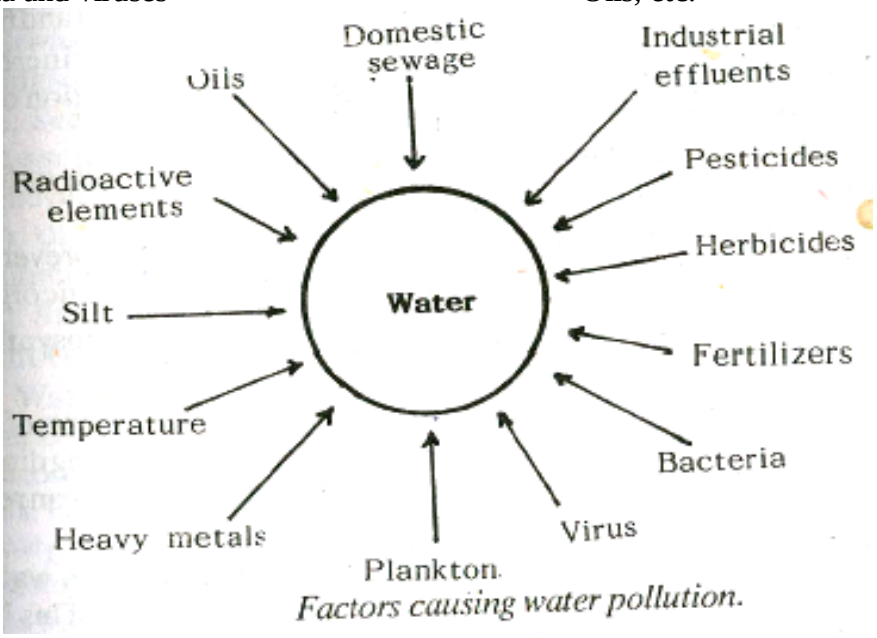
WATER POLLUTION

- Water is the soul of nature; its pollution will perish the world.
- Water pollution refers to the undesirable change occurring in water which may harmfully affect the life activities of man and domesticated species.

Water pollutants

The common water pollutants are as follows

- Domestic sewage
- Industrial effluents
- Pesticides
- Herbicides
- Fertilizers
- Bacteria and viruses
- Plankton blooms
- Heavy metals like mercury
- Temperature
- Silt
- Radioactivity
- Oils, etc.



Factors causing water pollution.

CAUSES OF WATER POLLUTION

Domestic sewage

- Domestic sewage consists of human faeces, urine, and the dirty used-up water in houses.
- It contains a large number of pathogenic bacteria and virus.
- The sewage is released into the rivers on the banks of which most of the cities are situated.

Industrial effluents

- All industrial plants produce some organic and inorganic chemical wastes.
- Those nonusable chemicals are dumped in water as a means of getting rid of them.
- The industrial wastes include heavy metals (Hg, Cu, lead zinc etc), detergents, petroleum, acids, alkalies, phenols, carbonate, alcohol cyanides, arsenic, chlorine, etc.

Thermal Pollution

- Many industries use water for cooling.
- The resultant warm water is discharged into rivers.
- This brings about thermal pollution.

Agricultural pollution

- The fertilizers used for crops are washed into ponds and rivers.

Pesticides

- Pesticides are used to control pests in fields and houses.
- They include DDT, BHC, endrin etc.

Radioactive wastes

- Liquid radioactive wastes are released into the sea around nuclear installations.
- The oceanic currents carry the radio active contaminants every where.
- Oil pollution
- Oil is a source of pollution in sea-water.
- Oil pollution is due to ship accidents, loading and discharging of oil at the harbour, oil refineries and off-shore oil production.

Retting

- The process of decaying coconut husk to get fibre for making coir is called retting.
- Retting releases H_2S.
- It makes water polluted.

ECOLOGICAL EFFECTS OF WATER POLLUTION

Minamata disease

- This disease is caused by mercury poisoning.
- It is characterized by crippling and death.
- This disease appeared in a coastal town, Minamata, in Japan.
- The primary cause for this disease was a p industry which was started on the san coast of Japan in 1905.
- From this factory a by-product called mercury was disposed into the sea.
- This mercury cumulated in marine animals.
- Later birds, cats and dogs which me the marine animals died.
- Finally many men who ate fish, crabs and shell fish died.
- Their initial symptoms of Minamata disease include the numbness of limbs, lips and tongue, impairment of motor control, deafness and blurring of vision.
- Finally it affects and destroys the brain.
- As a result of the attack of Minamata disease about 17 persons died and 23 became permanently disabled in the year 1953, in Japan.

Diarrhoea

- It is caused by mercury, cadmium and cobalt.

Mortality of Plankton and Fish

- Chlorine which is added to water control the growth of algae and bacteria in the cooling system of power stations may persist in streams to cause the mortality of plankton and fish.

Reduction in Productivity

- Intensive agriculture increases the amount of silt in lakes and rivers.
- Silt prevents the penetration of light to depths and thus reduces primary production.

Siltation

- Siltation is a phenomenon by which the gills of fish deposited with silt.
- This causes heavy mortality among fishes.

Poor Oxygenation

- Oil present on the surface of water prevents water oxygenation.
- This reduces respiration and metabolism in aquatic organisms.

Poor Photosynthesis

- Oil-pollution prevents photosynthesis in phytoplankton.

Red Tide

- When coastal waters are enriched with nutrients of sewage dinoflagellates multiply rapidly and form bloom.
- This blooming lat. liberate into the water toxic metabolic by-products which can result in a large scale death of marine fishes.
- This is called red tide.

Biochemical Oxygen Demand

- Sewage enriches the water with nutrients.
- This causes rapid growth of plankton and algae.
- This leads to oxygen depletion in water.
- The oxygen depletion causes the death of algae.
- They decay and decomposition of algae consumes more oxygen from water.
- Biochemical Oxygen Demand or biological oxygen demand (BOD) is the amount of oxygen required by the microorganisms in water.
- BOD is higher in polluted water (sewage) and lesser in drinking water.
- Increased BOD lowers the contents of dissolved O_2 in water causing the suffocation and death of aquatic flora and fauna.

Water-borne diseases

- Disease like jaundice, cholera, typhoid, diarrhoea, etc. are transmitted through water contaminated with sewage.

Methaemoglobinema

- The nitrate used in fertilizers enters the intestine of man through drinking water.
- In the intestine it is converted into nitrite.
- Nitrite is absorbed into the blood where it combines with haemoglobin to form methaemoglobin: Methaemoglobin cannot transport oxygen.
- This leads to suffocation and breathing troubles, especially in infants.
- This disease is called methaemoglobinema.

Eutrophication

- Domestic sewage and fertilizers add large quantities of nutrients such as nitrates and phosphates to the fresh water ecosystems.
- The rich supply of these nutrients makes blue green algae, green algae and other phytoplankton to grow abundantly.
- This increased productivity of lakes and ponds brought about by nutrient enrichment is known as eutrophication.
- As the algae use O_2 of the water for respiration, the O_2 is depleted from the water.
- The rapid growth also consumes all the nutrients of the water.
- The depletion of O_2 and nutrients lead to the death of algae and other phytoplankton.
- As other organisms, such as zooplankton and fishes of the water, depend on the blue green algae and phytoplankton for their food, they also die.
- This eutrophication leads to the complete depletion of the fauna from the ecosystem.

CONTROL OF WATER POLLUTION

Sewage Treatment

Pollution control by sewage treatment includes the following steps

- Sedimentation

- Dilution
- Storage

(i) Sedimentation

- When sewage is allowed to stand, the suspended particles settle to the bottom.
- So by sedimentation the suspended particles are removed from sewage.

(ii) Dilution

- The sewage can be diluted with water.
- This increases the O_2 contents and reduces BOD and CO_2.

(iii) Storage

- The diluted sewage is stored in a pond.
- This facilities the growth of microorganisms.
- This renders further oxidation of sewage.

Waste stabilization pond or oxidation pond

- The national Environmental Engineering Research Institute (NEERI) at Nagpur has devised a very economical method for the treatment of industrial and domestic effluents.
- Domestic and industrial wastes are stored in a dilute condition in shallow ponds called oxidation or stabilization ponds.
- After a few days micro-organisms and algae flourish.
- The micro-organisms decompose the organic wastes by oxidation, and the water is purified.
- This water is rich in nitrogen, phosphorus, potassium and other nutrients.
- This water can be used for fish agriculture etc.

Recycling

- Pollution can be prevented to a certain extent by reutilizing the wastes.
- This is called recycling.

Example

- The dung of cows and buffaloes can be used for the production of gobargas.
- Sewage can be used for irrigation fish culture after treatment in oxidation pond.
- Certain pollutants from industrial effluents can be removed by filtration and selective absorption.
- Excessive use of pesticides and herbicides should be avoided.
- At the Government level, legislations should be framed to control water pollution.

SOIL POLLUTION

- The contamination of soil by human and natural activities which may cause harmful effects on living beings.

Causes

- Industrial waste
- Urban waste
- Agricultural practices
- Radioactive pollutants
- Biological agent

Effects

- Affect human health
- Affect soil fertility
- Reduce soil productivity
- Cause abnormalities

Control measures

- Properly collect solid waste
- Microbial degradation
- Recovery of products from waste
- For methane generation, use cattle dung
- For biogas generation, use biodegradable organic waste

NOISE POLLUTION

- The word noise has a Latin origin nausea meaning a feeling of sickness at the stomach with an urge to vomit.
- Noise is defined as unwanted sound or sound without value.
- Noise pollution is the unwanted sound dumped into the environment.
- Noise is measured by the unit decibel (dB).
- One decibel is equal to the faintest sound that can be heard by the human ears.
- Some people feel discomfort with the sound of 85dB.
- But more people do not feel discomfort with the sound of 115 dB.
- Pain is usually felt at 145dB.

Causes of Noise Pollution

- Scooters
- Motor bikes
- Cars
- Tempos
- Vans
- Buses
- Trucks
- Tractors
- Aircrafts
- Supersonic aircrafts
- Motor boats
- Ships
- Loud speakers
- Loud pop-music
- Social gatherings
- Machines of factories
- Mills
- Industries
- Kitchen appliances
- Fire crackers and generators are some of the chief sources of pollutions.

ECOLOGICAL EFFECTS OF NOISE POLLUTION

- Noise diminishes the power of hearing.
- It gives pain to the ear.
- It interferes with communication-systems.
- It causes stress.
- It causes fright.
- It increases the rate of heart beat.
- It causes the constriction of blood vessels.
- It increases blood pressure.
- It causes head-ache.
- It causes the dilation of pupil of the eye.
- It causes emotional upsets and
- It causes deafness.
- Noise causes physical or mental fatigue and lack of concentration.
- In industrial situations this effect results in lowered efficiency, reduced work rate and higher chances for accident.
- Noise disturbs sleep.

- High frequency or ultrasonic sound can affect the semicircular canals of the internal ear and cause nausea and dizziness.

CONTROL OF NOISE POLLUTION

Noise pollution can be controlled in the following ways

- Legislations should be framed.
- The sources that generate unwanted sound should be reduced.
- Noisy automobiles should be condemned.
- Wheels of automobiles should be oiled properly.
- Industrialists must take up necessary steps to control noise.
- Loudspeakers should be set at a low sound.
- Trees absorb noise and thus reduce noise pollution. So thick vegetation must be grown around industries, cities and on the sides of roads.
- Noise-producing machines should be placed in closed rooms.
- Residential houses should be constructed far away from in factories and airports.

THERMAL POLLUTION

- Increase or decrease in the temperature of water, air and land by human activity is called thermal pollution.

Sources of thermal pollution

CO_2

- CO_2 is produced during the combustion of fuel in houses, factories, power stations, etc.
- It is also released by plants and animals in the process of respiration.
- The CO_2 contents of the atmosphere has gone up by 15% in the past 100 years.
- It is estimated that by the year 2000 AD the increase in the CO_2 contents of the air will be nearly 25%.
- This will result in an appreciable warming up of the earth.
- This is called green house effect.
- It is very likely that this will cause the melting of polar ice caps.
- This will result in an ice caps will lead to rise of nearly 60 feet in sea level.
- As a result coastal areas and low-lying areas all over the world will be flooded and will go under water.

Hot water

- Power stations, industries and nuclear reactors use large quantities of water for cooling purposes.
- The resulting hot waters are released into the rivers.

ECOLOGICAL EFFECTS OF THERMAL POLLUTION

- When the temperature of the earth increases, ice caps melt. This will flood the coastal and low lying areas of land.
- A rise of 10°C in temperature increases the rate of exchange of salts between the organisms and the environment. This will accelerate the entry of toxins into the body from the external medium.

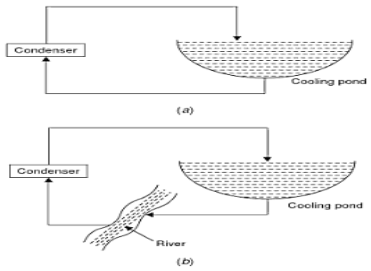
CONTROL OF THERMAL POLLUTION

- Cooling ponds
- Spray Ponds
- Cooling towers

Cooling Ponds

- Water from condensers is stored in ponds where natural evaporation

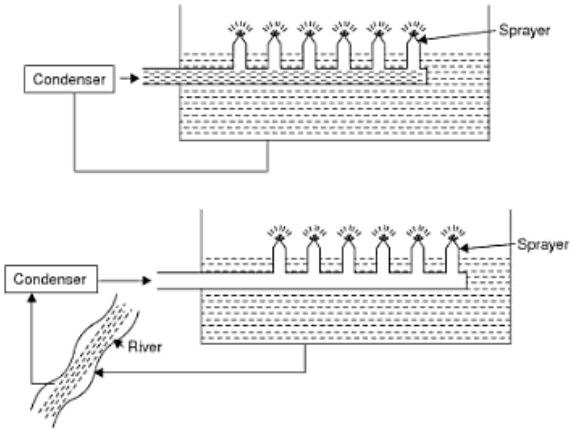
cools the water which can then be recirculated or discharged in nearby water body.



Dissipation of heat by cooling ponds

Spray Ponds

- The water from condensers is received in spray ponds.
- Here the water is sprayed through nozzles where fine droplets are formed.
- Heat from these fine droplets is dissipated to the atmosphere.

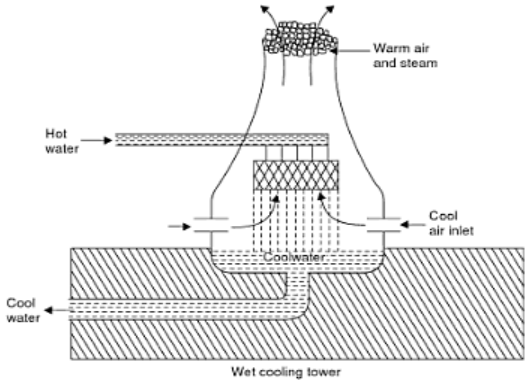


Dissipation of heat by spray ponds.

Cooling Towers

(i) Wet cooling tower

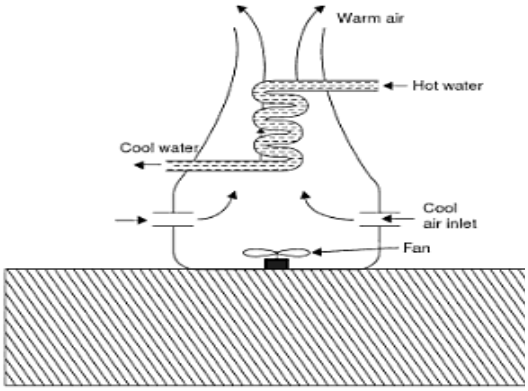
- Hot water is sprayed over baffles.
- Cool air entering from sides takes away the heat and cools the water.
- This cool water can be recycled or discharged.
- Large amount of water is lost through evaporation and in the vicinity of wet cooling tower extensive fog is formed which is not good for environment and causes damage to vegetation.



Wet cooling tower

(ii) Dry cooling tower

- The heated water flows in a system of pipes.
- Air is passed over these hot pipes with fans.
- There is no water loss in this method but installation and operation cost of dry cooling tower is many times higher than wet cooling tower.



Dry cooling tower

Possible Questions

Unit- I

Part – A
(20X1=20)

Multiple Choice Questions

Part- B (2 Marks)

1. Define environment.
2. What is meant by ecosystem? Write its types.
3. Write a short note on energy flow.
4. Add a note on ecological succession with an Example.
5. Write s note on food chains given example.

Part – C (6 Marks)

1. Explain in detail the components of ecosystems.
2. Explain in detail about the structure and functions of ecosystem.
3. What is the need for studying environmental studies?
4. What are food chains and food webs? Give examples and discuss their significance.
5. Describe in detail about Natural Resource and its types.

Karpagam Academy of Higher Education
Department of Computer Applications
Subject : Environmental Studies
Class: I BCA **Subject code: 18VAE101**
Objective Type Questions

UNIT I

Q.No	Questions	Option1	Option2	Option3	Option4	Answer
1	Valuable, practical services that help to preserve ecosystem performed by nature are called_____	ecosystem service	biological control	the green house effect	biosphere balancing	ecosystem service
2	The surrounding physical and biological factor with which organisms closely interact and remain adapted is known as _____	nature	ecology	forest	environment	environment
3	The organic matter produced by the Photosynthetic activity of green plants is called as _____	light energy	cellular process	energy flow	primary productivity	primary productivity
4	_____ is diffused into the ground by gravitational force	Rain water	Ocean	River water	sea	Rain water
5	Solar energy stored in material such as wood, grain, sugar, and municipal waste is called _____	fossil fuels	biomass	geothermal energy	natural gas	biomass
6	Decomposers are otherwise called as _____	detritivores	primary consumers	organic matter	secondary consumers	detritivores
7	Light energy is transformed into chemical energy by _____	photosynthesis	respiration	recycling	productivity	photosynthesis
8	All food chains starts with _____ and ends with decay	environment	organisms	photosynthesis	fungi	photosynthesis
9	In grazer food chain the living plants are directly_____	destroye	consume	decaye	grown	consume

10	Energy transformation through the food chain is _____	regular	comfortable	propose	inefficient	inefficient
11	_____ is the most populated city in India	Mumbai	Calcutt	Delhi	Chennai	Mumbai
12	The total number of major languages in India are _____	18	17	16	15	16
13	Any unit that includes all the organisms that interact with the physical environment is called _____	community	population	biosphere	ecosystem	ecosystem
14	A pond, serves as a good example for a _____ water ecosystem	fresh	brackish	marine	se	fresh
15	The type of ecosystem with the highest mean plant productivity is_____	tropical rain forest	temperate grasslan	desert	tundr	tropical rain forest
16	In an aquatic ecosystem, the tropic level equivalent to cows in grasslands is_____	nekton	zooplankton	phytoplankton	benthos	zooplankton
17	Bhopal disaster occur on _____	Dec 4, 1982	Dec 3, 1984	Dec 8, 1986	Dec 9, 1980	Dec 3, 1984
18	Which gas was liberated in Bhopal gas tragedy?	Ethyl isothiocyanate	Sodium isothiocyanate	Methyl isocyanate	Phenyl isocyanate and phosgene	Methyl isocyanate
19	Smog is a combination of_____	air and water vapour	water and smoke	smoke and fog	fire and water	smoke and fog
20	The most serious pollutant to rubber tyres is _____	CO2	CO	O3	NO2	O3
21	All species on earth together with their environments collectively comprise_____	lithosphere	hydrosphere	atmosphere	biosphere	biosphere
22	_____ is the study that deals with the interaction of organisms with their environment	Etiology	Ecology	Botany	Biology	Ecology
23	Organisms that feed upon other living organisms as a source of energy and nutrients are called as_____	producers	consumers	pests	decomposers	consumers

24	A food web is _____	like a food chain	a set of interconnected food chains, illustrating the tropic relationships among species	the set of prey species that are consumed by animals in an ecosystem	the tropic (feeding) levels that can be observed in an ecosystem	a set of interconnected food chains, illustrating the tropic relationships among species
25	The first tropic level refers to _____	all herbivores	all green plants	sunlight	all animals	all green plants
26	A biomass pyramid is important because it illustrates_____	how energy flows through a food we	the number of species in each tropic level	the biomass of all organisms at each tropic level in a system	the number of tropic levels in a system	the number of tropic levels in a system
27	Fungi is/are _____	single-celled prokaryotes	Phototrophic eukaryotes	eukaryotes single-celled and primitive multi-celled organisms	heterotrophic eukaryotes	heterotrophic eukaryotes
28	Basidiospores are considered to be a major source of _____	airborne allergens	water borne allergens	animal faeces	bioweapon	airborne allergens
29	Man and biosphere programme is affiliated with _____	UNESCO	IUCN	WWF	WIPO	UNESCO
30	_____ gases has an important role in maintaining atmospheric temperature	Nitrogen	Oxygen	Argon	Carbon dioxide	Carbon dioxide
31	Trichodermaharzianum has proved a useful microorganism for _____	reclamation of wastelands	bioremediation of contaminated soils	biological control of soil-borne plant pathogens	gene transfer in higher plants	bioremediation of contaminated soils
32	Non-Ionizing radiations with specific biological effects are_____	Gamma rays	Beta-rays	UV radiations	X-rays	UV radiations
33	Radiations are harmful as it_____	causes skin cancer	causes anemi	alters body tissues	is unstable	causes skin cancer

34	Ozone depletion in the stratosphere will cause _____	increased incidence of skin cancer	forest tires	global warming	hole	hole
35	Maximum deposition of DDT will occur in _____	phytoplankton	cr	eel	sea gull	sea gull
36	Most harmful environmental pollutants are _____	natural nutrients in excess	human organic wastes	non-biodegradable chemicals	waste animal fee	non-biodegradable chemicals
37	_____ is not true regarding Green House Gases (GHG)	It can be removed from the atmosphere by a photochemical change	The use of chlorofluorocarbons (CFCs) in refrigeration systems increases GHG	It can absorb and emit infrared radiation	It does not affect the temperature of the earth	It does not affect the temperature of the earth
38	Nuclear accidents mostly release radioactive _____ into the atmosphere	carbon	iodine	phosphorus	sulphur	iodine
39	Minimum risk level of mercury is below_____ micro gram per dl of bloo	10	15	20	25	10
40	Low level ozone is referred to as _____ ozone	tropospheri	stratospheri	ionosperi	exospheri	tropospheri
41	The ozone at ground level is primarily from _____ precursors	fossil fuel	CFCs	oxygen	methane	fossil fuel
42	The most serious environmental effect posed by hazardous wastes is _____	air pollution	contamination of groundwater	increased use of land for landfills	destruction of habitat	contamination of groundwater
43	EEAT scheme was launched during _____ Five Year Plan	5th	6th	7th	8th	6th
44	Black lung disease is associated with _____	farmers	coal miners	textile industry workers	sweepers	coal miners
45	Pottery workers are at high risk of _____ lung disease	asbestosis	asthm	silicosis	bronchitis	silicosis

46	_____ water is otherwise known as potable water	Raw	Irrigation	Drinking	Surface	Irrigation
47	_____ is the totality of genes, species and ecosystems in a region	Habit	Habitat	Biodiversity	Food chain	Biodiversity
48	_____ is the primary effect of excess phosphorous in the aquatic environment	Fixation	Nitrification	Eutrophication	Radiation	Eutrophication
49	_____ pathogen is associated with amoebic dysentery	Protozo	Virus	Bacteri	Worm	Protozo
50	The main source of water in India is_____	rain water	ground water	surface water	sea water	rain water
51	_____ are organisms consuming other living organisms	Carnivorous	Saprophages	Herbivorous	Biophages	Biophages
52	Floods are caused by_____	afforestation	cutting the forests	tilling the lan	constructing mega dams	cutting the forests
53	An increase in altitude is similar to an increase in latitude in that_____	it becomes more sunny	it becomes warmer	precipitation increases	it becomes colder	it becomes colder
54	In parasitism, _____	both species benefit	neither species benefits	one species benefits, but the other is weakene	one species benefits, and the other is not affecte	one species benefits, but the other is weakene
55	_____ is not an example of a biome	Mid-latitude grasslan	Desert	Forest-grassland ecotone	Tropical rain forest	Forest-grassland ecotone
56	Minute particles and liquid droplets are collectively called _____	convection current	ozone	UV radiation	aerosols	UV radiation
57	_____ limits the mixing between troposphere and the other upper zones	Ozone	Stratospause	Tropause	UV radiation	Ozone
58	Water vapor contains a huge amount of stored energy known as _____	latent heat	solar energy	stored heat	mechanical energy	latent heat
59	The source of energy of the sun is _____	nuclear fission	chemical reaction	nuclear fusion	photoelectric effect	nuclear fusion

60	Nuclear energy is derived by _____	combustion of atoms of U 235	fission of atoms of U 235	fusion of atoms of U 235	the breaking of U 235 bonds	fission of atoms of U 235

Unit II:

Natural Resources - Renewable and Non-renewable Resources: Natural resources and associated problems. Forest resources, Water resources, Mineral resources, Food resources, Energy resources, Land resources : Use and over-utilization, exploitation. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. Ill-effects of fire works.

