ENVIRONMENTAL SCIENCE

1) Define environment? Give the components of environment? Explain any one in detail?

A) **Environment** :- It can be defined as the surronding consisting of both biotic and abiotic entities and expresses the aggregate and complex situation through the interaction of these entities.

(or)

· Environment is the sum total of effective conditions under which organisms live

Components of Environment

1) Atmosphere.
2) Hydrosphere.
3) Lithosphere.
4) Biosphere.

1) **Atmosphere** :- Gaseous envelope surronding the earth is called Atmosphere. It has mainly two constituents. a) The gaseous mantle → It include gas like N_2 - 78.08%, O_2 - 20.94%, Ar, CO_2, H_2 etc.
b) particulate mantle → (i) solid phase (dust and smoke
(ii) Liquid phase (Fumes and Mists

* Atmosphere is divided into four phases they are:-

1) Troposphere / Tropopause - 0 - 20 km from earth's surface.
2) Stratosphere - 50 - 55 km
3) Mesosphere - 50 - 80 km
4) Ionosphere / Thermosphere - 80 - 500 km
5) Exosphere - Above 500 km.

2) Define Natural Resource? Give its classification with examples? Describe any one?

2) Resource :- Any material which is used to sustain life is called a Resource.

* If the resources are by nature they are called Natural resource.

Natural Resources.

- Exhaustible
  - Renewable
    - Ex:-
    - 1) Soil fertility
    - 2) Agriculture Products.
    - 3) Wild life
  - Non-Renewable
    - 1) Fossil Fuels
    - 2) Germ minerals.
    - 3) Metals.
- Inexhaustible
  - Immutable
    - 1) Atomic energy
    - 2) Wind
    - 3) Precipitation
    - 4) water power
  - Misusable.
    - 1) Solar power
    - 2) Atmosphere
    - 3) Rivers, lakes, Oceans etc
    - 4) Landscape

(i) Renewable Resources :- These resources can be replenished through rapid natural cycles.

* Available in plenty, can be grown in quantity through utilisation, reproduction.

Ex:- O_2, water, Food etc.

ii) Non-Renewable resources :- These resources cannot be replinished by natural cycles.

* They are limited. They are two types.

a) Recyclable :- can be recycled after their use.

b) Non-Recyclable :- cannot be recycled.

3) write a note on a) Forests.
b) Grass lands.

A) a) Forests :- Forests are natural vegetative coverings on the surface of earth.

* A country should have 1/3 of its area under forest according to national Forest policy 1998

* Advantages :-
1) Regulates temperature, water cycles etc.
2) Controls floods, winds, cyclones.
3) Contains fuels, minerals.
4) Maintains soil fertility.
5) Soure of wood, fibre and industrial raw materials.

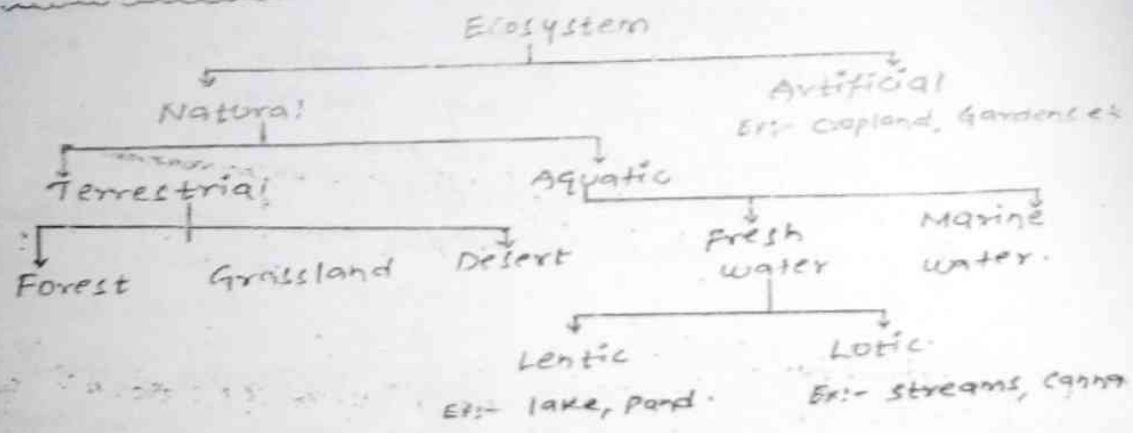
b) Grass lands :-

* Grass lands cover about 20% of earth's surface
* In India 8.5% of area under grasslands, while our domesticated animal population is about 500 millions.
* Grasslands are important resoures for graizing of domesticated animals.
* Grass lands help in soil conservation, serves food for live stock.
* Rotational graizing, Deffered rotation, and other practices are the management practices.
* Grass land :- An area covered with a thick, growth of grass termed as Grassland.

4) Define Ecosystem? Enlist the types of ecosystems? Explain the components of ecosystem? structures and functions of ecosystem?

A) Ecosystem:- According to Tansley " The System resulting from the integration of living and non-living factors of environment.

Kinds of Ecosystem



(i) Natural Ecosystem :- These ecosystems are operated by themselves under natural conditions without any human interference. They are two types.

(1) Terrestrial → Forest, Grassland Desert.

(2) Aquatic → a) Fresh water. b) marine water.

a) Fresh water → 1) Lentic → stagnent water.
2) Lotic → Flowing water.

(ii) Artificial ecosystem :- These ecosystems are maintained artificially by man where by addition of energy and planned manipulations natural balance is disturbed.

Ex:- Agriculture, Gardens, etc.

Components of Ecosystem:

1) **Autotrophs** :- They are self nourishing. It include green plants which use solar energy (or) chemo synthetic bacteria which use energy released during oxidation of inorganic compounds. They are termed as producers.

2) **Heterotrophs** :- They are other nourishing. They utilise the food materials obtained from the producers. They are called consumers. They are two types.

a) **Macro consumers** :- It include three types.

(i) primary consumers → Herbivores animals.
Ex:- Cattle, sheep, Goat etc.

(ii) Secondary consumers → carnivorous animals.
Ex:- Lion, Tiger, dog, wolf, Frog, Snake etc.

iii) Tertiary / climax consumers → obtain food from primary consumers.
→ Include carnivorus and ominivorus animals.
→ Feed on secondary consumers
Ex:- Eagle, Lion, Man etc.

b) **Micro consumers** :- They are known as Decomposers. They include saprophytes which decompose and degrade the organic materials.
Ex:- Bacteria, Fungi, viruses etc.

Structure and functions of Ecosystem.

Structure of Ecosystem.

- Abiotic (nonliving)
- Biotic (living) (Producers, Consumers, Reducers)
  - Autotrophic
  - Heterotrophic
    - ~~Producers~~ Primary
    - Secondary
    - Tertiary

Functions

1) Production :- Every year 100 billion tonnes of organic matter is produced by photosynthesis and same amount is oxidised back by respiration into CO_2 and H_2O.

2) Consumption :- It is the transformation of energy from one trophic level to another through the process of eating and being eaten.

3) Decomposition :- It is the process by which complex organic materials are broken into simple components that are utilised by plant is term as Decomposition. It include.

a) particulate break down.
b) Humus formation
c) Mineralisation.

Structure and function of pond ecosystem

Functions :-

1) Production :- Green plants and photosynthetic bacteria are main producers. They are two types.

a) Macrophytes :- It include three types.
   i) Free floating - ~~Hydrilla~~ ; pistia, wolffia etc.
   ii) Submerged - Hydrilla, Potamogeton.
   iii) Rooted Floating - Vallisneria : Chara, Nymphea.
   iv) Amphibious - Sagitteria, Limnophilla.

b) Phytoplankton :- Include minute floating plants
   Ex:- Algae, Fungi, nagellates, spirogyra, diatoms.

2) Consumption :-

a) Primary Consumers :- Small frogs, Fishes, larvae etc.
b) Secondary Consumers :- big fishes, snakes, crabs etc
c) Tertiary consumers :- Turtles, whales, water birds etc.

3) Decomposition and Transformation.

Decomposition carried by bacteria and fungi which convert complex form to simple inorganic formed they are called Decomposers.

5) Define Biodiversity ? classify Biodiversity ? significance of Biodiversity ? strategies for conservation of Biodiversity ?

A) Biodiversity :- It refers to the variability among the living organisms; plant, animals and microbes from all sources including terrestrial and aquatic ecosystems and ecological complexes of which they are part.

significance ~~classification~~ of Biodiversity / Values of Biodiversity

* It provides a socio-economic and monetary assets to the nation. Human society ~~dion~~ biological resources.

1) Productive use value :- This is assigned to product that are harvested for exchange in formal markets and is only the value of biological resources that is ~~concerned~~ concerned in national income. It provides many products, such as fuel, timber, fish, forest, skin, fruits, medicine etc.

2) Consumptive use value :- It reffers to the natur products that are consumed directly.

Ex:- * Those goods which do not come under normal circulation of trade.

3) Indirect use value:- Indirect use of Biodiversi is of much significant because the value is related primarily with the functions of ecosyster and is concerned with national accounting systems

Classification of biodiversity

1) Species diversity :- It reffers to the Variability among the living organisms in different ecosystems. and includes variability among the species and within the species of plants, animals and micro organisms.

2) Genetic diversity :- Diversity in the genetic resources of plants, animals and microorganisms. It include diversity among individuals of species as well as variability among species.

3) Ecosystem diversity :- The variation in species richiness in different ecosystems of a geographi-cal area.

Conservation of Biodiversity.

It is of two types.