NATURAL RESOURCES AND ASSOCIATED PROBLEMS AND SUSTAINABLE UTILIZATION

NATURAL RESOURCES

- Any component of the environment which can be transferred in a way such that it becomes more valuable and useful is termed as resource.
- Life on this planet earth depends upon the large number of things and services provided by the nature which are known as natural resources.

Resources

- There are two types of resources (i) renewable and (ii) non renewable resources

Renewable resources

- They have the capacity to renew. Example. Clean air, clean water.

Non renewable resources

- Available in minute quantities
- They cannot be regenerated
- Example. Ground water, minerals.

The major resources are (i) Forest (ii) water (iii) mineral (iv) food (v) energy and (vi) Land resources

FOREST RESOURCES:

- Forests are one of the most important resources of the world.
- They act as a blanket on the surface of the earth.
- Around $1/3^{rd}$ of world land area was found to be forests.

USES OF FOREST:

Commercial uses

- Forests provide timber
- fire wood
- food material
- resin
- gum
- non edible oils,
- drugs
- medicine
- rubber
- fibers
- Bamboo and many other important items.

Ecological uses:

- Production of Oxygen: Photosynthesis – earth's lungs
- Reducing global warming – sink for carbon di oxide
- Wild life habitat – 7 million species in tropical forests alone
- Regulation of hydrological cycle – prevent surface run off – giant sponges – 50-80% moisture.
- Soil conservation – hold solid particles tightly and prevent soil erosion – wind breaks.
- Pollution moderators: absorb toxic gases and purify air reduce noise pollution.

ASSOCIATED PROBLEMS OF FOREST RESOURCES

DEFORESTATION

Deforestation is mainly done for the following reasons:

- For shifting of Cultivation
- For fuel requirement
- To get raw materials for industrial use
- For the developmental projects of the Government
- To meet the growing food needs
- By overgrazing

CONSEQUENCES OF DEFORESTATION

1. Threatens many wild life species due to destruction of natural habitat
2. Biodiversity is lost along with that genetic diversity
3. Hilly regions are made prone to landslides
4. Soil erosion and loss of soil fertility
5. Hydrological cycle is affected

(loss of rainfall, flood, drought etc)

TIMBER EXTRACTION AND MINING

The important effects of timber extraction are

- thinning of forests
- loss of biodiversity, particularly tr ee breading species
- soil erosion and loss of soil fertility
- migration of tribal people from one place to another in search of new forest

- extinction of tribal people and their culture

CONSTRUCTION OF DAMS

Uses of dams are

- Dams are regarded as symbol of national development.
- provides large scale employment of tribal people and increase the std. of living of
- them
- contribute for economic uplift and growth
- help in checking flood
- generate electricity
- reduce power and water shortage
- provide irrigation water
- provide drinking water to remote areas
- promote navigation and fishery.

Associated Environmental problems:

1. Displacement of tribal people
2. Loss of flora and fauna
3. Siltation and sedimentation near reservoir
4. Stagnation and water logging near reservoir
5. Growth of aquatic weeds
6. Micro climatic changes
7. causes earthquakes
8. Breeding of disease vectors

WATER RESOURCES

- Water is an indispensible resource. Around 97% of world surface is covered with water. Most of the animals and plants have 60-65% of water in their body.

USES OF WATER RESOURCES

Water is used for

- Domestic

- irrigation and
- industrial purposes

ASSOCIATED PROBLEMS OF WATER RESOURCES

- Due to economic development, rapid industrial growth and population explosion over utilization of ground water leads to rapid depletion of water resources, ground subsidence, lowering of water table and water logging.
- The use of ground water and surface water rate which are higher than that of recharge ultimately leads to Water scarcity, Water logging, Salination, alkalization.
- creates declining of water levels
- crops failure and reduction in agricultural production
- over pumping of ground water create drought and food shortage
- over pumping of ground water sea water intrusion in coastal aquifers
- land subsidence may due to over pumping of ground water
- river pollution due to industrial activities and dumping of waste into rivers, which in turn force to utilize the ground water, ultimately leads to over pumping

Flood: over flow of water, whenever the water in flow is greater than the carrying capacity of the channels flood occurs.

Causes:

- heavy rainfall, snow melt, sudden release of water from dams.
- Prolonged down pour leading to overflowing of rivers and lakes
- Reduction in carrying capacity due to obstructions or sediments etc.
- Deforestation, overgrazing, mining increases water run off
- Removal of dense forests from hilly regions

Effects:

- Submerges the flooded area
- Loss of soil fertility due to soil erosion
- Extinction of civilization at costal area

Flood management:

- Dams and reservoirs can be constructed

- Embankments and proper channel management
- Flood way should not be encroached
- Forecasting or flood warning
- Decrease of run off by infiltration through afforestation or rain water harvesting etc.

Drought : Unpredictable delay in climatic condition occurring due to monsoon rain failure.

Types:

- **Meterological** : in order of month or year, actual moisture supply at a given place consistently falls below critical level.
- **Hydrological:** deficiency in surface and subsurface water supplies
- **Agricultural:** inadequate soil moisture to meet the need of a particular crop at particular time or susceptibility of crops during different stages in its development
- **Socioeconomic:** reduction in the availability of food and social securing of people

Causes:

- Deforestation and lesser rainfalls coupled with cutting of trees for timber leads to desertifictation.
- Over drafting of ground water, subsidence of soil, drying of wetlands
- Pollution of soil with solid waste, industrial effluents etc makes land useless and dry
- Population explosion in man and livestock leads to enhanced requirement of timber, fuel wood, grazing
- Shifting cultivation

Effects:

- Increase of water in stream pond
- Ground water table get declined
- Loss of agricultural crops
- Loss of biodiversity
- Government spent a lot of money as drought relief fund

Control measures

- Rain water harvesting
- Watershed management
- Prevent deforestation
- Encourage afforestation

MINERAL RESOURCES

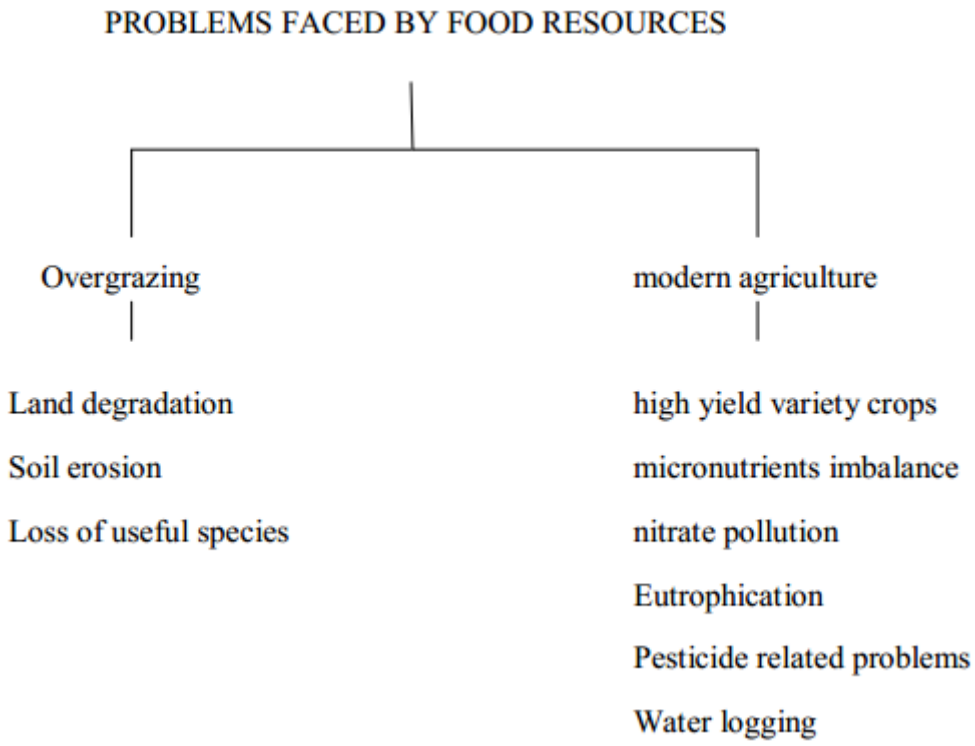
Environmental impacts of over extraction of mineral resources:

- Depending on the conditions of terrain and depth of ore deposits 2 types of mining operations are carried out. 1. open cast mining and 2. underground mining.

Both types of mining processes in each step produce several environmental effects such as,

- Deforestation takes place due to removal of vegetal covers.
- Great volume of debris has been generated which disrupt the surface and ground water circulation. It also reduces the water carrying capacity of streams very close to mining area
- The stacking of over burden and building of soil banks creates problems of landslides
- Under ground fire in coalmines is a hazard that is difficult to control
- Mining and ore processing normally causes air pollution and water pollution
- The acid water generated in coalmines can pose a serious problem of water pollution, which adversely affects the flora and fauna.
- Deeper excavation of ground causes lowering of water table, which leads to drying of wells or sea water intrusion
- In stone quarries, blasting of rocks not only annoying the people nearby, but also cause hazard from fly rocks and dusts and damage to buildings due to vibrations
- The disposal of waste material produced after concentrations of ore create increase concentration of heavy metals and toxic elements in the environment.

FOOD RESOURCES:



CHANGES CAUSED BY OVERGRAZING AND AGRICULTURE:

Overgrazing:

Process of eating away the vegetation along with its roots without giving a chance to regenerate

- Land degradation-leads to organically poor, dry, compacted soil cannot be used for further cultivation
- Soil erosion-cover of vegetation gets removed from soil
- Loss of useful species-good quality grasses and herbs with high nutritive value, when grazed lose even the root stocks which carry the reserve food for regeneration get destroyed which gives raise to secondary species like parthenium, Lantane, Xanthium etc
- To prevent –match the forage supplement to the herd"s requirement.eg.Switch grass

Modern agriculture:

- The practice through which specific plant species are cared and managed so as to obtain maximum yield of consumable parts of plants –agriculture

- Makes use of hybrid seeds and selected and single crop variety, high tech equipment and lots of energy subsides in the form of fertilizers, pesticides and irrigation water e.g. green revolution

Due to modern agriculture

- Damage to soil occurs
- Water contamination takes place
- Water scarcity occurs
- Global climate change takes place
- Water logging-results when soil is over irrigated
- Soil salinity-increase plant productivity, interferes with water uptake by plants
- Fossil fuels and pesticides produce air pollution

Impacts related to high yielding varieties:

- Monoculture ie the same genotype is grown over vast areas. Disease spread easily
- Micronutrient imbalance e.g Zinc deficiency-affect soil productivity
- Nitrate pollution-nitrogenous fertilizers applied deep soil contaminates ground water. cause blue baby syndrome methaemoglobinemia- affects infants
- Eutrophication: Over nourishment of lakes due to agriculture field wash out -leads to algal bloom-dead organic matters increases due to decomposition-leads to oxygen demand

Problems associated with pesticide use:

- Evolution of genetic resistance
- Imbalance in ecosystem
- Creation of new pest
- Persistence, Bioaccumulation and Biomagnification
- Mobility through soil, water, air, washed away into rivers, streams, when it rains can harm fishes
- Creating super pest
- Death of non starget organisms
- Salinity
- Water logging

ENERGY RESOURCES

Growing energy needs:

- Population explosion, Luxurious life, Industries, Agriculture, mining, transportation, lighting, cooling, heating, building all need energy. Fossil fuels like coal, oil, natural gas produce 95% of energy

Sources of energy

Primary- Renewable energy-resources which can be generated continuously in nature and

are in exhaustible and can be used again endlessly. wood, Tidal, Solar, wind, hydropower, biomass, biofuel, geothermal, hydrogen.

Non – renewable energy- Resources which have accumulated in nature over a long span of time and cannot be quickly replenished when exhausted.coal, petroleum, natural gas

Secondary-petrol, electrical energy, coal burning

Energy renewable	Advantage	Disadvantage
	1. Wide availability 2. Low cost 3. Decentralized power production 4. Low pollution 5. Available for the future	1. Unreliable supply 2. Produced in small quantity 3. Difficult to store 4. Cost more
Energy non renewable	1. Available in high concentrated form 2. Easy to store 3. Reliable supply 4. Lower cost	1.highly pollution Available only in few places High running cost Limited supply and will one day get exhausted

Use of alternate energy sources:

- Refers to energy sources which are not based on the burning of fossil fuels or the splitting of atoms. Such as solar energy, wind energy, hydro power, tidal energy, ocean thermal energy, geothermal energy, biomass energy.

LAND RESOURCE

- Land is critically important national resource which supports all living organisms including plants and animals. The soil profile of land determines its ability to serve socio-economic needs.

ASSOCIATED PROBLEMS

- Land Degradation: Land degradation is defined as the reduction in soil capacity to produce in terms of quality, quantity goods and services.
- Land slides- The hill slopes are prone to land slides, landslips, rockslides etc. These hazardous features have reduced the overall progress of the region as they obstruct the roads, communication media and water flow.
- Soil erosion:

ROLE OF INDIVIDUAL IN CONSERVATION OF NATURAL RESOURCES:

Natural resources are forest, water, soil, food, mineral and energy resources. Overuse of these resources cause problems

Conserve water:

- Don"t keep water taps running
- Install water saving toilets
- Check for water leaks
- Reuse soapy water
- Use drip and sprinkling irrigation

Conserve energy

- Turn off lights, fan when not in use
- Use solar cooker for cooking
- Try riding bicycle

Protect soil:

- Don"t uproot plants
- Grow grass which binds soil and prevent erosion
- Make compost
- Use green manure
- Don"t over irrigate
- Use mixed cropping

EQUITABLE USEOF RESOURCES FOR SUSTAINABLE IFE STYLE:

- Most developed countries like USA, Canada, Japan, Australia have 22% of natural resources, use 88%.73%of its energy and command 85%of its income

- Less developed countries has 78% of population, 12% Usage of natural resources, 27% of energy, 15% of income
- Gap arises due to increase in population distribution of resources and wealth
- Problem solved by equitable distribution of resources and wealth
- Global consensus has to be reached for more balanced distribution of basic resources like safe drinking water, food, fuel etc. So poor low developed countries able to sustain their life
- Two basic cause of unsustainability are over population in poor countries and over consumption of resources by rich countries generate wastes
- Rich countries lower down their consumption level
- Poor countries fulfilled by providing them resources

ENVIRONMENTAL EDUCATION

- Education can only release the dormant productive forces of the two-thirds of India's illiterate population.
- Environmental education is the process of creating awareness regarding the total environmental issues.
- The appreciation of nature, knowing the value and immense utility of conservation and evolving methods for sustainable development, methods of conservation, alternative sources of energies etc. are the ingredients of environmental education.
- Thus, environmental education is highly indispensable in the present-day society.
- A new dimension is to be added to the existing educational curricula by introducing topics related to environment.
- Such topics like population growth and its adverse effects and methods of controlling population, ecology and biosphere, human environment, problem of poverty, etc to be included in the syllabus.
- Through seminars, conferences and meetings on the subjects related to environment, awareness should be created.
- Through non-formal education, T.V. Programmes and newspapers we can spread the knowledge of protecting our planet from environmental hazards.

- We can adopt measures for environmental conservation, preservation of wild life and tree-plantation etc.
- Through NSS, NCC and other NOG's we can imbibe in the hearts of youths the awareness of environment to protect our planet.

Possible Questions

UNIT-II

Part – A (1X20=20)

Multiple Choice Questions

Part – B (2 Marks)

1. Define pollution
2. Define air pollution with a real time Example.
3. What is thermal pollution?
4. Describe soil pollution.
5. List out any four causes of water pollution given example.
6. Mention effects of noise pollution.

Part- C (6 Marks)

1. What are the adverse effects and control measures of water pollution? Explain.
2. What are the major sources of soil pollution? How does soil pollution affect soil productivity?
3. Discuss various effects and control measures of air pollution.
4. Explain in detail about Water Pollution Give Real Time Example.
5. Discuss in detail about Solid Waste Management.

Karpagam Academy of Higher Education
Department of Computer Applications
Subject : Environmental Studies
Class: I BCA **Subject code: 18VAE101**
Objective Type Questions

UNIT II

Q.No	Questions	Option1	Option2	Option3	Option4	Answer
1	_____is one of the following is the non-renewable resource	Water	Oxygen	Sunlight	Coal	Coal
2	_____ soil is the best for plant growth	Sandy soil	Clay	Gravel	Loamy Soil	Loamy Soil
3	_____ of stratosphere provides protection to our life	Nitrogen	Hydrogen	Ozone	Argon	Ozone
4	Atomic energy is obtained by using the ores of _____	copper	uranium	lithium	radium	uranium
5	The death of last individual of a species is called _____	extinction	cla	vanishe	climax	extinction
6	Red data books provide a list of _____	advanced plants	rare, endangered or endemic species	disease resistant animals	minerals	rare, endangered or endemic species
7	The areas of sociology that covers the size, compensation and distribution of population is called _____	environmental sociology	geography	anthropology	demography	demography
8	Both power and manure are provided by _____plants	thermal	nuclear	biogas	hydroelectri	biogas
9	The resources that are derived from bio-mass of living organisms are called _____ resources	renewable	non-renewable	environmental	natural	renewable

10	_____ is the major raw material for biogas	Plant leaves	Cow dung	Mu	Grass	Cow dung
11	Bio gas generation is mainly based on the principle of _____	fermentation	degradation	purification	sedimentation	fermentation
12	The number of lives births per 1000 people in a population in a year is known as _____	fecundity	the crude birth rate	fertility	the basic demographic equation	the crude birth rate
13	The dramatic increase in agricultural production that have been made possible by highyield “miracle crops” are called_____	biotechnical revolution	bioeconomic revolution	green house effect	green revolution	green revolution
14	The nation whose government is promoting large families because of an aging population and low fertility rate is _____	the United States	Indi	France	Chin	France
15	The two components that acid rain contains that are most damaging to the environment aresulfuric acid and _____	nitric aci	carbon dioxide	water	nitrogen	nitric aci
16	Blue revolution is associated with _____	agriculture	iron and steel	irrigation	fishing	fishing
17	A form of energy or matter that is essential for the functioning and sustained survival of living organism within a specific population or ecosystem is called _____	resources	natural resource	environment	forest	resources
18	Water which is an universal solvent for most of the biochemical and biological process,constitutes about the total volume of _____ billion kilometers	15	20	25	30	15
19	The complete failure of monsoon rainfall with a dry climate accompanied by acute shortage of water causes _____	soil erosion	flash floo	loss of bio-diversity	drought	drought

20	The study of minerals is called _____	geology	mineralogy	mining science	metallurgy	mineralogy
21	The resources that are obtained from any non-living materials are called _____resources	non-renewable	renewable	natural	environmental	non-renewable
22	_____ is the degradation of land in arid, semi-arid and dry sub-humid areas	Land fertility	Desertification	Ecosystem	Vegetation	Desertification
23	_____ is a useful biological indicator of sulphur-dioxide pollution	Bryophytes	Algal blooms	Pseudomonas	Lichens	Lichens
24	_____deserts are formed between tall mountain ranges which prevent moisture-rich clouds from reaching areas on the ice, or protected side, of the range	Polar	Trade win	Rain shadow	Costal	Rain shadow
25	Oil spills are a source of pollution for_____	water	land and water	land and air	air and noise	land and water
26	Air is composed of gases, water vapours and _____	rainfall	snowfall	dust particles	light	dust particles
27	_____ is a water borne disease	Small Pox	Meningitis	Diarrhe	Choler	Choler
28	Increase in global mean temperature causes _____	greenhouse effect	forest fire	desertification	loss of fertility	greenhouse effect
29	_____ is the gas that produces the most damaging acid rains	SO2	NO2	CO2	H2	SO2
30	_____ is the natural phenomenon, caused by an unlimited and unprecedented Rainfall	Soil erosion	Cyclone	Floods	Hightening	Floods
31	_____ scale is useful to record the force of win	decibel	richter	beaufort	fujit	richter
32	The first 'Green revolution' in _____ produced a large amount of foo	1960s	1970s	1980s	1990s	1960s

33	_____ is a nonrenewable energy resource	Solar	Methane	Hydroelectri	Coal	Coal
34	_____ types of habitats are there in a biosphere	4	2	3	6	4
35	Flora is the _____ life occurring in a particular region or time	plant	animal	human	microbial	plant
36	_____ is the leading source of energy used in the United States today	coal	oil resources	natural gas	nuclear power	oil resources
37	The energy used for all plant life processes is derived from _____ radiation	ultra violet	infra re	bet	solar	solar
38	Of all of the energy production in the United States, _____ percentage is lost in distribution and inefficient use	10	25	40	50	40
39	_____ is least likely to contain an oil trap	an anticline	fault	natural stratigraphy	syncline	syncline
40	_____ rock types would most likely be the best oil reservoir	Granite	Shale	Sandstone	Salt	Sandstone
41	About 75% of electricity comes from water in _____	South Ameri	Indi	Australi	Chin	South Ameri
42	Two-thirds of the world's known oil reserves are located in _____	siberi	gulf of mexico and caribbean	the middle east	indonesi	the middle east
43	Oil derived from coal, oil shales or tar sands is called _____	natural gas	biomass	syncrude	biogas	syncrude
44	India ranks _____ amongst the wind-energy producing countries of the worl	first	secon	thir	fourth	fourth
45	_____ energy is derived from heated groundwater	solar	geothermal	hydroelectri	nuclear	solar
46	Gobar gas is obtained from_____	manure	cow dung	crop residues	fossil	cow dung
47	Water used for paper mills should not contain _____	magnesium	sodium	iron	chlorine	iron
48	Oil spills are a source of pollution for_____	water	land and water	land and air	air and noise	land and water

49	_____ is not a primary pollutant	Particulate matter	Carbon monoxide	Sulpuric aci	Nitrogen oxides	Sulpuric aci
50	Ozone releases _____ atoms	carbon	nitrogen	oxygen	hydrogen	oxygen
51	World's most problematic aquatic weed is _____	azoll	wolffi	eichorni	trap	eichorni
52	The pollutant that causes hole in the ozone layer is _____	SF6	nitrous oxide	CFCs	PFCs	CFCs
53	Air is composed of gases, water vapours and _____	rainfall	snowfall	dust particles	light	dust particles
54	The newspaper contains one of the following toxic materials which is _____	C	P	Mg	Hg	P
55	_____ cycle is not a gaseous biogeochemical cycle in ecosystem	Nitrogen	Carbon	Sulphur	Phosphorus	Phosphorus
56	_____ book written by Rachel Carson resulted in banning DDT in USA	Silent spring	The environmentalism	Biomagnificatio n	Food chain	Silent spring
57	_____rain that contains chemical waste and causes of damage to plants and animals	Smog	Acid Rain	Seasonal Rain	Monsoon Rain	Acid Rain
58	Increased surface UV leads to increased _____ozone	tropospheri	stratospheri	Ionospheri	exospheri	tropospheri
59	Carbon dioxide is called green-house gas because it is _____	transparent to sunlight but traps heat	transparent to heat but traps sunlight	used in green-house to increase plant growth	transparent to both sunlight and heat	transparent to sunlight but traps heat
60	The slow rate of decomposition of fallen logs in nature is due to their _____	poor nitrogen content	low moisture content	low cellulose content	anaerobic environment around them	low moisture content

Unit III:

Biodiversity and Its Conservation: Introduction, definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels. India as a mega-diversity nation. Hot-spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

Biodiversity and its conservation

- Introduction
- Definition
- Genetic Biodiversity
- Species Biodiversity
- Ecosystem Diversity

Biogeographical classification of India

Value of biodiversity

- Consumptive
- Productive uses
- Social
- Ethical
- Aesthetic and option values.

Threats to biodiversity

- Habitat loss
- Poaching of wildlife
- Man-wildlife conflicts.

Biodiversity and its conservation

- If we divide the whole earth's mass into 10 billion parts, it is only in one part where life exists and the astounding variety of living organ-isms numbering somewhere around 50 million species are all restricted to just about a kilometer-thick layer of soil, water and air. Isn't it wonderful to see that so much diversity has been created by nature on this earth from so little physical matter!

- Biodiversity refers to the variety and variability among all groups of living organisms and the ecosystem complexes in which they occur.
- From the driest deserts to the dense tropical rainforests and from the high snow-clad mountain peaks to the deepest of ocean trenches, life occurs in a marvellous spectrum of forms, size, colour and shape, each with unique ecological inter-relationships.
- Just imagine how monotonous and dull the world would have been had there been only a few species of living organisms that could be counted on fingertips!
- In the Convention of Biological diversity (1992) biodiversity y has been defined as the variability among living organisms from all sources including *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they arc a part.

Biodiversity

- Biodiversity is the abbreviated word for "biological diversity" (bio-life or living organisms, diversity-variety).
- Thus biodiversity is the total variety of life on our planet, the total number of races, varieties and species.
- The sum of total of various types of microbes, plants and animals (producers, consumers and decomposers) in a system.

Levels of Biodiversity

- Units of biodiversity may range from the genetic level within a species to the biota in a specific region and may extend up to the great diversity found in different biomes.

GENETIC DIVERSITY

- It is the basic source of biodiversity.
- The genes found in organisms can form enormous number of combinations each of which gives rise to some variability.
- Genes are the basic units of hereditary information transmitted from one generation to other.
- When the genes within the same species show different versions due to new combinations, it is called genetic variability.

- For example, all varieties belong to the species *Oryza*, but there are thousands of wild and cultivated varieties of rice which show variations at the genetic level and differ in their color, size, shape, aroma and nutrient content of the grain.
- This is the genetic diversity of rice.

SPECIES DIVERSITY

- This is the variability found within the population of a species or between different species of a community.
- It represents broadly the species richness and their abundance in a community.
- There are two popular indices of measuring species diversity known as *Shannon - Wiener index* and *Simpon index*.

What is the number of species on this biosphere?

- The estimates of actual number vary widely due to incomplete and indirect data.
- The current estimates given by Wilson in 1992 put the total number of living species in a range of 10 million to 50 million.
- Till now only about 1.5 million living and 300.000 fossil species have been actually described and given scientific names.
- It is quite likely that a large fraction of these species may become extinct even before they are discovered and en-listed.

ECOSYSTEM DIVERSITY

- This is the diversity of ecological complexity showing variations in ecological niches, strophic structure, food-webs, nutrient cycling etc.
- The ecosystems also show variations with respect to physical parameters like moisture, temperature, altitude, precipitation etc.
- Thus, there occurs tremendous diversity within the ecosystems, along these gradients.

- We may consider diversity in forest ecosystem, which is supposed to have mainly a dominance of trees.
- But, while considering a tropical rainforest, a tropical deciduous forest, a temperate deciduous forest and a boreal forest, the variations observed are just too many and they are mainly due to variations in the above mentioned physical factors.
- The ecosystem diversity is of great value that must be kept intact.
- This diversity has developed over millions of years of evolution.
- If we destroy this diversity, it would disrupt the ecological balance.
- We cannot even replace the diversity of one ecosystem by that of another.
- Coniferous trees of boreal forests cannot take up the function of the trees of tropical deciduous forest lands and vice versa, because ecosystem diversity has evolved with respect to the prevailing environmental conditions with well regulated ecological balance.

BIOGEOGRAPGHICAL CLASSIFICATION OF INDIA

- India has different types of climate and topography in different parts of the country and these variations have induced enormous variability in flora and fauna.
- India as a rich heritage of biological diversity and occupies the tenth position among the plant rich nations of the world.
- It is very important to study the distribution, evolution, dispersal and environmental relationship of plants and animals in time and space.
- Biogeography comprising of Phytogeography and zoogeography deals with these aspects of plants and animals.
- In order to gain insight about the distribution and environmental interactions of flora and fauna of our country, it has been classified into ten biogeographic zones.
- Each of these zones has its own characteristic climate, soil, topography and biodiversity.

India's major biogeographic habitats

S.	Biogeographic Zone	Biotic Province	Total area

No.			(Sq.Km.)
1	Trans-Himalayan	Upper Regions	186200
2	Himalayan	North-West Himalayas West-Himalayas Central Himalayas East Himalayas	6900 720000 123000 83000
3	Desert	Kutch Thar Ladakh	45000 180000 NA
4	Semi-Arid	Central India Gujarat-Rajwara	107600 400400
5	Western Ghats	Malabar Coast Western Ghat Mountains	59700 99300
6	Deccan Peninsula	Deccan Plateau South Central Plateau Eastern Plateau Chhota Nagpur Central Highlands	378000 341000 198000 217000 287000
7	Gangetic Plain	Upper Gangetic Plain Lower Gangetic Plain	206400 153000
8	North-East India	Brahmaputra Valley North-Eastern Hills	65200 106200
9	Islands	Andaman Islands Nicobar Islands Lakshadweep Islands	6397 1930 180
10	Coasts	West Coast East Coast	6500 6500

Value of Biodiversity

- The value of biodiversity in terms of its commercial utility, ecological services, social and aesthetic value is enormous.
- We get benefits from other organisms in innumerable ways.
- Sometimes we realize and appreciate the value of the organism only after it is lost from his earth.
- Very small, insignificant, useless looking organisms may play a crucial role in the ecological balance of the ecosystem or may be a potential source of some invaluable drug for dreaded diseases like cancer or AIDS.

- The multiple uses of biodiversity or biodiversity value has been classified by McNeely *et al* in 1990.

i) Consumptive use value

- These are direct use values where the biodiversity product can be harvested and consumed directly.
    - E.g. fuel, food, drugs, fibre, etc.

Food

- A large number of wild plants are consumed by human beings as food.
- About 80,000 edible plant species have been reported from wild.
- About 90% of present day food crops have been domesticated from wild tropical plants.
- Even now our agricultural scientists make use of the existing wild species of plants that are closely related to our crop plants for developing new hardy strains.
- Wild relatives usually possess better tolerance and hardiness.
- A large number of wild animals are also our sources of food.

Drugs and medicines

- About 75% of the world's population depends upon plants or plant extracts for medicines.
- The wonder drug *Penicillin* used as an antibiotic is derived from a fungus called *penicillium.*
- Likewise, we get *Tetracyclin* from a bacterium.
- Quinine, the cure for malaria is obtained from the bark of Cinchona tree, while *Digitalin* is obtained from foxglove (Digitalis) which is an effective cure for heart aliments.
- Recently *vinblastin* and *vincristine,* two anticancer drugs, have been obtained from Periwinkle (*Catharanthus*) plant, which possesses anticancer alkaloids.
- A large number of marine animals are supposed to possess anti-cancer properties which are yet to be explored systematically.

Fuel

- Our forests have been used since ages for fuel wood.

- The fossil fuels coal, petroleum and natural gas arc also products of fossilized biodiversity.
- Firewood collected by individuals are not normally marketed, but are directly consumed by tribals and local villagers, hence falls under consumptive value.

ii) Productive use values

- These are the commercially usable values where the product is marketed and sold.
- It may include lumber or wild gene resources that can be traded for use by scientists for introducing desirable traits in the crops and domesticated animals.
- These may include the animal products like tusks of elephants, musk from musk deer, silk from silk-worm, wool from sheep, fir of many animals, lac from lac insects etc, all of which are traded in the market.
- Many industries are dependent upon the productive use values of biodiversity.
    - **E.g.** the paper and pulp industry, Plywood industry, Railway sleeper industry, Silk industry, textile industry, ivory-works, leather industry, pearl industry etc.
- Despite international ban on trade in products from endangered species, smuggling of fur, hide, horns, tusks, live specimen etc. worth millions of dollars are being sold every year.
- Developing countries in Asia, Africa and Latin America are the richest biodiversity centers and wild life products are smuggled and marketed in large quantities to some rich western countries and also to China and Hong Kong where export of cat skins and snake skins fetches a booming business.

iii) Social Value

- These are the values associated with the social life, customs, religion and psycho-spiritual aspects of the people.
- Many of the plants are considered holy and sacred in our country like Tulsi (holy basil), Peepal, Mango, Lotus, Bael etc.
- The leaves, fruits of flowers of these plants are used in worship or the plant itself is worshipped.
- The tribal people are very closely linked with the wild life in the forests.

- Their social life, songs, dances and customs are closely woven around the wildlife.
- Many animals like Cow, Snake, Bull, Peacock, Owl etc. also have significant place in our psycho-spiritual arena and thus hold special social importance.
- Thus biodiversity has distinct social value, attached with different societies.

iv) Ethical value

- It is also sometimes known as existence value.
- It involves ethical issues like "all life must be preserved".
- It is based on the concept of "Live and Let Live".
- If we want our human race to survive, then we must protect all biodiversity, because biodiversity is valuable.
- The ethical value means that we may or may not use a species, but knowing the very fact that this species exists in nature gives us pleasure.
- We all feel sorry when we learn that "passenger pegion" or "dodo" is no more on this earth.
- We are not deriving anything direct from Kangaroo, Zebra or Giraffe, but we all strongly that these species should exist in nature.
- This means, there is an ethical value or existence value attached to each species.

v) Aesthetic value

- Great aesthetic value is attached to biodiversity.
- No one of us would like to visit vast stretches of barren lands with no signs of visible life.
- People from far and wide spend a lot of time and money to visit wilderness areas where they can enjoy the aesthetic value of biodiversity and this type of tourism is now known as eco-tourism.
- The "Willingness to pay" concept on such eco-tourism gives us even a monetary estimate for aesthetic value of biodiversity.
- Ecotourism is estimated to generate about 12 billion dollars of revenue annually that roughly gives the aesthetic value of biodiversity.

vi) Option values

- These values include the potentials of biodiversity that are presently unknown and need to be explored.
- There is a possibility that we may have some potential cure for AIDS or cancer existing within the depths of a marine ecosystem, or a tropical rain-forest.
- Thus option value is the value of knowing that there are biological resources existing on this biosphere that may one day prove to be an effective option for something important in the future.
- Thus, the option value of biodiversity suggests that any species may prove to be a miracle species someday.
- The biodiversity is like precious gills of nature presented to us.
- We should not commit the folly of losing these gills even before unwrapping them.
- The option value also includes the values, in terms of the option to visit areas where a variety of flora and fauna, or specifically some endemic, rare or endangered species exist.

vii) Ecosystem service value

- Recently, a non-consumptive use value related to self maintenance of the ecosystem and various important ecosystem services has been recognized.
- It refers to the services provided by ecosystems like prevention of soil erosion, prevention of floods, maintenance of soil fertility, cycling of nutrients, fixation of nitrogen, cycling of water, their role as carbon sinks, pollutant absorption and reduction of the threat of global warming etc.
- Different categories of biodiversity value clearly indicate that ecosystem, species and genetic diversity all have enormous potential and a decline in biodiversity will lead to huge economic, ecological and socio-cultural loss.

THREATS TO BIODIVERSITY

- Extinction or elimination of a species is a natural process of evolution.
- In the geologic period the earth has experienced mass extinctions.
- During evolution, species have died out and have been replaced by others.

- However, the rate of loss of species in geological past has been a slow process, keeping in view the vast span of time going back to 444 million years.
- The process of extinction has become particularly fast in the recent years of human civilization.
- In this century, the human impact has been so serve that thousands of species and varieties are becoming extinct annually.
- One of the estimates by the noted ecologist, E.O. Wilson puts the figure of extinction at 10, 000 species per year or 27 per day.
- This startling figure raises an alarm regarding the serious threat to biodiversity.
- Over the last 150 years the rate of extinction has escalated more dramatically.
- If the present trend continues we would lose $1/3^{rd}$ to $2/3^{rd}$ of our current biodiversity by the middle of twenty first century.
- Let us consider some of the major causes and issues related to threats to biodiversity.

LOSS OF HABITAT

- Destruction and loss of natural habitat is the single largest cause of biodiversity loss.
- Billions of hectares of forests and grasslands have been cleared over the past 10,000 years for conversion into agricultural lands, pastures, settlement areas or development projects.
- These natural forests and grasslands were the natural homes of thousands of species which perished due to loss of their natural habitat.
- Severe damage has been caused to wetlands thinking them to be useless ecosystems.
- The unique rich biodiversity of the wetlands, estuaries and mangroves are under the most serious threat today.
- The wetlands are destroyed due to draining, filling and pollution thereby causing huge biodiversity loss.
- Sometimes the loss of habitat is in installments so that the habitat is divided into small and scattered patches, a phenomenon known as habitat fragmentation.

- There are many wild life species such as bears and large cats that require large territories to subsist.
- They get badly threatened as they breed only in the interiors of the forests.
- Due to habitat fragmentation many song birds are vanishing.
- There has been a rapid disappearance of tropical forests in our country also, at a rate of about 0.6% per year.
- With the current rate of loss of forest habitat, it is estimated that 20-25% of the global flora would be lost within a few years.
- Marine biodiversity is also under serious threat due to large scale destruction of the fragile breeding and feeding grounds of our oceanic fish and other species, as a result of human intervention.

POACHING

- Illegal trade of wildlife products by killing prohibited endangered animals i.e., poaching is another threat to wildlife.
- Despite international ban on trade in products from endangered species, smuggling of wildlife items like furs, hides, horns, tusks, live specimens and herbal products worth millions of dollars per year continuous.
- The developing nations in Asia, Latin America and Africa are the richest source of biodiversity and have enormous wealth of wildlife.
- The rich countries in Europe and North America and some affluent countries in Asia like Japan, Taiwan and Hong Kong are the major importers of the wild life products or wild life itself.
- The trading of such wild life products is highly profit making for the products who just hunt these prohibited wild life and smuggle it to other countries mediated through a mafia.
- The cost of elephant tusks can go upto $100 per kg; the leopard fur coat is sold at $100,000 in Japan while bird catchers can fetch upto $10,000 for a rare hyacinth macaw, a beautiful coloured bird, from Brazil.

- The worse part of the story is that for every live animal that actually gets into the market, about 50 additional animals are caught and killed.
- If you are fond of rare plants, fish or birds, please make sure that you are not going for the endangered species or the wild-caught species.
- Doing so will help in checking further decline of these species.
- Also do not purchase furcoat, purse or bag, or items made of crocodile skin or python skin.
- You will certainly help in preserving biodiversity by doing so.

MAN-WILDLIFE CONFLICTS

- We have discussed about the need to preserve and protect our wildlife.
- However, sometimes we come across conflicting situations when wildlife starts causing immense damage and danger to man and under such conditions it becomes very difficult for the forest department to pacify the affected villagers and gain local support for wild-life conservation.
- Instances of man animal conflicts keep on coming to lime light from several states in our country.
- In Sambalpur, Orissa 195 humans were killed in the last 5 years by elephants.
- In retaliation the villagers killed 98 elephants and badly injured 30 elephants.
- Several instances of killing of elephants in the border regions of Kote-Chamarajanagar belt in Mysore have been reported recently.
- The man-elephant conflict in this region has arisen because of the massive damage done by the elephants to the farmer's cotton and sugarcane crops.
- The agonized villagers electrocute the elephants and sometimes hide explosives in the sugarcane fields, which explode as the elephants intrude into their fields.
- In fact, more killings are done by locals than by poachers.
- Recently, in early 2004, a man-eating tiger was reported to kill 16 Nepalese people and one 4-year old child inside the Royal Chitwan National Park, 240Km South west of Kathmandu.
- The Park renowned for its wildlife conservation effort has become a zone of terror for the locals.

- At times, such conflicting situations have been reported from the border regions of Corbett, Dudhwa, Palamau and Ranthambore National Parks in our country as well.
- Very recently in June, 2004 two men were killed by leopards in Powai, Mumbai.
- A total of 14 persons were killed during 19 attacks since January by the leopards from the Sanjay Gandhi National Park, Mumbai which has created a panic among the local residents.

Causes of Man-animal conflicts

- Dwindling habitats of tigers, elephants, rhinos and bears due to shrinking forest cover comples them to move outside the forest and attack the field or sometimes even humans.
- Human encroachment into the forest areas raises a conflict between man and the wildlife, perhaps because it is an issue of survival of both.
- Usually the ill, weak and injured animals have a tendency to attack man.
- Also, the female tigress attacks the human if she feels that her newborn cubs are in danger.
- But the biggest problem is that if human-flesh is tasted once then the tiger does not eat any other animal.
- At the same time, it is very difficult to trace and cull the man-eating tiger and in the process many innocent tigers are also killed.
- Earlier, forest departments used to cultivate paddy, sugarcane etc. within the sanctuaries when the favorite staple food of elephants i.e. bamboo leaves were not available.
- Now due to lack of such practices the animals move out of the forest in search of food.
- It may be noted that, one adult elephant needs 2 quintals of green fodder and 150 kg of clean water daily and if it is not available, the animal strays out.
- Very often the villagers put electric wiring around their ripe crop fields.
- The elephants get injured, suffer in pain and turn violent.
- Earlier there used to be wild-life corridors through which the wild animals used to migrate seasonally in groups to other areas.

- Due to development of human settlements in these corridors, the path of wildlife has been disrupted and the animals attack the settlements.
- The cash compensation paid by the government in lieu of the damage caused to the farmers crop is not enough.
- In Mysore, a farmer gets a compensation of Rs. 400//- per quintal of expected yield while the market price is Rs. 2400/- per quintal.
- The agonized farmer therefore gets revengeful and kills the wild animals.

Remedial Measures to Curb the Conflict

1. Tiger conservation project (TCP) has made provisions for making available, vehicles, tranquillizer guns, binoculars and radio sets etc. to tactfully deal with any imminent danger.
2. Adequate crop compensation and cattle compensation scheme must be started, along with substantial cash compensation for loss of human life.
3. Solar powered fencing should be provided along with electric current proof trenches to prevent the animals from straying into fields.
4. Cropping pattern should be changed near the forest borders and adequate fodder, fruit and water should be made available for the elephants within forest zones.
5. Wild life corridors should be provided for mass migration of big animals during unfavorable periods.
6. About 300 km^2 area is required for elephant corridors for their seasonal migration.
7. In similipal Sanctuary, Orissa there is a ritual of wild animal hunting during the months of April-May for which forest is burnt to flush out the animals. Due to massive hunting by people, there is a decline in prey of tigers and they start coming out of the forest in search of prey.
8. Now there is WWF-TCP initiative to curb this ritual of “Akhand Shikar” in Orissa.

UNIT- III

POSSIBLE QUESTIONS

Part – A (1X20=20Marks)

(Multiple Choice Questions)

Part- B (2 Marks)

1. Define Biodiversity.
2. Write a note on biogeographical area of India.
3. Define consumptive use value.
4. What is meant by productive use value?
5. Mention any two approaches of biodiversity conservation.
6. What is meant by genetic biodiversity?
7. Write the social value of biodiversity.
8. What is consumptive values?
9. Define endangered species.
10. List out the major Biosphere Reserves in India.
11. Give a short note on ecosystem diversity.

Part- B (6 Marks)

1. Explain genetic diversity, species diversity and ecosystem diversity.
2. Explain in detail about values of biodiversity.
3. Discuss in detail about Biogeographical classification of India.
4. Write a short note on
    a. Social value (ii) Ethical value (iii) aesthetic value and (iv) Option value
5. What are the various types of biodiversity? List out major biodiversity zones of India.
6. Explain in detail about habitat loss and poaching of wildlife.
7. What are the threats to biodiversity? Discuss the remedial steps that can curb the conflict.
8. As an individual in this biosphere how will you conserve natural resources?

Karpagam Academy of Higher Education
Department of Computer Applications
Subject : Environmental Studies
Class: I BCA **Subject code: 18VAE101**
Objective Type Questions

UNIT III

S.No	Questions	Option1	Option2	Option3	Option4	Answer
1	_____ plants also consume coal and produce similar pollutants	Green	Fertilizer	Metallurgical	Power	**Metallurgical**
2	The most important indoor air pollutant is	radon gas	bio-gas	LPG gas	bio-mass	**radon gas**
3	Fossil fuel burning produces black soot	white soot	red soot	green soot	black soot	**black soot**
4	Pollutants also erode waxy coating of the leaves called	photosynthesis	cuticle	biphenyls	bronchitis	**cuticle**
5	Sound is mechanical energy from a _____ source	floating	winding	vibrating	tracking	**vibrating**
6	CPCB stands for	Central Pollution Control Board	Central Population Control Board	Central Prevention Control Board	Central Perspective Control Board	**Central Pollution Control Board**
7	Proper _____ will reduce the noise from the machinery	cleaning	repalcing	changing	oiling	**oiling**
8	Excess of fluoride in drinking water causes defects in teeth and bones called	fluorosis	methaemoglobinemia	minamata disease	Itai-itai	**fluorosis**
9	Nitrate when present in excess in drinking water causes	bioaccumulation	biomagnification	fluorosis	blue baby syndrome	**blue baby syndrome**
10	_____ are used to kill pests that damage crops	Pesticides	Fertilizer	Crop boosters	Refineries	**Pesticides**
11	Thermal power plants generate a large quantity of	fire	lava	fly ash	radon gas	**fly ash**

12	_____ from the fertilizers in soil reach nearby	Nitrogen & phosphorus	strontium & isotopes	radium & uranium	iodine & caesium	**Nitrogen & phosphorus**
13	_____ organic waste should be used for generation of biogas	Biodegradable	Microbial	Solid wastes	Effluents	**Biodegradable**
14	Radioactive substances are present in	land	ocean	nature	space	**nature**
15	The isotopes release energy in the form of	gamma rays	sun rays	moon rays	light rays	**gamma rays**
16	The _____ particles are fast moving positively charged particles	beta	teta	alpha	gamma	**alpha**
17	Metabolic activities of aquatic organisms increase at high temperature and require more	oxygen	nitrogen	carbon-di-oxide	helium	**oxygen**
18	COD stands for	chemical oxygen damage	chemical ozone damage	chemical oxide damage	chemical over damage	**chemical oxygen damage**
19	Mercury dumped into water is transformed into water soluble methyl mercury by _____ action	viral	fungal	bacterial	acidic	**bacterial**
20	Compounds containing nitrogen and phosphorus helps in the growth of	algae	fungai	virus	bacteria	**algae**
21	No fire works or fire crackers shall be used between	10.00 p.m. and 6.00 a.m.	10.00 a.m. and 6.00 p.m.	6.00 p.m. and 10.00 a.m.	6.00 a.m. and 10.00 p.m.	**10.00 p.m. and 6.00 a.m.**
22	Noise can cause temporary or permanent	visual loss	physical loss	hearing loss	internal loss	**hearing loss**
23	Air pollutants mixing up with rain can cause high _____ in fresh water lakes	alkality	acidity	abscission	necrosis	**acidity**
24	_____ causes constriction of respiratory passage and can cause bronchitis like conditions	SO2	H2O	CO2	O2	**SO2**

25	Presence of waste heat in the water which can cause undesirable changes in the natural environment is known as	air pollution	water pollution	noise pollution	thermal pollution	**thermal pollution**
26	Power plants utilize only _____ of the energy provided by fossil fuels for their operations	1/3	2/3	1/4	1/2	**1/3**
27	_____ becomes a barrier for oxygen penetration into deep cold waters	Low temperature	Very low temperature	High temperature	Very High temperature	**High temperature**
28	Fish migration is affected due to formation of various	thermal zones	water zones	final zones	solar zones	**thermal zones**
29	Decomposing organic matter in soil also produces	good vapours	waste vapours	toxic vapours	water vapours	**toxic vapours**
30	_____ should be used for methane generation	plastic	paper	iron	Cattle dung	**Cattle dung**
31	Solid waste management can be classified as municipal, _____ agricultural, medical, miningwaste and sewage sludge.	chemical	industrial	mechanical	Biomedical	industrial
32	solid waste management can be classified as _____types	4	5	6	7	**6**
33	_____includes anatomical wastes, pathological wastes, infectious wastes etc	Bio medical waste	mechanical waste	chemical waste	industrial waste	**Bio medical waste**
34	_____ waste contains a variety ofdiscarded materials like polyethylene bags, empty metal and aluminium cans,	horticulture	Domestic	construction	agricultural	**Domestic**

35	The urban solid waste materials that can be degraded by micro-organisms are called _____	biodegradable wastes	mechanical waste	Non-biodegradable wastes	industrial waste	**biodegradable wastes**
36	Wastes that cannot be degraded by micro-organisms are called_____	biodegradable wastes	industrial waste	mechanical waste	Non-biodegradable wastes	**Non-biodegradable wastes**
37	Soil waste management stress on three 'R's-Reduce,_____ and recycle before destruction and safe storage of wastes.	Reuse	Risk	Rotation	Reproduction	**Reuse**
38	_____ is the reprocessing of discarded materials into new useful products.	Rotation	Recycling	Risk	Reproduction	**Recycling**
39	Types of discarding wastes are sanitary landfill,composting and _____	Incineration	Dioxin	polychronite	Biodegrade	**Incineration**
40	small effort made by each individual at his own place will have pronounced effect at the global level as _____	Think globally act locally	Talk globally act locally	Teach globally act locally	To globally act locally	**Think globally act locally**
41	The _____ tragedy occurred in a suburb of Niagara Falls,New York.	Bopal gas	Air gas	Love canal	Donar air	**Love canal**
42	Fog which formed due to accumulation of cold air at the bottom of the river valley persisted for 4 consecutive days, is called _____	Rotation	inversion	comparision	formation	**inversion**

43	Geological processes like earthquakes, volcanoes, floods and landslides are normal natural events which have resulted in the formation of the earth called as _____	Creative manangement	Inversion Management	Disaster management	information management	**Disaster management**
44	_____ occur due to sudden movements of earths crust	Earthquakes	Valcono	Flood	landslide	**Earthquakes**
45	The point on a fault at which the first movement occurs during an earthquake is called the _____	Valcono	Epicenter	landslide	Flood	**Epicenter**
46	Earthquake-generated water waves called _____ can severely affect coastal areas	Ocean	Flood	tsunamis	Earthquake waves	**tsunamis**
47	Heavy rains or sudden snow melt the quantity of water in streams exceeds their capacity and water overflows the banks and causes inundation of the surrounding land is called_____	flood	Creative manangement	landslide	Epicenter	**flood**
48	_____occurs when coherent rock of soil masses move downslope due to gravitational pull.	flood	Epicenter	Landslide	Earthquakes	**Landslide**
49	_____ of water gradually cause chemical weathering of rocks making them prone to landslides.	physicl action	Water action	Chemical action	Biological action	**Chemical action**

50	Tropical _____ in the warm oceans are formed because of heat and moisture	water	Flood	cyclones	landslide	**cyclones**
51	SST means_____	sea surface temperature	sea space temperature	space surface temperature	surface space temperature	**sea surface temperature**
52	Tropical cyclones are called _____ in the Atlantic, Caribbean and north eastern Pacific	Typoons	cyclones	willy willies	hurricanes	**hurricanes**
53	Tropical cyclones are called _____in the western Pacific	hurricanes	Typoons	cyclones	willy willies	**Typoons**
54	Tropical cyclones are called _____in the the sea around Australia	willy willies	hurricanes	Typoons	cyclones	**willy willies**
55	_____ are recurring phenomena in the tropical coastal regions	hurricanes	willy willies	cyclones	Typoons	**cyclones**
56	In India,_____ is considered to be amongst the worst flood hit states of the country	Andhra pradesh	Uttar Pradesh	Maharastra	Kerala	**Uttar Pradesh**
57	_____ pollution can be prevented by using really clean fuel i.e. hydrogen fuel	Air	Water	Ocean	Soil	**Air**
58	CFC stands for_____	chlorofluorocarbons	chlorofluorocarbons	chlorofluorocarbondioxide	chemical fluorocarbons	**chlorofluorocarbons**
59	_____ in the use of raw materials will correspondingly decrease the production of waste.	Reduction	Rotation	Decrease	Reproduction	**Reduction**

60	_____consists of a large number of materials including factory rubbish, packaging material,Metals etc.	Industrial waste	Domestic waste	Agricultural	Biological	**Industrial waste**

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Under section 3 of UGC Act 1956)
COIMBATORE – 641 021
DEPARTMENT OF COMPUTER APPLICATIONS

UNIT –IV

Unit IV: Environmental Pollution - Definition, Causes, effects and control measures of Air pollution, Water pollution, Soil pollution , Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management: Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: Foods, earthquake, cyclone and landslides.

ENVIRONMENTAL POLLUTION

Definition

- Pollution may be defined as an undesirable change in the physical, chemical or biological characteristics of our air, water and land that may or will harmfully affect human life, the lives of the desirable species, our industrial processes, living conditions and cultured assets, or that may or will waste or deteriorate our raw material resources.

Types of environmental pollution

- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards

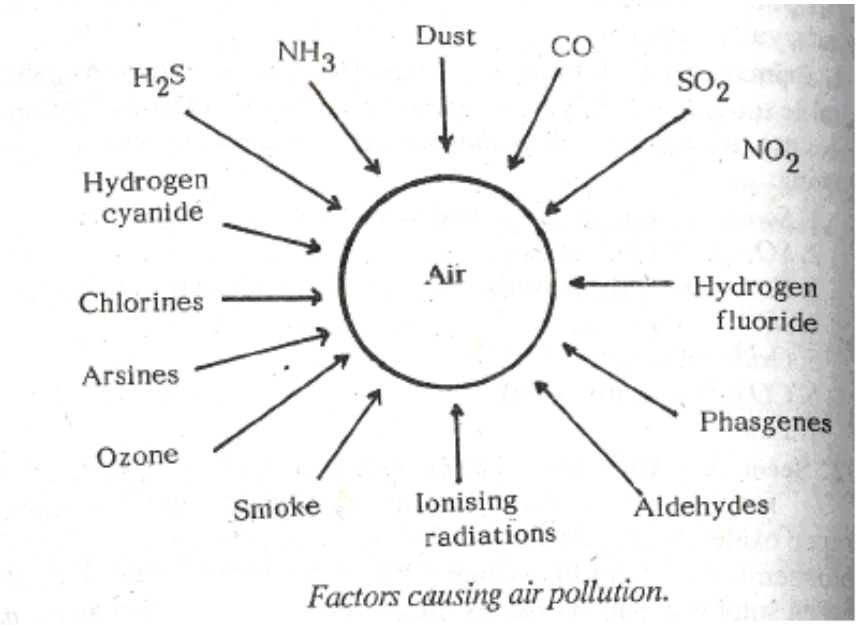
AIR POLLUTION

- Air pollution refers to the undesirable change occurring in air causing harmful effects on man and domesticated species.

Air pollutants

- Dust
- Smoke
- Sulphur oxides (CO)
- Nitrogen oxides (SO_2)
- Ammonia (NH_3)
- Nitrogen dioxide(NO_2)
- Hydrogen cyanide
- Hydrogen fluorides
- Hydrogen sulphide (H_2S)
- Chlorines
- Phosgenes
- Arsines
- Aldehydes
- Ozone

- Ionizing radiations
- CO_2



Factors causing air pollution.

Air pollutants are two types

- Primary air pollutants
- Secondary air pollutants

Primary Air Pollutants

- Air is polluted by poisonous gases and undesirable substances.
- They are released by burning fossil fuels.
- These substances are called primary air pollutants.
- The tissues present in the tip of dusheri mango turns black when they are exposed to sulphur dioxide (SO_2) fumes.

The primary pollutants are following

- Soot released from unburned fuel
- SO_2
- Benzopyrene (hydrocarbon) released from cigarette smoke.
- NH_3
- Oxides of nitrogen
- CO (carbon monoxide)
- Lead

Secondary Air Pollutants

- Secondary air pollutants are poisonous nitrogen oxides, hydrocarbons and O_2 interact to produce more powerful photochemical oxidants like ozone (O_3), peroxyacetyl nitrate (PAN), Aldehydes, sulphuric acid, peroxides, etc.

- All these constitute photochemical smog.

CAUSES OF AIR POLLUTION

Agriculture

- Hydrocarbons released by plants, pollen grains, insecticides etc. cause air pollution.

Dust

- Dust in the air is increased by dust storms, wind, volcanoes, automobiles, etc.

Industries

- The Combustion of fossil fuels like coal, petroleum, etc. in industries is the main source of pollution.

Automobiles

- The combustion of petrol and diesel in automobiles releases harmful gases into the air.
- They also produce dust.

Ionising Radiations

- Ionizing radiations include alpha particle, beta particles and gamma rays.
- They are released into the air from testing atomic weapons and atomic explosions.

Freons

- Use of freons and other chlorine-flourine-carbons as refrigerants, coolants and as filling agents in aerosol pachages cause pollution.

Aerosols

- Aerosols are small particles of all sorts of solid or liquid substances suspended in the air.
- They block the stomata of plants and prevent he gaseous exchanges between plants and atmosphere.
- They may also change the climate of an area.

Biological indicators

- Some plants are sensitive to certain air pollutants.
- These plants are used to indicate the presence of these substances.
- These plants are called biological indicators

Example

- Pinto beans and petunias are used to indicate the presence of peroxy acetyl nitrate (PAN).
- Tobacco and annual blue-grass plants are used to show the presence of ozone (O_3).

ECOLOGICAL EFFECTS OF AIR POLLUTION

Death

- When air is polluted with poisonous gases, death comes as a result immediately. Bopha episode is a good example.

Bhopal episode

- On 2nd December 1984about 3000 human beings died about 5000 paralysed and thousands of cattle, bird, dogs and cats died in one night at Bhopal.
- This mass death is due to the leakage of methyl isocyanate (toxic gas) into the air from art insecticide plant managed by Union Carbide.

Chlorosis

- The disappearance of chlorophyll is called Chlorosis.
- It is caused by SO_2 and fluorides present in the air.

Necrosis

- The breakdown of cells is called necrosis.
- It is caused by SO_2, nitrogen dioxide, ozone and fluorides.

Green house effect

- CO_2 is released into the air by the combustion of fuels.
- It is estimated that CO_2 content of the is increasing at the rated 0.4% per annum.
- This will result in an appreciable warming up of the ear.
- This is called green house effect.
- It is very likely that this will cause the melting of polar ice caps resulting in a rise of nearly 60 feet on the sea level.
- Coastal regions and low lying areas allover the world will be go under water.

Crop losses

- Heavy loss of crop plants is caused by smog.
- Smog denotes a combination of smoke and fog.
- The important components of s ozone and PAN (Peroxyacetyl nitrate).
- They damage leafy vegetables, cereals, textile crops, ornamental plants, fruits and forest trees.

Respiratory disorders

- Excessive ethylene accelerates respiration causing premature senescence (old age) and abscission (accumulation of yellow fluid (pus) in the body).
- Aldehydes irritate nasal and respiratory tracts.
- Chlorine and phosgenes (carbonyl chloride) cause pulmonary oedema.

Nausea

- H_2S smells like rotten eggs and nausea.

Vomiting

- SO_2 causes vomiting.

Jaundice

- Arsines induce RBC breakdown and jaundice.

Oxygen carrying capacity

- CO reduces O_2 carrying capacity of RBC by its permanent combination with haemoglobin.

Coughing

- Coughing is induced by phosgenes (carbonyl chloride).

Headache

- SO_2 causes headache.

Cancer

- Cancer is caused by air pollutants like ash, soot, smoke. chromium, nickel and radioactive elements.

Mutation

- Radioactive elements produce mutation.
- Ozone produces chromosomal aberrations.

Cardiac diseases

- Cadmium causes high blood pressure and heart diseases.

Pneumonia

- Pneumonia is caused by breathing in too much of manganese particles.

Depletion of Ozone Umbrella

- Intheatmosphere, about 30km above the surface of the earth, the ozone molecules (O_3) form an umbrella.

- It prevents the penetration of harmful ultra violet radiation from the sun and thus protects the life of the earth.
- It is now feared that there is danger of appearing holes on the ozone umbrella.
- This is caused by the use of freons and other chlorine-fluorine-carbons as refrigerents, coolants in domestic refrigerators and otter cold storage facilities, and as filling agents in foam plastics and in aerosol packages.
- Reaching ozone umbrella, they destroy ozone molecules as a result of photochemical reactions.
- Over the past 16 years, the density of the ozone layer has been diminishing at an average rate of 3%.
- It is calculated that the depletion of ozone layer by I% results in an increase in the incidence of skin cancer by 5% to 7%.

Acid Rains

- One of the major environmental issues facing human society at the National and International level is the problem of acid.
- The rainwater is always slightly acidic as CO_2 in the atmosphere gets dissolved in it.
- However during recent years, it has been noted a further lowering of pH of rainwater often as 2.4.
- This lowering of pH is due to the dissolution of acids in the rain water.
- Precipitation of oxides of sulphur and nitrogen with rain is termed acid rain.
- Acid rain is caused by air pollution.
- When atmospheric air contains sulphur dioxide (SO_2) and oxides of nitrogen such as nitrous oxide (N_2O) and nitric oxide (NO), they dissolve in rainwater forming sulphuric acid and nitric acid.
- The rain water falls as acid rain.
- The main source of oxides of sulphur and nitrogen is the burning of fossil fuels in power plants based on coal and oil contribute more than 60% of all sulphur oxides and 25 to 20% of nitrogen oxides in the atmosphere.
- Automobiles make a sustainable contribution in large cities.
- Ozone is now recognized as a major factor in the formation of acid rain.
- Acid rain affects both materials and organisms.

- It attacks building materials principally sandstone, limestone, marble, steel and nickel.
- In plants, it leads to Chlorosis (gradual yellowing in which the chlorophyll making mechanism is impeded) or depigmentation of leaves.
- Acid rain increases the acidity of lakes and rivers.
- Vast tracts of forests and lakes in Europe and North America have been destroyed by acid.
- Acidity kills fish, bacteria and algae and the aquatic ecosystem collapses into sterility leaving a crystal clear but ultimately a dead lake.

CONTROL OF AIR POLLUTION

- The emission of exhaust from automobiles can be reduced by devices, such as positive crankcase ventilation valve and catalytic converter.
- Electrostatic precipitators can reduce smoke and dust from industries.
- Later birds, cats and dogs which me the marine animals died.
- Finally many men who ate fish, crabs and shell fish died.
- Their initial symptoms of Minamata disease include the numbness of limbs, lips and tongue, impairment of motor control, deafness and blurring of vision.
- Finally it affects and destroys the brain.
- As a result of the attack of Minamata disease about 17 persons died and 23 became permanently disabled in the year 1953, in Japan.

Diarrhoea

- It is caused by mercury, cadmium and cobalt.

Mortality of Plankton and Fish

- Chlorine which is added to water control the growth of algae and bacteria in the cooling system of power stations may persist in streams to cause the mortality of plankton and fish.

Reduction in Productivity

- Intensive agriculture increases the amount of silt in lakes and rivers.
- Silt prevents the penetration of light to depths and thus reduces primary production.

Siltation

- Siltation is a phenomenon by which the gills of fish deposited with silt.
- This causes heavy mortality among fishes.

Poor Oxygenation

- Oil present on the surface of water prevents water oxygenation.
- This reduces respiration and metabolism in aquatic organisms.

Poor Photosynthesis

- Oil-pollution prevents photosynthesis in phytoplankton.

Red Tide

- When coastal waters are enriched with nutrients of sewage dinoflagellates multiply rapidly and form bloom.
- This blooming lat. liberate into the water toxic metabolic by-products which can result in a large scale death of marine fishes.
- This is called red tide.

Biochemical Oxygen Demand

- Sewage enriches the water with nutrients.
- This causes rapid growth of plankton and algae.
- This leads to oxygen depletion in water.
- The oxygen depletion causes the death of algae.
- They decay and decomposition of algae consumes more oxygen from water.
- Biochemical Oxygen Demand or biological oxygen demand (BOD) is the amount of oxygen required by the microorganisms in water.
- BOD is higher in polluted water (sewage) and lesser in drinking water.
- Increased BOD lowers the contents of dissolved O_2 in water causing the suffocation and death of aquatic flora and fauna.

Water-borne diseases

- Disease like jaundice, cholera, typhoid, diarrhoea, etc. are transmitted through water contaminated with sewage.

Methaemoglobinema

- The nitrate used in fertilizers enters the intestine of man through drinking water.
- In the intestine it is converted into nitrite.
- Nitrite is absorbed into the blood where it combines with haemoglobin to form methaemoglobin: Methaemoglobin cannot transport oxygen.
- This leads to suffocation and breathing troubles, especially in infants.

- This disease is called methaemoglobinema.
- Gaseous pollutants arising from industries can be removed by differential solubility of gases in water.
- A finepray of water in the device called scrubber can separate many gases like NH_3, SO_2, etc. from the emitted exhaust.
- Certain gases can be removed by filtration or absorption through activated carbon.
- Certain gases can be made chemically inert by chemical conversion.
- At the Government level pollution can be controlled by framing legislations.

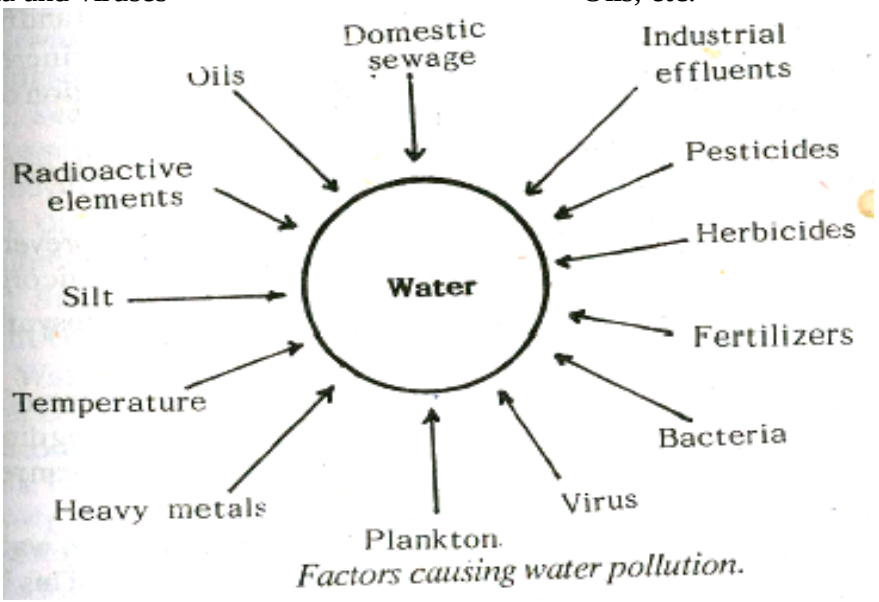
WATER POLLUTION

- Water is the soul of nature; its pollution will perish the world.
- Water pollution refers to the undesirable change occurring in water which may harmfully affect the life activities of man and domesticated species.

Water pollutants

The common water pollutants are as follows

- Domestic sewage
- Industrial effluents
- Pesticides
- Herbicides
- Fertilizers
- Bacteria and viruses
- Plankton blooms
- Heavy metals like mercury
- Temperature
- Silt
- Radioactivity
- Oils, etc.



Factors causing water pollution.

CAUSES OF WATER POLLUTION

Domestic sewage

- Domestic sewage consists of human faeces, urine, and the dirty used-up water in houses.
- It contains a large number of pathogenic bacteria and virus.
- The sewage is released into the rivers on the banks of which most of the cities are situated.

Industrial effluents

- All industrial plants produce some organic and inorganic chemical wastes.
- Those nonusable chemicals are dumped in water as a means of getting rid of them.
- The industrial wastes include heavy metals (Hg, Cu, lead zinc etc), detergents, petroleum, acids, alkalies, phenols, carbonate, alcohol cyanides, arsenic, chlorine, etc.

Thermal Pollution

- Many industries use water for cooling.
- The resultant warm water is discharged into rivers.
- This brings about thermal pollution.

Agricultural pollution

- The fertilizers used for crops are washed into ponds and rivers.

Pesticides

- Pesticides are used to control pests in fields and houses.
- They include DDT, BHC, endrin etc.

Radioactive wastes

- Liquid radioactive wastes are released into the sea around nuclear installations.
- The oceanic currents carry the radioactive contaminants everywhere.
- Oil pollution
- Oil is a source of pollution in sea-water.
- Oil pollution is due to ship accidents, loading and discharging of oil at the harbour, oil refineries and off-shore oil production.

Retting

- The process of decaying coconut husk to get fibre for making coir is called retting.
- Retting releases H_2S.
- It makes water polluted.

ECOLOGICAL EFFECTS OF WATER POLLUTION

Minamata disease

- This disease is caused by mercury poisoning.
- It is characterized by crippling and death.
- This disease appeared in a coastal town, Minamata, in Japan.
- The primary cause for this disease was a p industry which was started on the san coast of Japan in 1905.
- From this factory a by-product called mercury was disposed into the sea.
- This mercury cumulated in marine animals.

Eutrophication

- Domestic sewage and fertilizers add large quantities of nutrients such as nitrates and phosphates to the fresh water ecosystems.
- The rich supply of these nutrients makes blue green algae, green algae and other phytoplankton to grow abundantly.
- This increased productivity of lakes and ponds brought about by nutrient enrichment is known as eutrophication.
- As the algae use O_2 of the water for respiration, the O_2 is depleted from the water.
- The rapid growth also consumes all the nutrients of the water.
- The depletion of O_2 and nutrients lead to the death of algae and other phytoplankton.
- As other organisms, such as zooplankton and fishes of the water, depend on the blue green algae and phytoplankton for their food, they also die.
- This eutrophication leads to the complete depletion of the fauna from the ecosystem.

CONTROL OF WATER POLLUTION

Sewage Treatment

Pollution control by sewage treatment includes the following steps

- Sedimentation
- Dilution
- Storage

(i) Sedimentation

- When sewage is allowed to stand, the suspended particles settle to the bottom.

- So by sedimentation the suspended particles are removed from sewage.

(ii) Dilution

- The sewage can be diluted with water.
- This increases the O_2 contents and reduces BOD and CO_2.

(iii) Storage

- The diluted sewage is stored in a pond.
- This facilities the growth of microorganisms.
- This renders further oxidation of sewage.

Waste stabilization pond or oxidation pond

- The national Environmental Engineering Research Institute (NEERI) at Nagpur has devised a very economical method for the treatment of industrial and domestic effluents.
- Domestic and industrial wastes are stored in a dilute condition in shallow ponds called oxidation or stabilization ponds.
- After a few days micro-organisms and algae flourish.
- The micro-organisms decompose the organic wastes by oxidation, and the water is purified.
- This water is rich in nitrogen, phosphorus, potassium and other nutrients.
- This water can be used for fish agriculture etc.

Recycling

- Pollution can be prevented to a certain extent by reutilizing the wastes.
- This is called recycling.

Example

- The dung of cows and buffaloes can be used for the production of gobargas.
- Sewage can be used for irrigation fish culture after treatment in oxidation pond.
- Certain pollutants from industrial effluents can be removed by filtration and selective absorption.
- Excessive use of pesticides and herbicides should be avoided.
- At the Government level, legislations should be framed to control water pollution.

SOIL POLLUTION

- The contamination of soil by human and natural activities which may cause harmful effects on living beings.

Causes

- Industrial waste
- Urban waste
- Agricultural practices
- Radioactive pollutants
- Biological agent

Effects

- Affect human health
- Affect soil fertility
- Reduce soil productivity
- Cause abnormalities

Control measures

- Properly collect solid waste
- Microbial degradation
- Recovery of products from waste
- For methane generation, use cattle dung
- For biogas generation, use biodegradable organic waste

NOISE POLLUTION

- The word noise has a Latin origin nausea meaning a feeling of sickness at the stomach with an urge to vomit.
- Noise is defined as unwanted sound or sound without value.
- Noise pollution is the unwanted sound dumped into the environment.
- Noise is measured by the unit decibel (dB).
- One decibel is equal to the faintest sound that can be heard by the human ears.
- Some people feel discomfort with the sound of 85dB.
- But more people do not feel discomfort with the sound of 115 dB.
- Pain is usually felt at 145dB.

Causes of Noise Pollution

- Scooters
- Motor bikes
- Cars
- Tempos
- Vans
- Buses
- Trucks
- Tractors
- Aircrafts
- Supersonic aircrafts
- Motor boats
- Ships
- Loud speakers
- Loud pop-music
- Social gatherings
- Machines of factories
- Mills
- Industries
- Kitchen appliances
- Fire crackers and generators are some of the chief sources of pollutions.

ECOLOGICAL EFFECTS OF NOISE POLLUTION

- Noise diminishes the power of hearing.
- It gives pain to the ear.
- It interferes with communication-systems.
- It causes stress.
- It causes fright.
- It increases the rate of heart beat.
- It causes the constriction of blood vessels.
- It increases blood pressure.
- It causes head-ache.
- It causes the dilation of pupil of the eye.
- It causes emotional upsets and
- It causes deafness.
- Noise causes physical or mental fatigue and lack of concentration.
- In industrial situations this effect results in lowered efficiency, reduced work rate and higher chances for accident.
- Noise disturbs sleep.
- High frequency or ultrasonic sound can affect the semicircular canals of the internal ear and cause nausea and dizziness.

CONTROL OF NOISE POLLUTION

Noise pollution can be controlled in the following ways

- Legislations should be framed.
- The sources that generate unwanted sound should be reduced.
- Noisy automobiles should be condemned.
- Wheels of automobiles should be oiled properly.
- Industrialists must take up necessary steps to control noise.
- Loudspeakers should be set at a low sound.
- Trees absorb noise and thus reduce noise pollution. So thick vegetation must be grown around industries, cities and on the sides of roads.
- Noise-producing machines should be placed in closed rooms.
- Residential houses should be constructed far away from in factories and airports.

THERMAL POLLUTION

- Increase or decrease in the temperature of water, air and land by human activity is called thermal pollution.

Sources of thermal pollution

CO_2

- CO_2 is produced during the combustion of fuel in houses, factories, power stations, etc.

- It is also released by plants and animals in the process of respiration.
- The CO_2 contents of the atmosphere has gone up by 15% in the past 100 years.
- It is estimated that by the year 2000 AD the increase in the CO_2 contents of the air will be nearly 25%.
- This will result in an appreciable warming up of the earth.
- This is called green house effect.
- It is very likely that this will cause the melting of polar ice caps.
- This will result in an ice caps will lead to rise of nearly 60 feet in sea level.
- As a result coastal areas and low-lying areas all over the world will be flooded and will go under water.

Hot water

- Power stations, industries and nuclear reactors use large quantities of water for cooling purposes.
- The resulting hot waters are released into the rivers.

ECOLOGICAL EFFECTS OF THERMAL POLLUTION

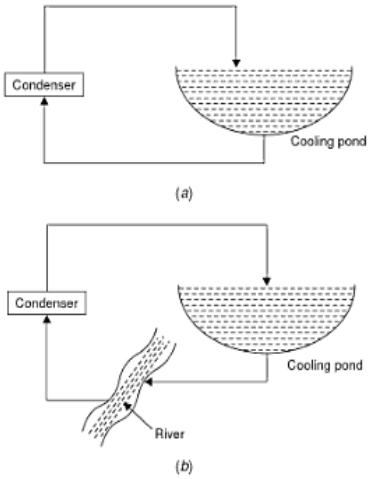
- When the temperature of the earth increases, ice caps melt. This will flood the coastal and low lying areas of land.
- A rise of 10°C in temperature increases the rate of exchange of salts between the organisms and the environment. This will accelerate the entry of toxins into the body from the external medium.

CONTROL OF THERMAL POLLUTION

- Cooling ponds
- Spray Ponds
- Cooling towers

Cooling Ponds

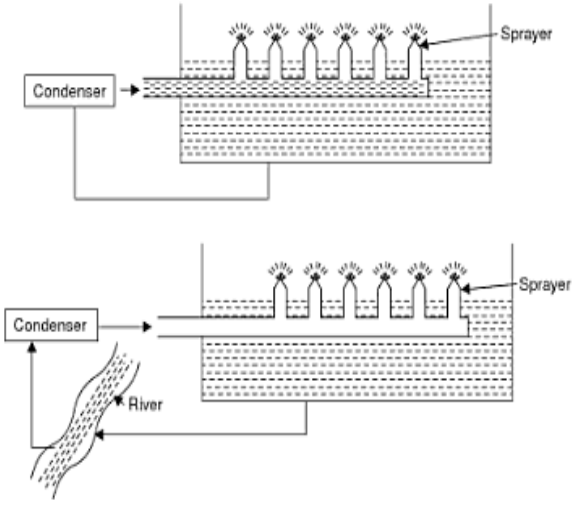
- Water from condensers is stored in ponds where natural evaporation cools the water which can then be recirculated or discharged in nearby water body.



Dissipation of heat by cooling ponds

Spray Ponds

- The water from condensers is received in spray ponds.
- Here the water is sprayed through nozzles where fine droplets are formed.
- Heat from these fine droplets is dissipated to the atmosphere.



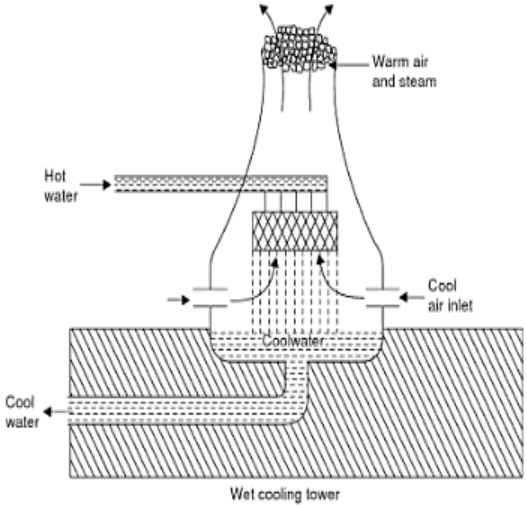
Dissipation of heat by spray ponds.

Cooling Towers

(i) Wet cooling tower

- Hot water is sprayed over baffles.
- Cool air entering from sides takes away the heat and cools the water.
- This cool water can be recycled or discharged.

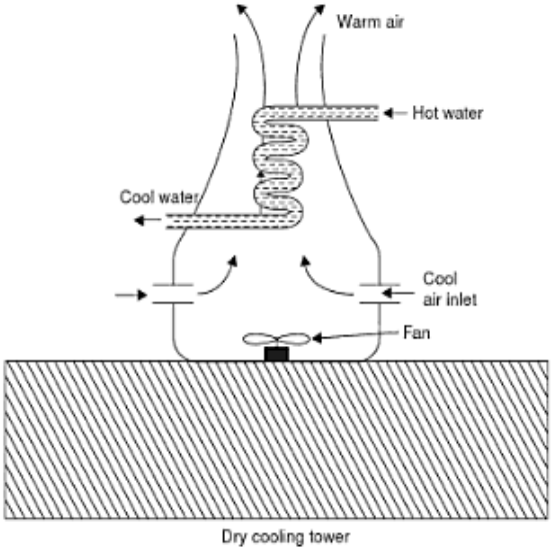
- Large amount of water is lost through evaporation and in the vicinity of wet cooling tower extensive fog is formed which is not good for environment and causes damage to vegetation.



Wet cooling tower

(ii) Dry cooling tower

- The heated water flows in a system of pipes.
- Air is passed over these hot pipes with fans.
- There is no water loss in this method but installation and operation cost of dry cooling tower is many times higher than wet cooling tower.



Dry cooling tower

UNIT- IV
Possible Questions

Part – A (1X20=20)

(Multiple Choice Questions)

Part- B (2 Marks)

1. What are the two important principles of watershed management?
2. Write a short note on rain water harvesting.
3. What is the need for water conservation?
4. What the objectives of rainwater harvesting?
5. What are the impacts of human activities on watershed?
6. What are the measures you will take for sustainable utilization of water?

Part- C (6 Marks)

1. Explain in detail about environment and human health
2. Give a detailed account on landslides and its disaster and rehabilitation management.
3. Explain in detail cyclone and its disaster management
4. Explain in detail about the value of education.
5. Explain in detail about watershed management.
6. Explain any one natural resource and its associated problem. What are the measures to be followed for its sustainable utilization?
7. Explain in detail about rain water harvesting.
8. Describe the role of individuals in conservation of natural resources.
9. Discuss in detail about resettlement and rehabilitation issues.

Karpagam Academy of Higher Education
Department of Computer Applications
Subject : Environmental Studies
Class: I BCA **Subject code: 18VAE101**
Objective Type Questions

UNIT IV

S.No	Question	Opt A	Opt B	Opt C	Opt D	Answers
1	Which of the following is not an air pollutant ?	Smoke	Carbon Dioxide	Nitrogen Gas	Sulphur Dioxide	Nitrogen Gas
2	Which part of plant evaporates water ?	Stomata	Fruit	Branch	Root	Stomata
3	A fossil fuel is best described as	a flammable solid or gas	a fuel that contains carbon.	fossilised rock that will burn in a power station.	substance formed from ancient biological material.	a flammable substance formed from ancient biological material.
4	An example of a non-renewable, non-fossil energy resource is	oil.	coal.	tidal	uranium.	tidal
5	Which of the following is not a renewable energy source?	wind	solar	biomass	natural gas	biomass
6	The term ‘exothermic’ refers to a chemical reaction	in which heat is absorbed.	in which heat is given out.	that proceeds very rapidly.	that requires high temperatures to begin the reaction.	that requires high temperatures to begin the reaction.
7	What percentage of the coal’s energy reaches the city?	approximately 30%	approximately 50%	approximately 60%	approximately 90%	approximately 90%

8	How much of the energy contained in the diesel-oil fuel is not converted to electricity when burnt in the power station?	4800 kJ	3200 kJ	2400 kJ	1200 kj	2400 kJ
9	Mercury is particularly hazardous to human health because	it bioaccumulates high up the food chain.	as a heavy metal, it can cause serious impact injury.	as a pure metal it is very soluble in water, hence easily absorbed through drinking water.	it is light and volatile, and so is widely dispersed through the environment by wind	as a heavy metal, it can cause serious impact injury.
10	Which of the following is the best description of sulfur dioxide?	a gas less dense than air	a gas more dense than air	a gas insoluble in water	an acidic liquid at ordinary room temperature	an acidic liquid at ordinary room temperature
11	The dosage of sulfur dioxide is best described as	a measure of the harm sulfur dioxide does to a person.	the amount of sulfur dioxide a person experiences in a given time.	the amount of sulfur dioxide absorbed by a person in a given time.	the amount of sulfur dioxide entering the environment in a given time	the amount of sulfur dioxide absorbed by a person in a given time.
12	The toxicity of mercury is best described as	how mercury enters the environment.	a measure of the harm mercury does to a person.	the persistence of mercury in the environment.	how much mercury a person experiences in a given time	the persistence of mercury in the environment.
13	In some regions, the combination of acid rain and smog causes damage to forests that is worse than the impact of either acid rain or smog on its own. This is an example of	specificity.	acute toxicity.	chronic toxicity.	synergistic action.	chronic toxicity.

14	Which one of the following best accounts for mercury's significant harm to the environment	persistence	degradability	specificity	synergism	synergism
15	The main purpose of the Environmental Risk Assessment is to	. ensure maximum local employment on the project.	. eliminate any disruption to the environment during repair.	minimise the number of people likely to object to the project	balance any environmental damage against the benefit of the repair	minimise the number of people likely to object to the project
16	Which one of the following factors best indicates that the dam repair is ecologically sustainable	disruption to local wildlife is temporary	employment is created during the repair project	the habitat of endemic threatened populations has been disturbed	previously submerged heritage buildings can be investigated	previously submerged heritage buildings can be investigated
17	After the dam is repaired, it is found that soil sediments in the flood plain of the river contain significant levels of phosphorus that were not present before the water release. A scientist suggests that this can be corrected by planting a particular type of vegetation that absorbs and bioaccumulates phosphorus from the soil. This is an example of	recycling.	soil bioremediation.	water conservation.	waste minimisation.	waste minimisation.
18	The dominant gas in biogas is:	CH4	C2 H5	CO2	NO2	CH4
19	Maximum amount of gas found in air is	Oxygen	Carbon dioxide	Hydrogen	Nitrogen	Nitrogen

20	which state of matter, the distance between the molecules is minimum ?	Solid	Plasma	Liquid	Gas	Plasma
21	Which energy is converted into electrical energy by a solar cell ?	Nuclear Energy	Chemical Energy	Solar Energy	Magnetic Energy	Solar Energy
22	Carrier of Dengue disease is	Aedes Mosquito	Culex Mosquito	Housefly	Anopheles Mosquito	Aedes Mosquito
23	Which state of India is known as 'Tiger State'? `	Gujarat	West Bengal	Madhya Pradesh	Assam	Madhya Pradesh
24	Which of the following has maximum speed ?	Air	Water Current	Sound	Light	Light
25	Tobacco addiction is caused due to	Cocaine	Nicotine	Caffeine	Histamine	Nicotine
26	Which of the following is called artificial kidney?	dialyzer	donar kidney	tissue-matched	preserved kidney	dialyzer
27	Which of the following causes AIDS ?	Bacteria	Fungus	Retro virus	TMV	Retro virus
28	Global warming is caused due to	lack of rainfall	presence of a hole in ozone layer	human activities against nature	extinction of animals and plants	human activities against nature
29	The most abundant green house gas is	NO2	CO2	O3	SO2	CO2
30	Which is considered as a future source of power, that can meet our unlimited demand	Hydel power	Hydrogen	Thermal power	Solar power	Hydrogen
31	What is the rate of growth of human population ?	10 million per year	90 million per year	1 million per year	80 million per year	90 million per year

32	Which is a better method to dispose large amounts of water carrying relatively small amounts of chemical wastes?	land filling method	Deep-well injection	Surface impoundments	incineration	Surface impoundments
33	Nuclear family refers to	Any family born after 1950	Family includes parents and their children	Entire family including children, their parents and grandparents	Only husband and wife	Family includes parents and their children
34	Which country has the maximum number of tube-wells in the world ?	America	Australia	China	India	India
35	Which of the following is not an air pollutant ?	Smoke	Carbon Dioxide	Nitrogen Gas	Sulphur Dioxide	Nitrogen Gas
36	Which part of plant evaporates water ?	Stomata	Fruit	Branch	Root	Stomata
37	In elbow and knee joints, the bones can move in -	all directions	four directions	one directions	two directions	one directions
38	Which energy is converted into electrical energy by a solar cell ?	Chemical Energy	Nuclear Energy	Solar Energy	Magnetic Energy	Solar Energy
39	Carrier of Dengue disease is	Aedes Mosquito	Culex Mosquito	Housefly	Anopheles Mosquito	Aedes Mosquito
40	Wildlife Week is celebrated on	1st October to 7th October	15th October to 2 1st October	1st June to 7th June	15th June to 21st June	1st October to 7th October
41	In which state of matter, the distance between the molecules is minimum ?	Solid	Liquid	Gas	Plasma	Solid
42	The biochemical laboratory of human body is	Stomach	Liver	Intestine	Kidney	Liver

43	Which state of India is known as 'Tiger State'?	Gujarat	West Bengal	Madhya Pradesh	Assam	Madhya Pradesh
44	Habitat of Dog Fish is	River	Pond	Lake	Sea	Sea
45	Which of the following has maximum speed ?	Air	Water Current	Sound	Light	Light
46	Tobacco addiction is caused due to	Cocaine	Caffeine	Nicotine	Histamine	Nicotine
47	Ozone layer is found in	Thermosphere	Stratosphere	Troposphere	Mesosphere	Stratosphere
48	Full form of CNG is	Common National Gas	Compressed Natural Gas	Common Natural Gas	Cirtified Natural Gas	Compressed Natural Gas
49	Renewable source of energy is	Coal	Petroleum	Plants	Uranium	Plants
50	Sugar is form of _____	Protein	Carbohydrate	Fat	Water	Carbohydrate
51	The mosquito repellent (coils, mats and liquids) that we generally use in our homes are:	Pesticides	Fertilizers	Sedatives	Insecticides	Insecticides
52	The young ones of the frog are called:	Young frogs	Frog cubs	Puppies	Tadpoles	Tadpoles
53	How many muscles are there in a human body?	600	700	800	900	600
54	A battery or cell converts _____ energy into electrical energy	Solar	Heat	Mechanical	Chemical	Chemical
55	We have days and nights because of:	Earth's rotation	Earth's revolution	Sun's rotation	Sun's revolution	Earth's rotation
56	Which of the following plays an important role in the cause of rainfall	Evaporation	Condensation	Both evaporation & condensation	Filtration	Both evaporation & condensation

57	The process of solid changing into liquid upon the supply of heat is called:	Condensation	Evaporation	Melting	Boiling	Melting
58	Our sun is:	Planet	Satellite	Comet	Star	Star
59	During summer the earth is	Closer to the sun	Away from the sun	Closer to the moon	Away from the moon	Closer to the sun
60	When we exhale, our lungs have to:	Contract	Expand	Be still	None of the above	Contract
61	Which of the following is a biodegradable waste?	Plastics	Polythene	Glass	None of these	None of these

KARPAGAM ACADEMY OF HIGHER EDUCATION

(Under section 3 of UGC Act 1956)
COIMBATORE – 641 021
DEPARTMENT OF COMPUTER APPLICATIONS

Unit V: Social Issues and the Environment:

From unsustainable to sustainable development. Urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns. Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Population growth, variation among nations. Population explosion—Family Welfare Programme. Environment and human health. Human rights. Value education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in environment and human health.

Social issues and the environment

- Urban problems related to energy
- Water conservation and management
- Rain water harvesting
- Water shed management
- Resettlement and Rehabitilisaion
- Natural resources and associated problems and sustainable utilization
- Environmental Education

SOCIAL ISSUES AND THE ENVIRONMENT

- Human beings live in both natural and social world. Our technological development has strong impacts on the natural as well as the social components.
- When we talk of development, it cannot be perceived as development only for a privileged few who would have a high standard of living and would derive all the benefits.
- Development has to be visualized in a holistic manner, where it brings benefits to all, not only for the present generation, but also for the future generations.
- There is an urgent need to inter-link the social aspects with development and environment.

- In this unit we shall discuss various social issues in relation to environment.

URBAN PROBLEMS RELATED TO ENERGY

- Cities are the main centers of economic growth, trade, education, innovations and employments.
- Until recently, a big majority of human population lived in rural areas and their economic activities centered around agriculture, cattle rearing, fishing, hunting or some cottage industry.
- It was some 200 years ago, with the dawn of industrial era, the cities showed a rapid development.
- Now about 50 percent of the world population lives in urban areas and there is increasing movement of rural folk to cities in search of development.
- The urban growth is so fast that is becoming difficult to accommodate all the industrial, commercial and residential facilities within a limited municipal boundary.
- As a result there is spreading of the cities into the sub-urban or rural areas too, a phenomenon known as urban sprawl.
- In developing countries too urban growth is very fast and in most of the cases it is uncontrollable and in planned growth.
- In contrast to the rural set-up the urban set-up is densely populated, consumes a lot of energy and materials and generates a lot of waste.
- The energy requirements of urban population are much higher than that of rural ones.
- This is because urban people have a higher standard of life and their life style demands more energy inputs in every sphere of life.

The energy demanding activities include

- Residential and commercial lighting.
- Transportation means including automobiles and public transport for moving from residence to workplace.
- Modern life-style using a large number of electrical gadgets in everyday life.
- Industrial plants using a big proportion of energy.
- A large amount of waste generation which has to be disposed off properly using energy based techniques.
- Control and prevention of air and water pollution which need energy dependent technologies.

- Due to high population density and high energy demanding activities, the urban problems related to energy are much more magnified as compared to the rural population.

WATER CONSERVATION AND MANAGEMENT

- Water being one of the most precious and indispensable resources needs to be conserved.
- The following strategies can be adopted for conservation of water.

Decreasing run-off losses

- Huge water-loss occurs due to run-off on most of the soils, which can be reduced by allowing most of the water to infiltrate into the soil.
- This can be achieved by using contour cultivation, terrace farming, water spreading, chemical treatment or improved water-storage system.

(i) Contour cultivation

- On small furrows and ridges across the slopes trap rainwater and allow more time for infiltration.
- Terracing constructed on deep soils have large water-storage capacity.
- On gentle slopes trapped run off is spread over a large area for better infiltration.

(ii) Conservation-bench terracing

- Conservation-bench terracing involves construction of a series of benches for catching the run off water.

(iii) Water spreading

- Water spreading is done by channeling or lagoon-leveling.
- In channeling, the water-flow is controlled by a series of diversions with vertical intervals.
- In lagoon leveling, small depressions are dug in the area so that there is temporary storage of water.

(iv) Chemical wetting agents (Surfactants)

- Chemical wetting agents (Surfactants) increase the water intake rates when added to normal irrigated soils.

(v) Surface crop residues

- Surface crop residues, Tillage, mulch, animal residues etc. help in reducing run-off by allowing more time for water to penetrate into the land.

(vi) Chemical conditioners

- Chemical conditioners like gypsum ($CaSO_4.2H_2O$) when applied to sodic soils improve soil permeability and reduce run off.
- Another useful conditioner is HPAN (hydrolysed polyacrylonitrile).

(vii) Water-storage structures

- Water storage structure like farm ponds, dug-outs etc. built by individual farmers can be useful measures for conserving water through reduction of runoff.

Reducing evaporation losses

- This is more relevant in humid regions.
- Horizontal barriers of asphalt placed below the soil surface increase water availability and increase crop yield by 33-40%.
- This is more effective on sandy soil but less effective on loamy sand soils.
- A co-polymer of starch and acrylonitrile called 'super slurper' has been reported to absorb water upto 1400 times its weight.
- The chemical has been found to be useful for sandy soils.

Storing water in soil

- Storage of water takes place in the soil root zone in humid regions when the soil is wetted to field capacity.
- By leaving the soil fallow for one season water can be made available for the crop grown in text season.

Reducing irrigation losses

- Use of lined or covered canals to reduce seepage.
- Irrigation in early morning or late evening to reduce evaporation losses.
- Sprinkling irrigation and drip irrigation to conserve water by 30-50%.
- Growing hybrid crop varieties with less water requirements and tolerance to saline water help conserve water.

Re-use of water

- Treated wastewater can be used for ferti-irrigation.
- Using grey water from washings, bath-tubs etc. for watering gardens, washings cars or paths help in saving fresh water.

Preventing wastage of water

- This can be done in house-holds, commercial buildings and public places.
    - Closing taps when not in use
    - Repairing any leakage from pipes
    - Using small capacity flush in toilets

Increasing block pricing

- The consumer has to pay a proportionately higher bill with higher use of water.
- This helps in economic use of water by the consumers

RAINWATER HARVESTING

- Rainwater harvesting is a technique of increasing the recharge of groundwater by capturing and storing rainwater.
- This is done by constructing special water-harvesting structures like dug wells, percolation pits, lagoons, check dams etc.
- Rainwater, wherever it falls, is captured and pollution of this water is prevented.
- Rainwater harvesting is not only proving useful for poor and scanty rainfall regions but also for the rich ones.
- The annual average rainfall in India is 1200 mm, However, in most places it is concentrated over the rainy season, from June to September.
- It is an astonishing fact that Cherapunji, the place receiving the second highest annual rainfall as 11000 mm suffers from water scarcity.
- The water flows with run off and there is little vegetation to check the run off and allow infiltration.
- Till now there is hardly any rain-water harvesting being done in this region, thereby losing all the water that comes through rainfall.

Rainwater harvesting has the following objectives

- To reduce run off loss
- To avoid flooding of roads
- To meet the increasing demands of water
- To raise the water table by recharging ground water
- To reduce groundwater contamination
- To supplement groundwater supplies during lean season.

Rainwater can be mainly harvested by any one of the following methods

  - By storing in tanks or reservoirs above or below ground.
  - By constructing pits, dug-we., lagoons, trench or check-dams on small rivulets
  - By recharging the groundwater.

- Before adopting a rain-water harvesting system, the soil characteristics, topography, rainfall pattern and climatic conditions should be understood.

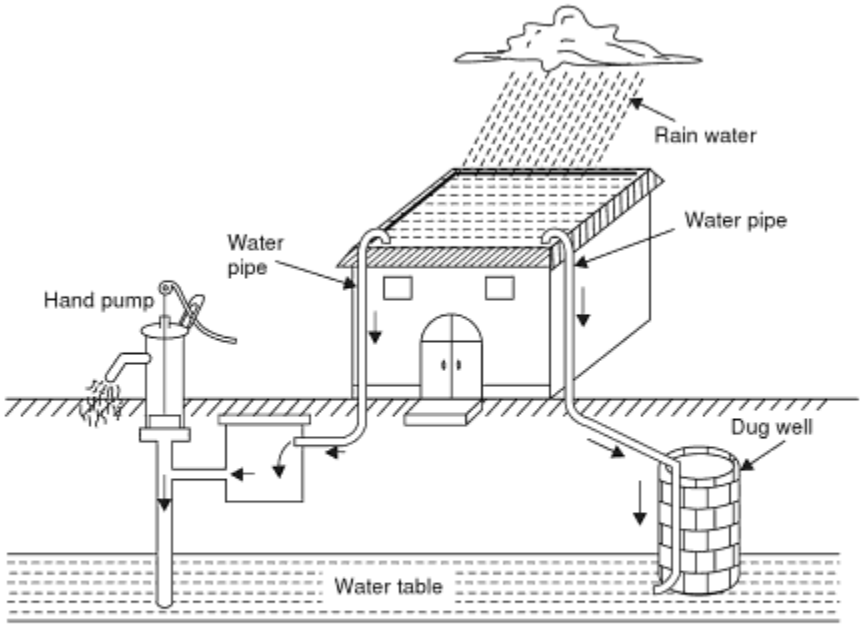
Traditional Rain Water Harvesting

- In India, it is an old practice in high rainfall areas to collect rainwater from roof-tops into storage tanks.
- In foot hills, water flowing from springs are collected by embankment type water storage.
- In Himalayan foot-hills people use the hollow bamboos as pipelines to transport the water of natural springs.
- Rajasthan is known for its `tankas' (under-ground tanks) and khadins (embankments) for harvesting rainwater.
- In our ancient times we had adequate Talaabs, Baawaris, Johars, Hata etc. in every city, village and capital cities of our kings and lords, which were used to collect rain-water and ensured adequate water supply in dry periods.

Modern Techniques of Rain Water Harvesting

- In arid and semi-arid regions artificial ground water recharging is done by constructing shallow percolation tanks.
- Check-dams made of any suitable native material (brush, poles, rocks, plants, loose rocks, wire-nets, stones, slabs, sacks etc.) are constructed for harvesting runoff from large catchment areas.
- Rajendra Singh of Rajasthan popularly known as "water man" has been doing a commendable job for harvesting rain-water by building check dams in Rajasthan and he was honoured with the prestigious Magsaysay Award for his work.
- Groundwater flow can be intercepted by building groundwater dams for storing water underground.
- As compared to surface dams, groundwater dams have several advantages like minimum evaporation loss, reduced chances of contamination etc.
- In roof top rainwater harvesting, which is a low cost and effective technique for urban houses and buildings, the rain-water from the top of the roofs is diverted to some surface tank or pit through a delivery system which can be later used for several purposes.
- Also, it can be used to recharge underground aquifers by diverting the stored water to some abandoned dug-well or by using a hand pump.
- All the above techniques of rainwater harvesting are low-cost methods with little maintenance expenses.

- Rainwater harvesting helps in recharging the aquifers, improves groundwater quality by dilution, improves soil moisture and reduces soil erosion by minimizing run-off water.



Roof-top rainwater harvesting by recharging
(*i*) through hand pump or (*ii*) through abondoned dugwell.

WATERSHED MANAGEMENT

- The watershed is defined as the land area from which water drains under gravity to a common drainage channel.
- Thus, watershed is a delineated area with a well-defined topographic boundary and one water outlet.
- The watershed can range from a few square kilometers to few thousand square kilometers in size.
- In the watershed the hydrological conditions are such that water becomes concentrated within a particular location like a river or a reservoir, by which the watershed is drained.
- The watershed comprises complex interactions of soil, landform, vegetation, land use activities and water.
- People and animals are an integral part of a watershed having mutual impacts on each other.
- We may live anywhere; we would be living in some watershed.
- A watershed affects us as it is directly involved in sustained food production, water supply for irrigation, power generation, and transportation as well as for influencing sedimentation and erosion, vegetation growth, floods and droughts.

- Thus, management of watersheds, treating them as a basic functional unit, is extremely important and the first such Integrated Watershed Management was adopted in 1949 by the Damodar Valley Corporation.

Watershed degradation

- The watersheds are very often found to be degraded due to uncontrolled, unplanned and unscientific land use activities.
- Overgrazing, deforestation, mining, construction activities, industrialization, shifting cultivation, natural and artificial fires, soil erosion and ignorance of local people have been responsible for degradation of various watersheds.

The objectives of watershed management are as follows:

- Rational utilization of land and water resources for optimum production causing minimum damage to the natural resources is known as watershed management.
- To rehabilitate the watershed through proper land use adopting conservation strategies for minimizing soil erosion and moisture retention so as to ensure good productivity of the land for the farmers.
- To manage the watershed for beneficial developmental activities like domestic water supply, irrigation, hydropower generation etc.
- To minimize the risks of floods, droughts and landslides.
- To develop rural areas in the region with clear plans for improving the economy of the region.

Watershed Management Practices

- In the Fifth Five Year Plan, watershed management approach was included with a number of programmes for it and a national policy was developed.
- In watershed management, the aspects of development are considered with regard to the availability of resources.
- The practices of conservation and development of land and water are taken up with respect to their suitability for peoples' benefit as well as sustainability.

Various measures taken up for management include the following:

(i) Water harvesting

- Proper storage of water is done with pro-vision for use in dry seasons in low rainfall areas.
- It also helps in moderation of floods.

(ii) Afforestation and Agroforestry

- In watershed development, afforestation and crop plantation play a very important role.

- They help to prevent soil erosion and retention of moisture.
- In high rainfall areas woody trees are grown in between crops to substantially reduce the runoff and loss of fertile soil.
- In Dehradun trees like Eucalyptus and Leucaena and grasses like Chysopogon are grown along with maize or wheat to achieve the above objectives.
- Woody trees grown successfully in such agroforestry programmes include Dalbergia sissoo (Sheesham), Tectona panda (Teak) and Acacia nilotica (Keekar) which have been used in watershed areas of river Yamuna.

(iii) Mechanical measures for reducing soil erosion and runoff losses

- Several mechanical measures like terracing, bunding, bench terracing, no-till farming, contour cropping, strip cropping etc. are used to minimize runoff and soil erosion particularly on the slopes of water-sheds.
- Bunding has proved to be a very useful method in reducing run-off, peak discharge and soil loss in Dehradun and Siwaliks.

(iv) Scientific mining and quarrying

- Due to improper mining, the hills lose stability and get disturbed resulting in landslides, rapid erosion etc.
- Contour trenching at an interval of 1 meter on overburden dump, planting some soil binding plants like Ipomoea and Vitex and draining of water courses in the mined area are recommended for minimizing the destructive effects of mining in watershed areas.

(v) Public participation

- People's involvement including the farmers and tribals is the key to the success of any watershed management programme, particularly the soil and water conservation.
- People's cooperation as well as participation has to be ensured for the same.
- The communities are to be motivated for protecting a freshly planted area and maintaining a water harvesting structure implemented by the government or some external agency (NGO) independently or by involving the local people.
- Properly educating the people about the campaign and its benefits or sometimes paying certain incentives to them can help in effective people's participation.
- Successful watershed management has been done at Sukhomajri Panchkula, Haryana through active participation of the local people.

- Watershed management in Himalayan region is of vital importance since most of the watersheds of our country lie here.
- Several anthropogenic activities accelerate its slope instability which needs to be prevented and efforts should be made to protect the watershed by preventing overgrazing, terracing and contour farming to check runoff and erosion etc.
- On steeper slopes with sliding faces, straw mulching tied with thin wires and ropes helps in establishing the vegetation and stabilizing the slopes.

RESETTLEMENT AND REHABITILISAION

Problems and Concerns

- Economic development raises the quality and standard of living of the people of a country.
- Developmental projects are planned to bring benefits to the society.
- However, in the process of development, very often there is over-exploitation of natural resources and degradation of the environment.
- Besides this, quite often, the native people of the project site are directly affected.
- These native people are generally the poorest of the poor, underprivileged tribal people.
- Various types of projects result in the displacement of the native people who undergo tremendous economic and psychological distress, as the socio-economic and ecological base of the local community is disturbed.

(a) Displacement problems due to dams

- The big river valley projects have one of the most serious socio-economic impacts due to large scale displacement of local people from their ancestral home and loss of their traditional profession or occupation.
- India is one of countries in the world leading in big dam construction and in the last 50 years more than 20 million people are estimated to have been directly or indirectly affected by these dams.
- The Hirakund Dam has displaced more than 20,000 people residing in about 250 villages.
- The Bhakra Nangal Dam was constructed during 1950.s and till now it has not been possible to rehabiltate even half of the displaced persons.

- Same is the case with Tehri Dam on the river Bhagirathi, construction of which was green signalled after three decades of long campaign against the project by the noted activist Sunderlal Bahuguna the propagator of Chipko Movement .
- The immediate impact of the Tehri Dam would be on the 10,000 residents of the Tehri town. While displacement is looming large over the people, rehabilitation has become a more burning issue.

(b) Displacement due to Mining

- Mining is another developmental activity, which causes displacement of the native people.
- Several thousands of hectares of land area is covered in mining operation and the native people are displaced.
- Sometimes displacement of local people is due to accidents occurring in mined areas like subsidence of land that often leads to shifting of people.

(c) Displacement due to Creation of National Parks

- When some forest area is covered under a National Park, it is a welcome step for conservation of the natural resources.
- However, it also has a social aspect associated with it which is often neglected.
- A major portion of the forest is declared as core-area, where the entry of local dwellers or tribals is prohibited. When these villagers are deprived of their ancestral right or access to the forests, they usually retaliate by starting destructive activities.
- There is a need to look into their problems and provide them some employment.

REHABILITATION ISSUES

- The United Nations Universal Declaration on Human Rights [Article 25(1)] has declared that right to housing is a basic human right.
- In India, most of the displacements have resulted due to land acquisition by the government for various reasons.
- For this purpose, the government has the Land Acquisition Act, 1894 which empowers it to serve notice to the people to vacate their lands if there is a need as per government planning.
- Provision of cash compensation in lieu of the land vacated exists in section 16 of the Act.

The major issues related to displacement and rehabilitation are as follows:

- Tribals are usually the most affected amongst the displaced who are already poor. Displacement further increases their poverty due to loss of land, home, jobs, food insecurity, loss of access to common property assets, increased morbidity and mortality and social isolation.

- Break up of families is an important social issue arising due to displacement in which the women are the worst affected and they are not even given cash/land compensation.
- The tribals are not familiar with the market policies and trends. Even if they get cash compensation, they get alienated in the modern economic set-up.
- The land acquisition laws ignore the communal ownership of property, which is an inbuilt system amongst the tribals. Thus the tribals lose their communitarian basis of economic and cultural existence. They feel like fish out of water.
- Kinship systems, marriages, social and cultural functions, their folk-songs, dances and activities vanish with their displacement. Even when they are resettled, it is individual-based resettlement, which totally ignores communal settlement.
- Loss of identity and loss of the intimate link between the people and the environment is one of the biggest loss. The age-long indigenous knowledge, which has been inherited and experienced by them about the flora, fauna, their uses etc. gets lost.

Rehabilitation Policy

- There is a need for a comprehensive National Rehabilitation Policy.
- Different states are following different practices in this regard.
- There is a need to raise public awareness on these issues to bring the resettlement and rehabilitation plans on a humane footing and to honour the human rights of the oustees.

NATURAL RESOURCES AND ASSOCIATED PROBLEMS AND SUSTAINABLE UTILIZATION

NATURAL RESOURCES

- Any component of the environment which can be transferred in a way such that it becomes more valuable and useful is termed as resource.
- Life on this planet earth depends upon the large number of things and services provided by the nature which are known as natural resources.

Resources

- There are two types of resources (i) renewable and (ii) non renewable resources

Renewable resources

- They have the capacity to renew. Example. Clean air, clean water.

Non renewable resources

- Available in minute quantities
- They cannot be regenerated

- Example. Ground water, minerals.

The major resources are (i) Forest (ii) water (iii) mineral (iv) food (v) energy and (vi) Land resources

FOREST RESOURCES:

- Forests are one of the most important resources of the world.
- They act as a blanket on the surface of the earth.
- Around 1/3rd of world land area was found to be forests.

USES OF FOREST:

Commercial uses

- Forests provide timber
- fire wood
- food material
- resin
- gum
- non edible oils,
- drugs
- medicine
- rubber
- fibers
- Bamboo and many other important items.

Ecological uses:

- Production of Oxygen: Photosynthesis – earth's lungs
- Reducing global warming – sink for carbon di oxide
- Wild life habitat – 7 million species in tropical forests alone
- Regulation of hydrological cycle – prevent surface run off – giant sponges – 50-80% moisture.
- Soil conservation – hold solid particles tightly and prevent soil erosion – wind breaks.
- Pollution moderators: absorb toxic gases and purify air reduce noise pollution.

ASSOCIATED PROBLEMS OF FOREST RESOURCES DEFORESTATION

Deforestation is mainly done for the following reasons:

- For shifting of Cultivation
- For fuel requirement
- To get raw materials for industrial use
- For the developmental projects of the Government
- To meet the growing food needs

- By overgrazing

CONSEQUENCES OF DEFORESTATION

1. Threatens many wild life species due to destruction of natural habitat
2. Biodiversity is lost along with that genetic diversity
3. Hilly regions are made prone to landslides
4. Soil erosion and loss of soil fertility
5. Hydrological cycle is affected

(loss of rainfall, flood, drought etc)

TIMBER EXTRACTION AND MINING

The important effects of timber extraction are

- thinning of forests
- loss of biodiversity, particularly tr ee breading species
- soil erosion and loss of soil fertility
- migration of tribal people from one place to another in search of new forest
- extinction of tribal people and their culture

CONSTRUCTION OF DAMS

Uses of dams are

- Dams are regarded as symbol of national development.
- provides large scale employment of tribal people and increase the std. of living of
- them
- contribute for economic uplift and growth
- help in checking flood
- generate electricity
- reduce power and water shortage
- provide irrigation water
- provide drinking water to remote areas
- Promote navigation and fishery.

Associated Environmental problems:

1. Displacement of tribal people
2. Loss of flora and fauna
3. Siltation and sedimentation near reservoir

4. Stagnation and water logging near reservoir
5. Growth of aquatic weeds
6. Micro climatic changes
7. causes earthquakes
8. Breeding of disease vectors

WATER RESOURCES

- Water is an indispensible resource. Around 97% of world surface is covered with water. Most of the animals and plants have 60-65% of water in their body.

USES OF WATER RESOURCES

Water is used for

- Domestic
- irrigation and
- industrial purposes

ASSOCIATED PROBLEMS OF WATER RESOURCES

- Due to economic development, rapid industrial growth and population explosion over utilization of ground water leads to rapid depletion of water resources, ground subsidence, lowering of water table and water logging.
- The use of ground water and surface water rate which are higher than that of recharge ultimately leads to Water scarcity, Water logging, Salination, alkalization.
- creates declining of water levels
- crops failure and reduction in agricultural production
- over pumping of ground water create drought and food shortage
- over pumping of ground water sea water intrusion in coastal aquifers
- land subsidence may due to over pumping of ground water
- river pollution due to industrial activities and dumping of waste into rivers, which in turn force to utilize the ground water, ultimately leads to over pumping

Flood: over flow of water, whenever the water in flow is greater than the carrying capacity of the channels flood occurs.

Causes:

- Heavy rainfall, snow melt, sudden release of water from dams.

- Prolonged down pour leading to overflowing of rivers and lakes
- Reduction in carrying capacity due to obstructions or sediments etc.
- Deforestation, overgrazing, mining increases water run off
- Removal of dense forests from hilly regions

Effects:

- Submerges the flooded area
- Loss of soil fertility due to soil erosion
- Extinction of civilization at costal area

Flood management:

- Dams and reservoirs can be constructed
- Embankments and proper channel management
- Flood way should not be encroached
- Forecasting or flood warning
- Decrease of run off by infiltration through afforestation or rain water harvesting etc.

Drought : Unpredictable delay in climatic condition occurring due to monsoon rain failure.

Types:

- **Meterological** : in order of month or year, actual moisture supply at a given place consistently falls below critical level.
- **Hydrological:** deficiency in surface and subsurface water supplies
- **Agricultural:** inadequate soil moisture to meet the need of a particular crop at particular time or susceptibility of crops during different stages in its development
- **Socioeconomic:** reduction in the availability of food and social securing of people

Causes:

- Deforestation and lesser rainfalls coupled with cutting of trees for timber leads to desertifictation.
- Over drafting of ground water, subsidence of soil, drying of wetlands
- Pollution of soil with solid waste, industrial effluents etc makes land useless and dry
- Population explosion in man and livestock leads to enhanced requirement of timber, fuel wood, grazing
- Shifting cultivation

Effects:

- Increase of water in stream pond

- Ground water table get declined
- Loss of agricultural crops
- Loss of biodiversity
- Government spent a lot of money as drought relief fund

Control measures

- Rain water harvesting
- Watershed management
- Prevent deforestation
- Encourage afforestation

MINERAL RESOURCES

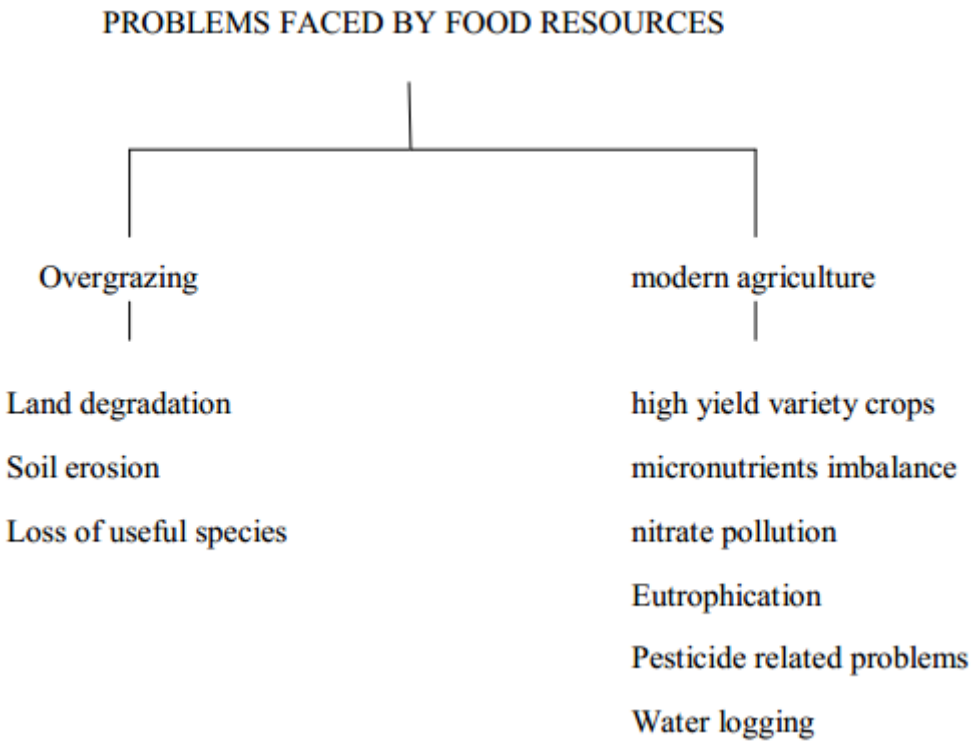
Environmental impacts of over extraction of mineral resources:

- Depending on the conditions of terrain and depth of ore deposits 2 types of mining operations are carried out. 1. open cast mining and 2. underground mining.

Both types of mining processes in each step produce several environmental effects such as,

- Deforestation takes place due to removal of vegetal covers.
- Great volume of debris has been generated which disrupt the surface and ground water circulation. It also reduces the water carrying capacity of streams very close to mining area
- The stacking of over burden and building of soil banks creates problems of landslides
- Under ground fire in coalmines is a hazard that is difficult to control
- Mining and ore processing normally causes air pollution and water pollution
- The acid water generated in coalmines can pose a serious problem of water pollution, which adversely affects the flora and fauna.
- Deeper excavation of ground causes lowering of water table, which leads to drying of wells or sea water intrusion
- In stone quarries, blasting of rocks not only annoying the people nearby, but also cause hazard from fly rocks and dusts and damage to buildings due to vibrations
- The disposal of waste material produced after concentrations of ore create increase concentration of heavy metals and toxic elements in the environment.

FOOD RESOURCES:



CHANGES CAUSED BY OVERGRAZING AND AGRICULTURE:

Overgrazing:

Process of eating away the vegetation along with its roots without giving a chance to regenerate

- Land degradation-leads to organically poor, dry, compacted soil cannot be used for further cultivation
- Soil erosion-cover of vegetation gets removed from soil
- Loss of useful species-good quality grasses and herbs with high nutritive value, when grazed lose even the root stocks which carry the reserve food for regeneration get destroyed which gives raise to secondary species like parthenium, Lantane, Xanthium etc
- To prevent –match the forage supplement to the herd"s requirement.eg.Switch grass

Modern agriculture:

- The practice through which specific plant species are cared and managed so as to obtain maximum yield of consumable parts of plants –agriculture
- Makes use of hybrid seeds and selected and single crop variety, high tech equipment and lots of energy subsides in the form of fertilizers, pesticides and irrigation water e.g. green revolution

Due to modern agriculture

- Damage to soil occurs

- Water contamination takes place
- Water scarcity occurs
- Global climate change takes place
- Water logging-results when soil is over irrigated
- Soil salinity-increase plant productivity, interferes with water uptake by plants
- Fossil fuels and pesticides produce air pollution

Impacts related to high yielding varieties:

- Monoculture ie the same genotype is grown over vast areas. Disease spread easily
- Micronutrient imbalance e.g Zinc deficiency-affect soil productivity
- Nitrate pollution-nitrogenous fertilizers applied deep soil contaminates ground water. cause blue baby syndrome methaemoglobinemia- affects infants
- Eutrophication: Over nourishment of lakes due to agriculture field wash out -leads to algal bloom-dead organic matters increases due to decomposition-leads to oxygen demand

Problems associated with pesticide use:

- Evolution of genetic resistance
- Imbalance in ecosystem
- Creation of new pest
- Persistence, Bioaccumulation and Biomagnification
- Mobility through soil, water, air, washed away into rivers, streams, when it rains can harm fishes
- Creating super pest
- Death of non starget organisms
- Salinity
- Water logging

ENERGY RESOURCES

Growing energy needs:

- Population explosion, Luxurious life, Industries, Agriculture, mining, transportation, lighting, cooling, heating, building all need energy. Fossil fuels like coal, oil, natural gas produce 95% of energy

Sources of energy

Primary- Renewable energy-resources which can be generated continuously in nature and

are in exhaustible and can be used again endlessly. wood, Tidal, Solar, wind, hydropower, biomass, biofuel, geothermal, hydrogen.

Non – renewable energy- Resources which have accumulated in nature over a long span of time and cannot be quickly replenished when exhausted.coal, petroleum, natural gas

Secondary-petrol, electrical energy, coal burning

Energy renewable	Advantage	Disadvantage
	1. Wide availability 2. Low cost 3. Decentralized power production 4. Low pollution 5. Available for the future	1. Unreliable supply 2. Produced in small quantity 3. Difficult to store 4. Cost more
Energy non renewable	1. Available in high concentrated form 2. Easy to store 3. Reliable supply 4. Lower cost	1.highly pollution Available only in few places High running cost Limited supply and will one day get exhausted

Use of alternate energy sources:

- Refers to energy sources which are not based on the burning of fossil fuels or the splitting of atoms. Such as solar energy, wind energy, hydro power, tidal energy, ocean thermal energy, geothermal energy, biomass energy.

LAND RESOURCE

- Land is critically important national resource which supports all living organisms including plants and animals. The soil profile of land determines its ability to serve socio-economic needs.

ASSOCIATED PROBLEMS

- Land Degradation: Land degradation is defined as the reduction in soil capacity to produce in terms of quality, quantity goods and services.
- Land slides- The hill slopes are prone to land slides, landslips, rockslides etc. These hazardous features have reduced the overall progress of the region as they obstruct the roads, communication media and water flow.
- Soil erosion:

ROLE OF INDIVIDUAL IN CONSERVATION OF NATURAL RESOURCES:

Natural resources are forest, water, soil, food, mineral and energy resources. Overuse of these resources cause problems

Conserve water:

- Don"t keep water taps running
- Install water saving toilets
- Check for water leaks
- Reuse soapy water
- Use drip and sprinkling irrigation

Conserve energy

- Turn off lights, fan when not in use
- Use solar cooker for cooking
- Try riding bicycle

Protect soil:

- Don"t uproot plants
- Grow grass which binds soil and prevent erosion
- Make compost
- Use green manure
- Don"t over irrigate
- Use mixed cropping

EQUITABLE USEOF RESOURCES FOR SUSTAINABLE IFE STYLE:

- Most developed countries like USA, Canada, Japan, Australia have 22% of natural resources, use 88%.73%of its energy and command 85%of its income
- Less developed countries has 78% of population, 12% Usage of natural resources, 27% of energy, 15% of income
- Gap arises due to increase in population distribution of resources and wealth
- Problem solved by equitable distribution of resources and wealth
- Global consensus has to be reached for more balanced distribution of basic resources like safe drinking water, food, fuel etc. So poor low developed countries able to sustain their life
- Two basic cause of unsustainability are over population in poor countries and over consumption of resources by rich countries generate wastes
- Rich countries lower down their consumption level
- Poor countries fulfilled by providing them resources

ENVIRONMENTAL EDUCATION

- Education can only release the dormant productive forces of the two-thirds of India’s illiterate population.

- Environmental education is the process of creating awareness regarding the total environmental issues.
- The appreciation of nature, knowing the value and immense utility of conservation and evolving methods for sustainable development, methods of conservation, alternative sources of energies etc. are the ingredients of environmental education.
- Thus, environmental education is highly indispensable in the present-day society.
- A new dimension is to be added to the existing educational curricula by introducing topics related to environment.
- Such topics like population growth and its adverse effects and methods of controlling population, ecology and biosphere, human environment, problem of poverty, etc to be included in the syllabus.
- Through seminars, conferences and meetings on the subjects related to environment, awareness should be created.
- Through non-formal education, T.V. Programmes and newspapers we can spread the knowledge of protecting our planet from environmental hazards.
- We can adopt measures for environmental conservation, preservation of wild life and tree-plantation etc.
- Through NSS, NCC and other NOG's we can imbibe in the hearts of youths the awareness of environment to protect our planet.

ENVIRONMENT AND HUMAN HEALTH

- In general terms a physically fit person not suffering from any disease is called a healthy person.

- However, there are many other dimensions associated with the state of being healthy.
- According to World Health Organisation (WHO) health is .a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.
- Human health is influenced by many factors like nutritional, biological, chemical or psychological.
- These factors may cause harmful changes in the body's conditions called disease.

Infectious organisms

- Disease causing organisms pose greater environmental threats to health, more severely in the developing countries especially the tropical ones.
- High temperature and moisture along with malnutrition help many diseases to spread in these countries.
- Microbes especially bacteria can cause food poisoning by producing toxins in the contaminated food.
- Some moulds grow on food and produce poisonous toxins.
- Infectious organisms can also cause respiratory diseases (pneumonia, tuberculosis, influenza etc.) and gastrointestinal diseases (diarrhoea, dysentery, cholera etc.).
- There are various types of parasites that cause diseases like malaria, schistosomiasis, filariasis etc.
- Most of these infections take place when the environmental conditions are unclean and unhygienic.

Chemicals

- A large number of chemicals are introduced in the environment by anthropogenic activities.
- Industrial effluents containing various chemicals are of major concern.
- Chemicals can be divided into two categories i.e. hazardous and toxic chemicals.
- Hazardous are the dangerous chemicals like explosives, inflammable chemicals etc.
- Toxic chemicals (toxins) are poisonous chemicals which kill cells and can cause death.
- Many other chemicals can cause cancer (carcinogenic), affect genetic material (DNA) in cells (mutagenic) or cause abnormalities during embryonic growth and development (teratogenic), while there are others that affect nervous system (neurotoxins) and the reproductive system.
- Some of the pesticides and other industrial pollutants may act as hormone analogs in humans and other species.
- These environmental hormones affect reproduction, development and cause various types of ailments including tumors.
- Many chemicals like DDT and other chlorinated pesticides bioaccumulate in food-chain and show deleterious effects at the top of the food chain.
- Many chemical substances present in wastewaters like heavy metals (mercury, cadmium, lead etc.) fluoride and nitrate can affect human health.
- Metals can contaminate food while cooking in various types of utensils including alloys like steel.
- Containers for canned food, especially which are acidic in nature, contaminate the food with lead.
- Lead also comes in water from the water-pipes where it is added for plumbing purposes.
- Various alcoholic beverages contain lead while tobacco contains cadmium that goes in the body and affects human health.
- Various chemicals, gases and particulates laden with chemicals, spewed into the environment from various industries cause air pollution and affect human health.

Noise

- Although human ear is capable of tolerating a range of sound levels, yet if sound levels beyond the permissible level exist for certain duration, it becomes painful and sometimes irreparable damage occurs.
- Besides hearing damage various types of physiological and psychological changes are induced by noise pollution.

Radiations

- Radiations are known to cause short-term and long-term changes in various organs.
- Cosmic rays and ultra-violet rays cause harmful effects on human health which may include cancer.

Diet

- Diet has a very important role in maintaining health.

- Malnutrition makes humans prone to other diseases.
- There is a strong correlation between cardiovascular diseases and the amount of salt and fat in one's diet.
- Food contamination can cause various ill effects.
- There had been cases of Dropsy in India, a disease which occurred due to contamination of mustard oil with the poisonous seeds of Argemone mexicana.
- Likewise various adulterated pulses, condiments, oils etc. sold in the market to earn profit affect human health.

Settlement

- Proper environment, availability of basic necessities of life like, water, sanitation etc. are essential for healthy living.
- Housing is very important from security point of view.
- Improper settlement and poor physical environment may cause various psychological problems which affect various vital physiological processes in the body.

PHYSICAL FITNESS

- Physical activity refers to any body movement that burns calories, whether it's for work or play, daily chores or the daily commute.
- Physical fitness is generally achieved through correct nutrition, exercise, hygiene and rest.
- Regular physical activity can improve Health, fitness, quality of life.

Simple definition of physical fitness

Physiological	Health related
• Metabolism • Morphological • Bone integrity	• Body composition • Cardiovascular fitness • Flexibility • Muscular endurance • Muscle strength

Risk of Physical Activity

- Early death
- Coronary heart disease
- Stroke
- High blood pressure
- Diabetes
- Cancer
- Depression

Among the children and adolescents physical activity can

- Improve bone health
- Improve cardio respiratory and muscular fitness
- Decrease levels of body fat.

HUMAN RIGHTS

- Human right means that a human being must enjoy on this earth.
- Foundation of human was laid in 13th century. But positive hopes for all people for a happy, dignified and secured living condition wee raised only after "Universal Declaration of Human Rights (UNDHR) by UNO on 1012.1948.
- It highlights on protection to all individuals against injustice and human right violation.
- UNDHR defines specific rights to life, liberty, security, freedom of thought, association, freedom of movement right of equal pay for equal work, right to form or join union, right to health care, education etc.
- Universal declaration rights are universal but disparity between developing and developed countries.
- Poverty and population leads to violation of human rights.

  WHO estimates

  - One out of every five is malnourished, lacks clean drinking water, lacks hygienic conditions and health facilities.
  - One out of 3 lack fuel for cooking.
  - 1/5 is desperately poor
  - Every year 40 million people die due to contaminated water.
- Acute scarcity of employment.
- Merit of universal education and child labour prevention is of much less importance than his struggle for existence.
- Developed and developing country give importance only to 'respect to human rights' and 'non social – economic rights' respectively.

VALUE EDUCATION

- Education is one of the most important tools in bringing about socioeconomic and cultural progress of a country.
- The objective of education should not be merely coaching the students to get through the exams with good results and get some good job.
- Education does not simply mean acquiring information but using the resources within the limits of ethical value.

- The scientific and technological advancements have shrunk the world into a village.
- But in the drive to development man has become too materialistic, self centered and over ambitious.
- Value based education has a very significant role in providing proper direction to youth to inculcate positive attitude and to teach them the distinction between right and wrong.
- It teaches them to be compassionate, peace loving, helpful, generous and tolerant so that they can move towards more harmonious, peaceful, enjoyable and sustainable future.
- Value education help in arriving value based judgements based on practical understanding of various natural principles.
- Value education increases awareness about our national history, our cultural heritage, national pride, constitutional rights and duties, national integration, community development and environment.
- It is crucial to the retention of national identity, peaceful and harmonious society.
- Education should give overall development of the student personality.
- The main of education is to produce citizens with sound character and health.
- Good citizens are the only hope for the progress and prosperity of the country.
- Life based upon good principles is an essential requisite.
- Therefore moral education should be included in the school curriculum.
- The curriculum should provide enough opportunity for pupils to acquire a considerable amount of knowledge that is essential for morally responsible living in our democratic society.
- Value education shall prepare individuals for participation in social life and acceptance of social rules.
- Schools should provide a healthy environment for sharing responsibilities of community life and relationships.

Value based environmental education

- Environmental education is something that every person should be well versed with.
- The principles of ecology and fundamentals of environment help to create a sense of earth citizenship and a sense of care for the earth and its resources - a sense of commitment towards the management of the resources in a sustainable way so that our children and grand children too have a safe and clean planet.
- Following the Supreme Court directives 1998 environmental education has been included in the curriculum right from the school stage to university level.
- The objective of it is to make everyone environment literate.
- Let us see how environmental education can be made value based one.

    - Preparation of text books materials on environmental education – to built a positive attitude towards environmental factors.

- Social values like love, tolerance, compassion can be woven into environment education. This will help to nurture all forms of life and biodiversity.

Cultural and religious values

- Our culture and religions teach us not to exploit nature –but to perform such functions which project and sacred nature.
- Therefore these values can be added up with environment education.
- Environment Education should stress on earth centric views rather than human centric view such that it include the ethical values.

Global values

- Stress on the concept human is part of nature and all natural processes are inter linked and they are in harmony.
- If this harmony is disturbed it may lead to imbalance in ecology and catastrophic results.

Spiritual values

- Highlights on self contentment, discipline, reduction of wants etc.
- This will reduce our consumerist approach.
- If the mentioned values are incorporated in environment education, the goal of sustainable development and environment conservation can be easily attained.
- Value based environment education can bring about a total transformation of our mind set, our attitudes and life style to protect nature.

ENVIRONMENTAL ETHICS

- Over exploitation of forests, land, water as well as various living components of biosphere and failure to tackle the problem of pollution and environmental degradation are exposing the humanly to the thread of a global environment crisis.
- It emphasis that real development cannot occur unless the strategies which are formulated are implemented are environmentally sustainable.
- Even though our government is formulating several rules, regulations, policies, laws, it is the duty of each and every one to protect our nature.
- Therefore human beings are ethically responsible for the preservation of the world's ecological integrity.
- The environment ethics literally means conscious efforts to protect environment and to maintain its stability from the pollutants.

Following are some of the ways to safeguard environment.

- To sacrifice the consumption of some of the good which reduces environment quality.
- Minimize the resource utilization and conservation

- Adopt sustainable and eco friendly development. (e.g) reduction of waste, recycling, waste management and harvesting non conventional energy.
- If we change as individuals then the society will also change by itself.
- The society is nothing but an extension of the individual.

GLOBAL WARMING

- The green house gases are collected in the environment due to the activities of human beings.
- The green house gases produce green house effect.
- The green house gases allow the solar radiant ion of short wavelengths to pass through them which are converted into long wavelength radiant ion.
- These radiations of long wavelengths do not escape away through the green house gases therefore they remain in the atmosphere and rise the temperature of the atmosphere. Due to which the global temperature is raising day by day.
- This event is called Global warming.
- Global warming is a great problem due to which the normal temperature of the earth has increased higher than before.

Causes of global warming

- Increase in the amount of carbon dioxide gas in the atmosphere due to excessive deforestation.
- Increase in the amount of oxides of carbon, oxides of nitrogen produced during the combustion of fossil fuel like coal and petroleum partially or completely.
- Collection of chlorofluorocarbon in atmosphere due to use of aerosols in refrigerator and air conditioners, use of foams and fire extinguishers.
- Nitrogen oxides gas is produced by chemical fertilizers used in agriculture and by the combustion of fuel used in automobile.
- Various biotic activities, agricultural activities and decay of organic wastes produce green house gases causing Global warming.
- Air pollution
- Depletion of ozone layer
- Volcanic eruptions
- Burning of fossil fuels
- Human activities

Effects of Global warming

- Rate of evaporation of water increases due to global warming creating shortage of water availability.
- Due to global warming, the polar snow will melt, flooding the rivers and oceans which will endanger the costal life.

- Due to global warming, the death of organisms (animals and plants) is possible.
- Water and air gets polluted rapidly.
- Global warming may cause erratic and untimely rainfall and droughts.
- Ecosystem failure
- Economic collapse
- Storm
- Effects of human health
- Extinction
- Increase in temperature

Preventive measures of Global warming

- By discouraging deforestation and efforcing a complete control on excessive cutting of forests.
- By encouraging plantation.
- Controlled and minimum use of fossil fuel with complete combustion.
- Complete ban over use of chlorofluorocarbons (aerosol).
- By replacing the use of fertilizers by biotic manure.
- By using alternative sources of energy in general.
- Use of bio-gas plants
- Use of nuclear power plants
- Installation of pollution controlling devices in automobiles (catalytic converter) and industries (Electro Static Precipitators, Bag filters, Wet scrubbers etc)

ENVIRONMENT (PROTECTION) ACT, 1986

This act is to take action to protect and improve environment and set up the followings

1. Standard of quality of air, water or soil
2. Maximum permissible limits of concentration of pollutants (including noise pollutant)
3. procedures and safe guard for handling hazardous items
4. Prohibition of using hazardous items
5. Prohibition and restriction of certain industries in certain area
6. Procedure and safe guard for prevention of accidents

Environment (Protection) Rules, 1986

State Pollution control board is to follow the guidelines provided in schedule VI.

Some are as follows

- Advises industries for treating the waste water and gases – use of technology – achieve prescribed standard.
- Encourage recycling and reusing the wastes

- Encourage recovery of biogas, energy and reusable matter
- Discharge of effluents and emissions into environment is permitted by SPCB after taking into account capacity of the receiving water body.
- To emphasize clean technology to increase fuel efficiency and decrease environmental pollutants

The act provides for environmental Audit for checking complying with the environmental laws and regulations.

Air (Prevention & Control of Pollution) Act, 1981

Salient features

- Prevention, control and abatement of air pollution
- Air pollution has been defined as the presence of any solid, liquid or gaseous substance (including noise) in the atmosphere in such a concentration that may be or tend to be harmful to human being or any other living creature or plants or property or environment.
- Noise pollution – inserted in 1987
- Central Pollution Control Board (CPCB) & State Pollution Control Board (SPCB) similar to water pollution board
- Section 20 provides for emission std to auto mobile and air pollution control area in consultation with SPCB
- Direction of PCB can be appealed in the appellate authority.

Water (prevention and control of pollution) Act 1974:

- Maintaining and restoring the wholesomeness of water by preventing and controlling its pollution.

The salient features and provisions of Act are summed as follows.

- Maintenance and Restoration of Quality – surface and ground water
- Establishment of central PCB and state PCB
- Confers powers and functions to CPCB and SPCB
- The act provides for funds, budgets, accounts and audits of the CPCB & SPCB
- The act provides penalties for the defaulters and duties and powers

Wildlife [protection] act, 1972:

- Land mark in the history of wildlife legislation.
- 1976 the powers are transferred from state to central government.
- Indian Board for Wild life (IB W L) was created in 1952 in our country which after WLA, 1972, took up the task of setting National parks and sanctuaries.

Wildlife [protection] Act

- Defines wild life related terminology.
- Provide appointments of advisory Board, wildlife warden, their powers & duties etc.

- Prohibition of hunting of endangered species [was first] mentioned.
- List of endangered species is provided.
- Guides central 200 authorities.
- Provides grants for setting up of national parks, wild life sanctuaries etc.
- The Act imposes ban on trade & commence of scheduled animals.
- Provides legal proves to officers to punish the offenders.
- Provide captive breeding programme for endangered species.

Many conservation projects for endangered species were started under this act.

- Lion 1972
- Tigers 1973
- Crocodile [1974]
- Deer 1981.

Forest (conservation) Act, 1980

It deals with conservation of forest and includes reserve forest, protected forest and any forest land irrespective of ownership.

Salient features

- State government can use forest only forestry purpose.
- Provision for conservation of all types of forests. Advisory committee appointed for funding conservation
- Illegal non-forest activity within a forest area can be immediately stopped under this act.
- Non forest activity means clearing land for cash-crop agriculture, mining etc.
- However construction in forest for wild life or forest management is exempted from non forestry activity.

1992 Amendment:

- This amendment allows transmission lines, seismic surveys, exploration drilling and hydro electric project in forest area without cutting trees or with limited cutting of trees – prior approval central government (CG) to be sought.
- Wild life sanctuaries, National parks etc. are prohibited from exploration except with CG prior approval.
- Cultivation of coffee, rubber, tea (cash crop), fruit bearing trees, oil yielding trees, trees of medicinal values are also prohibited in reserved forest area with out prior approval from CG. Has this may create imbalance to ecology of the forest.
- Tusser (a type of silk yielding insect) cultivation in forest area is allowed since it discourages monoculture practices in forests and improves biodiversity.
- Plantation of mulberry for rearing silk worm is prohibited.

- Proposal sent to CG for non-forestry activity must have a cost benefit analysis and environmental impact statement (EIS).

Environmental Legislation

- 1972 June 5th – Environment was first discussed as an agenda in UN conference on Human Environment. There after every year 5th June is celebrated as Environment Day.

Constitutional Provisions:

- Added in 1976 – Article 48A – "The state shall endeavor to protect and improve the environment and to safeguard forests and wildlife of the country".
- Article 51A (g): "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures".
- By these two articles one constitution makes environment protection and conservation as one of our fundamental duties.

CENTRAL AND STATE POLLUTION CONTROL BOARD:

Central pollution control Board (CPCB):

- Advices central government (CG) in matters – prevention and control of water pollution
- Co ordinates SPCB and provide technical assistance and guidance
- Training programs for prevention and control of pollution by mass media and other ways
- Publishes statistical and technical details about pollution
- Prepares manual for treatment and disposal of sewerage and trade effluents
- Lays std for water quality parameters
- plans nation-wide programs for prevention, control or abatement of pollution
- Laboratories for analysis of water, sewage or trade effluents

State pollution control Board (SPCB):

SPCB has similar functions as SPCB and governed by CPCB.

- SPCB advises state government w.r.t. location of any industry that might pollute.
- Lays std for effluents to take samples from streams, wells or trade effluents or sewage.
- Passing through an industry. Samples taken are analysed at recognized labs. If the sample is not confirming to the water quality standard, then the unit is neglected.
- Every industry to obtain consent from PCB before commencing an effluent unit by applying in prescribed form with fee.

Enforcement of environmental legislation – major issues

- Target of 33% of land to be covered by forest not achieved.
- Rivers turning to open sewers.
- Big towns and cities polluted.

- Wild life endangered.
- EFP (Effluent Treatment Plant) or Air Pollution Control devices are expensive – leads to closure of units. Government should provide subsidy for small units.
- Pollution control laws not backed up by policy pronouncements or guidelines.
- Chairman of PCB – political nominee. Hence political interference.
- Involving public in decision making envisaged by policy statement of the ministry of environment and forest (1992) is only in paper.

Draw backs of wild life (protection) act

- Fall out of Stockholm conference not localized.
- Ownership certificate of animals article – illegal trading
- Trade through J & K. This act not applicable to J&K.
- Offender to get just 3 years imprisonment and or Rs.25000/- fine.

Draw backs of the forest (conservation) act 1980

- Inheritance of exploitative and consumerist elements of the British period.
- Tribal people (i.e.) inhabitants of forest are left by the act.
- Instead of attracting public support (tribal) it has intrigued in the human rights.
- Protection of trees, birds and animals have marginalized poor people.

RIO EARTH SUMMIT (RIO Summit)

- Five years after the Brundtland Report, the UN General Assembly asked for a report on progress made towards sustainable development and convened the United Nations Conference on Environment and Development (UNCED)
- UNCED was held in June 1992 at Rio de Janeiro in Brazil
- The Rio Earth Summit as it became known was the largest environmental conference ever held, attracting over 30,000 people including more than 100 heads of state.
- The objectives of the conference were to build upon the hopes and achievements of the Brundtland Report, in order to respond to pressing global environmental problems and to agree major treaties on biodiversity, climate change and forest management.
- Perhaps for the first time, a major environmental conference adopted a more nature-centered approach towards environmental problems.
- Despite its environmental focus, the biggest arguments at the Earth Summit concerned finance, consumption rates and population growth.
- The developed nations were calling for environmental sustainability, but the less industrialized developing nations were demanding a chance to allow their economies to catch up with the developed world.

The Earth Summit produced a number of outcomes including:

- The Convention on Biological Diversity;
- The Framework Convention on Climate Change;
- Principles of Forest Management;
- The Rio Declaration on Environment and Development; and
- Agenda 21.

The Convention on Biological Diversity

- The Convention on Biological Diversity entered into international law in 1994 with 153 nations signing up.
- At first, many of the developed nations, most notably the United States, were reluctant to sign because they felt that their biotechnology industry would be threatened.
- The Convention states that participating nations have rights over their biological resources, allowing responsible and sustainable exploitation, but ensuring that biological diversity is conserved.
- The Convention commits participating nations to a number of guiding principles.
- Identify the components of biodiversity that are useful in conservation.
- These components must then be used sustainably and activities that may harm the diversity must be monitored.
- Develop national strategies for the conservation and sustainable use of biodiversity.
- Integrate conservation and sustainable use of biodiversity into planning and policy making.
- Help people understand the importance of planning and policy making by using the media and educational programmes.
- Establish laws to protect and conserve threatened species and protected areas.
- Around these areas, environmentally sound development must be used.
- Restore degraded ecosystems and promote the recovery of threatened species.
- Establish ways to control the risks from organisms modified by biotechnology.
- Use the participation of members of the public within projects that threaten biodiversity.
- Developed nations were given a responsibility to pass on their environmentally sound technologies for the purpose of conserving and sustainably using biodiversity.
- The developed nations must also provide financial aid to developing nations to help them implement the terms of the Convention.
- **Following the implementation of the Convention in 1994,** the UK's national Biodiversity Action Plan has co-ordinated activity to conserve and enhance biodiversity in this country.

- It is overseen by the UK Biodiversity Group, drawn from central and local government, official and voluntary conservation bodies, business, farming and land management. Action plans for the protection of over 400 priority species and 45 habitats are now in place.
- Wildlife protection has often focused on special reserves which contain habitats and species which must be maintained.
- But there is a risk that populations become smaller, fragmented and vulnerable to extinction.
- Their long-term survival, and overall enhancement of wildlife, depends on action in cities, towns and the countryside as a whole.

Climate Change

- The United Nations Framework Convention on Climate Change (FCCC) was adopted and signed by 162 countries in 1992 at the Rio Earth Summit.
- With 26 Articles, consisting of objectives, principles, commitments and recommendations, the FCCC became a blueprint for precautionary action against the threat of global climate change.
- The Convention highlighted the fact that human activities, like the burning of fossil fuels, are releasing large quantities of gases into the Earth's atmosphere.
- These gases, including carbon dioxide are enhancing the natural greenhouse effect. There are many concerns that the increase of such greenhouse gases in the atmosphere is causing "global warming", which is threatening humans and natural ecosystems.
- The aim of the Convention was to provide an international framework within which future actions could be taken to reduce the threat of global warming.
- The Convention indicates that participating nations have the right to exploit their own resources, but they have a responsibility to ensure that their activities do not cause any environmental harm to other nations.
- The ultimate goal of the Convention is to stabilize greenhouse gases in the atmosphere at a level that will not pose undue risk to the global climate system.
- Since most of the world's greenhouse emissions come from developed nations, the Convention challenges the developed nations to take the lead in combating climate change and its negative effects.
- Developing nations whose economies are based on fossil fuels may have difficulties in reducing their greenhouse gas emissions.
- It is therefore recognised that developed nations will need to offer technological and financial assistance to the developing nations to encourage their transition towards a more sustainable form of economic development.
- As with the Convention on Biological Diversity, the Framework Convention on Climate Change commits participating nations to a number of actions, stating that they must:
- Provide information on quantities of greenhouse gases emitted.

- Regularly publish updates on programmes to control greenhouse gas emissions and adapt to climate change.
- Promote sound management, preserving greenhouse sinks such as plants and forests.
- Plan for the impacts of climate change on coastal zones, water resources and agriculture.
- Protect areas prone to flooding or drought.

Forests

- One of the key agreements reached at the 1992 Rio Earth Summit was the Principles of Forest Management.
- The Principles of Forest Management include a number of points.
- All nations should take part in "the greening of the world" through planting and conserving forests.
- Forests should be managed in order to meet the social, economic, ecological, cultural and spiritual needs of present and future generations.
- Unique examples of forest should be protected, for example ancient forests and forests with cultural, historical, spiritual and religious importance.
- Pollutants that harm forests should be controlled.
- Forestry plans should consider the non-economic values of forests and the environmental consequences of their management.
- Forest degradation should be avoided.

The Rio Declaration on Environment and Development

- The 1992 Rio Declaration on Environment and Development defines the rights of the people to be involved in the development of their economies, and the responsibilities of human beings to safeguard the common environment.

There are a number of principles to the Rio Declaration.

- People are entitled to a healthy and productive life in harmony with nature.
- Development today must not threaten the needs of present and future generations.
- Nations have the right to exploit their own resources, but without causing environmental damage beyond their borders.
- Environmental protection shall constitute an integral part of the development process.
- Eradicating poverty and reducing disparities in living standards in different parts of the world are essential if we are to achieve sustainable development whilst meeting the needs of the majority of the people.
- Environmental issues are best handled with the participation of all concerned citizens.
- The polluter should, in principle, bear the cost of pollution.

- Sustainable development requires better scientific understanding of the problems. Nations should share knowledge and technologies to achieve the goal of sustainability.

Agenda 21

- Agenda 21 is a commitment to sustainable development, which was agreed by many of the world's governments.
- Nations that have pledged to take part in Agenda 21 are monitored by the International on Sustainable Development, and are encouraged to promote Agenda 21 at the local and regional levels within their own countries.
- The Conventions, Principles and Declarations of the Earth Summit, provide guidelines to deal with the problems of poverty, hunger, resource consumption and the deterioration of ecosystems.
- Agenda 21 provides a format for this to happen, detailing an action plan for sustainable development and establishing targets for actions that combine economic development and environmental protection.
- Agenda 21: Is the blueprint for sustainability in the 21st century.
- Provides options for combating the deterioration of land, air and water, whilst conserving habitats and their diversity.
- Deals with poverty, over consumption, health and education.
- Promotes roles for all. Everyone – governments, business, trade unions, scientists, teachers, indigenous people and youth – have roles to play in achieving sustainable development and should be involved in the decision making processes.
- Encourages the reduction of environmentally and socially detrimental processes, but within a framework which allows economic success.
- Agenda 21 promotes the attitude that a nation's wealth should also account for the full value of its natural resources.
- Agenda 21 also encourages nations to consider the costs of environmental degradation.
- In addition, to reduce the risk of damage, environmental assessments should be carried out and where degradation does occur, those responsible should bear the costs.
- Agenda 21 highlights the need to eradicate poverty.
- One of the major problems facing poorer nations is their lack of resources and ability to live sustainably.
- Developed nations have taken on the responsibilities of assisting poorer nations to reduce their environmental impacts and achieve sustainable development.
- Agenda 21 asks governments to integrate sustainable development into their national strategies and highlights the importance of involving non-governmental organisations (NGOs) and the public in the process.

- For sustainable development to work, issues must be tackled on a local, national and international level and nations must work 'towards international agreements which respect the interests of all and protect the integrity of the global environmental and developmental system.'

SOLID WASTE MANAGEMENT

- Waste, which is non-affective and comes from city, town or village as domestic and biomedical waste is termed as municipal solid waste
- The process of transportation, storage, collection and processing of solid waste in a protective and economic manner is termed as solid waste management.
- The above steps are followed thoroughly in waste management, its first and foremost priority is waste avoidance by minimizing it.
- To reduce waste, reuse it and recycle, it is called waste prevention.
- It is our second priority to reuse, recycles it at the maximum level.
- Once the possibility of waste prevention is exhausted, the next priority is to reduce the volume of residual waste pass on for final disposal.
- In recycling, material is separated from the garbage for the process of recycling.

For example

- Old cars are recycled in the German industry.
- Gas, oil, Chemicals and Tar are also retrieved from the old tyres.
- Papers, cans etc. are recycled to produce fresh papers.
- Glass is melted to prepare new articles.

Types

- Garbage or food waste
- Rubbish
- Agricultural waste
- Industrial waste
- Hazardous waste

Causes

- **Over population -** Pollution naturally increases with the growing number of persons, produce more waste.
- **Affluence -** The tendency to pronounce the things as fashion and check them out, when not required as out of fashion.
- **Technology -** Packaging of most of the gifts is considered as the source of solid waste pollution as most of these are non-biodegradable.
- Due to poor implementation of environment protection laws, urbanization, lack of awareness and lack of participation from the public, the problem of solid waste has increased at the highest level.
- Growth in consumption leads to consumption of items and on the other hand, wastes production.

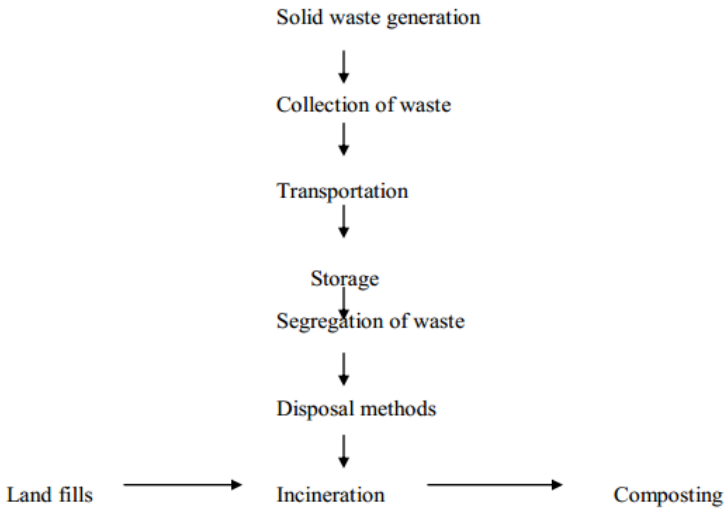
- Population increase
- Growing Urbanization
- Industry
- Mining
- Transport

Effects

- Contaminates water and air, resulting into diseases and dysentery in Human beings.
- Mosquitoes breed in the stagnant water, blocked due to waste choked in the drains.
- Decomposition of solid waste spreads obnoxious odour in the air, thus polluting it.
- Burning of waste, especially plastic adds up obnoxious fumes in the air.
- Garbage dumps and decomposed waste helps many harmful species to breed in them.
- The infected water supply also leads to large scale epidemics.

Control measures

- Solid waste management include the waste generation



- Collection of solid waste
- Disposal of solid waste

Disposal

- **It involves the following process:**

Sanitary landfill:

- The people in the city dump around 90% of the solid waste into natural or constructed pit or depression which compacts due to the surrounding dust.

Composting:

- In this process, the materials like glass, rubber and plastic etc. are separated and the rest waste is exposed for bacterial action for decomposition for several months to produce manure.

Incineration:

- Burning of waste to warm up residential units is termed as incineration.
- It is a convenient and quick method.

Pyrolysis:

- It's the process of burning the waste in absence of 0_2- In it organic compounds split into gaseous and gaseous fractions (CO, $C0_2$, CH_4, tar and charred carbon).

Disposal into sea:

- It's a simple and cheap method in which the solid waste is disposed under deep sea water at a remarkable distance from the coastal areas.

Possible Questions

UNIT- V

Part –A (1X20=20)
(Multiple Choice Questions)

Part- B (2 Marks)

1. What are types of disaster?
2. What is meant by environmental education?
3. Write a note on EP Act.
4. Define global warming.
5. Write short notes on RIO-summit.
6. What is green house effect?
7. Write short notes on deforestation.
8. Brief out energy policy act.
9. What are the causes of earthquake?
10. How will you reduce the risks of disaster management?
11. What is meant by hazard?
12. Define vulnerability and risk.
13. What are the causal factors of disaster?
14. Define disaster.
15. What is meant by vulnerability?
16. Write any four mitigation measures of man-made disaster.
17. Define mitigation.
18. List out any five consequences of man-made disaster.
19. What are the control measures of earthquake?
20. List out the effect of landslides.
21. Write types of hazard.
22. Write short notes on response phase.
23. What is mean by disaster risk reduction?

Part- C (6 Marks)

1. Elaborate the causes, consequence and mitigation measures of man-made disaster.
2. Define disaster management. Explain the disaster management cycle.
3. Explain man made disaster and its consequences with suitable example.
4. Write any two natural disasters and explain its consequences.
5. Explain in detail the disaster management cycle.

Karpagam Academy of Higher Education
Department of Computer Applications
Subject : Environmental Studies
Class: I BCA **Subject code: 18VAE101**
Objective Type Questions

UNIT V

S.NO	QUESTIONS	OPTION 1	OPTION 2	OPTION 3	OPTION 4	ANSWER
1	The process of extraction, refinement,fabrication and delivery are all energy consuming and add to pollution of earth,air and water.	embodied energy	kinetic energy	potential energy	all the above	embodied energy.
2	_____depends on energy mainly from fossil fuels.	rural transport	Urban transport	urbanization	urban and rural	Urban transport
3	As _____and _____spreads due to extensive changes in land use the once perennial rivers are becoming increasingly seasonal.	deforestation and desertification	afforestation and asertification	deforestation and afforestation	desertification	deforestation and desertification
4	Urban residential and commercial facilities are responsible for approximately____	25%	35%	45%	65%	35%
5	_____ controls erosion and conserves	Medhbandi	chak	naanda	talab	Medhbandi
6	The _____is well-known for its built	chak	talab	Mewar region	medhbandi	Mewar region
7	A small reservoir of less than five bighas	samand	saqar	talab	talai	talai
8	A medium sized lake is called_____	bandh or talab	saqar	talai	samand	bandh or talab
9	A bigger lake is called_____	sagar	sagar or samand	talab	chak	sagar or samand

10	_____ begins by taking control over a degraded site through local participation.	pollution	energy	Watershed management	potential energy	Watershed management
11	_____ such degraded areas is an important aspect of watershed management.	afforestation	Afforesting	deforestation	desertification	Afforesting
12	There are _____ aspects that are closely connected with ethical issues that are related to our environment.	2	3	4	5	2
13	The concept of _____ is based on a thinking that the soul moves from man to animal and in reverse depending on ones actions.	karma	ahimsa	life	wilderness	karma
14	_____ goddesses have been associated with specific plant species.	tree	plant	animals	trees and plants	tree
15	The _____ plant is grown on the doorstep outside every home.	tulsi	moneyplant	green leaves	all the above	tulsi
16	Certain species of trees have been protected as they are valued for their _____or _____	fruit or flowers	flowers or trees	trees or fruits	trees or plants	fruit or flowers
17	The _____ is protected for its fruit around most farms even when wood becomes scarce.	banyan tree	coconut tree	mango tree	peach tree	mango tree
18	The _____is protected by tribal people as it provides edible flowers, oil from its seeds and is used to make a potent alcohol.	Mohua tree	Madhuca indica	mango tree	both a and b	both a and b

19	About _____ of the solar energy reaching the Earth is absorbed on the earth's surface whichincreases its temperature.	85%	75%	65%	95%	75%
20	The _____ affects plant and animal life in aquatic ecosystems.	fossil fuel	oil refining	acid rain	acidic raining	acid rain
21	The destruction of the _____ is seen to cause increased cases of skin cancer and cataracts.	toposphere	stratosphere	ozone layer	mesosphere	ozone layer
22	After _____, the ozone layer is expected to recover slowly over a period of about 50 years.	1990	1000	2000	3000	2000
23	The signing of the Montreal Protocol in _____	1985	1986	1987	1990	1987
24	Wasteland can be reclaimed for_____ by reducing the salt content which can be done by leaching and flushing.	agriculture	forestry	agro	agroforestry	agriculture
25	_____implies integration of trees with agricultural crops or livestock management simultaneously.	afforestation	agro forestry	agriculture	forest	agro forestry
26	Wasteland can be classified into _____forms	2	3	4	5	2
27	NGO stands for _____	non-governmental organization	non govern opportunities	not good organization	non government organization	non-governmental organization
28	_____items greatly increase this waste.	dispose	Disposable	delegation	garbage	Disposable
29	_____ was the first State in India to regulate the manufacture and use of plastics.	tamil nadu	andhra pradesh	karnataka	Himachal Pradesh	Himachal Pradesh

30	_____is one of the end results of consumerism.	Materialism	consumer	consumerlism	consumer	Materialism
31	_____is driven by huge sums spent on advertising designed to create both a desire to follow trends, and a personal feeling of satisfaction based on acquisition.	matreials	Consumerism	materialism	consumer	Consumerism
32	Reduce, Reuse, Recycle, or the____ principle, is the new concept in waste management.	3P	3Rs	4Rs	3Ps	3Rs
33	_____and_____is used to make new metal products.	Metal scrap and broken glass	metal and glass	metal scrap and new glass	new glass and broken glass	Metal scrap and broken glass
34	Using sewage in a _____plant to make fuel.	gas	biogas	bio	biochemical	biogas
35	The spirit of the proclamation adopted by the United Nations Conference on Human Environment which took place in Stockholm in June _____	1972	1872	1772	2002	1972
36	The Government passed this Act in _____ to clean up our air by controlling pollution.	1991	1981	1852	1952	1981
37	VOC stands_____	volatile organic compounds	volatile of compounds	vague of compounds	non volatile if inorganic compounds	volatile organic compounds
38	(PCBs) stands for_____	popular control board	Pollution Control Boards	population control board	all the above	Pollution Control Boards
39	RTO_____	road transport office	railway transport office	road trans office	railway transport origin	road transport office

40	The Government has formulated this Act in _____to be able to prevent pollution of water by industrial, agricultural and household wastewater that can contaminate our water sources.	1975	1974	1973	1972	1974
41	The main objectives of the Water Act are to provide for _____,_____ and abatement of water pollution and the maintenance or restoration of the wholesomeness of water.	prevention	control	protect and prevention	prevention and control	prevention and control
42	The Forest Conservation Act of _____	1982	1980	1981	1985	1980
43	India's first Forest Policy was enunciated in _____	1951	1952	1953	1954	1952
44	The Forest Conservation Act of 1980 was enacted to control _____	afforestation	defforestation	afforestation	prevention and control	defforestation
45	_____are not permitted to trespass into the Reserved Forest.	cattle	kinetic energy	bus	train	cattle
46	MoEF stands for_____	ministry of ecosystem and foundation	Ministry of Environment and Forests	ministry of environmental and foundation	ministry of ecosystem and forest	Ministry of Environment and Forests
47	New projects are called _____	green projects	green field projec	field projects	green field	green field projects
48	Project that already exist but require expansion must also apply for clearance_____	green field projects	field projects	green projects	brown field projects	brown field projects
49	An _____ is not intended to stop all types of development.	EIA	AMI	EMI	MMI	EIA
50	march 21_____	world forestry day	world health day	world heritage day	earth day	world forestry day

51	april 07_____	world forestry day	world health day	world heritage day	earth day	world health day
52	april 18_____	world forestry day	world health day	world heritage day	earth day	world heritage day
53	april 22_____	world forestry day	world health day	world heritage day	earth day	earth day
54	june 05 _____	world forestry day	world heritage da	world environment day	world population day	world environment day
55	june 11_____	earth day	world health day	world environment day	world population day	world population day
56	february 2 _____	world wetland day	world health day	world environment day	world population day	world wetland day
57	august 6_____	hiroshima day	world ozone day	green consumer day	wildlife week	hiroshima day
58	september 16 _____	hiroshima day	world ozone day	green consumer day	wildlife week	world ozone day
59	september 28_____	hiroshima day	world ozone day	green consumer day	wildlife week	green consumer day
60	october 1-7_____	hiroshima day	world ozone day	green consumer day	wildlife week	wildlife week