1) Insitu conservation :- It aims at :-
   a) Establishing new protected areas.
   b) Consolidating the network of protected areas
   c) Ensuring conservation of biodiversity.
   d) coordinating new and existing protected areas
   e) Minimising the over exploitation
   f) Encouraging public participation.
   g) Enhancing ecological and social value.
   h) Initiating the regional cooperation.
   i) conducting periodical reviews.

2) Ex-situ conservation :- Conservation of species in artificial conditions such as zoos, aquaria, botanical gardens etc. It include following steps.
   a) Encouraging and establishing seed bank.
   b) Collection and maintainance of microbial culture.
   c) Strengthening the Ex-situ conservation facilite
   d) Development of database on Biodiversity.
   e) Encouraging captive farms, breeding facilities.
   f) [illegible] and short term plans development

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6) Define pollution? Enlist types of pollutions and pollutants with brief explanation.

A) Pollution :- An undesirable change in the physical, chemical and biological characteristics of air, water, and soil which adversly affects the living conditions.

Types of Pollution

1) Water pollution :- Mixing of undesirable quantites of metalic ions, radioactive wastes, Industrial wastes etc.

2) Air pollution :- By smoke, Vechiles, Gases, Agro-chemicals etc.

3) Soil pollution :- By Fungicides, weedicides, pesticides, wastes, sludge etc.

4) Noise pollution :- By Aeroplanes, Vechiles, factories Loud speakers etc.

Types of Pollutants :-

① Primary Pollutants :- Released directly into the environment by human activities. Ex:- SO_2.

② Secondary Pollutants :- Result of primary pollutants undergoing chemical changes by reacting with air, water, sunlight (or) other primary pollutants.
Ex:- $SO_2 + H_2O \rightarrow H_2SO_4$.

③ Biodegradable Pollutants :- Those pollutants which are degrable (or) broken down into simple forms. Ex:- CO_2, H_2O.

④ Non-biodegradable :- Cannot be broken down by biological organisms. Ex:- plastics, Insecticides etc

7) Define water pollution? Enlist the causes and how to control it?

A) water pollution :- Any physical (or) chemical change in the natural quality of water which adversely affects the living organisms.

Causes

1) Heavy metals.
2) Industrial waste discharge.
3) Agro chemicals usage.
4) Animal wastages discharge.
5) Detergents disposal.
6) Thermal discharge.
7) Sediments dispersed.
8) Acid Rains.
9) Organic and inorganic wastes.
10) pathogens.

control measures.

1) Primary treatment :- Sewage passed through series of filters and screens to remove sand, silt, dirt, sediments etc.

2). Secondary treatment :- It is a biological method to remove biodegradable organic wastes, disinfection with chlorine to kill pathogens bacteria, viruses etc. It include two processes.
a) Trickling filter b) activated sludge process

3) Tertiary treatment :- chemical method. it include.
a) coagulation and sedimentation
b) ~~Abs~~ adsorption.
c) Oxidation.
d) Reverse osmosis.
e) Biological methods.

Q) Define Air pollution, Types of air pollutants, Causes of Air pollution.

A) "Any undesirable change in the air which adversly affects the life is termed as Air pollution.

Types :-

1) Inorganic pollutants :-
Ex:- Oxides of C, Nitrogen, sulphur. etc.

2) Organic pollutants :-
Ex:- Hydrocarbons, Aliphatics, Aromatics, Oxygenated Hydrocarbons, Ketones, etc

3) Radioactive pollutants
Ex:- Uranium, Thorium, Mercury etc.

4) Aerosols :- Dust, smoke etc.

5) Biopesticides and Agrochemical pollutants :-
Ex:- Fungicides, insecticides, weedicides etc.

6) Heavy metals.

7) Industrial gases.

8) Exhaust gases.

Causes of Air pollution.

1) over population.
2) Increasing urbanisation
3) use of high smoke emullsion machinary.
4) Increasing traffic.
5) Rapid industrialisation
6) use of highly toxic agrochemicals.
7) Air vechiles discharge.
8) sprays, perfumes, cosmetic sprays etc.

9) Define noise pollution? its causes? methods to control it?

A) Noise pollution:- Any unwanted or unpleasant sound affected the human and other forms of life adversly.

Effects.

a) Heart problems.
b) Permanant Deafness if in large quantity.
c) Ear problems.
d) Blood circulation problems.
e) Peptic ulcers, Gastro-intestinal problems, infertility, nervousness, allergy etc.

Causes

1) Public sources → Loudspeakers, vechiles, Railways, planes and other transport.
2) Domestic sources → crackers, washingmachines, Generators, T.V, Radio, Mixers, etc.
3) Agricultural source → Threshers, Motors, Engines, cultivators etc.
4) Social source → Functions, Fire works, public meetings, cermonies etc

Control measures

1) use of sound Filters at traffic junctions
2) use of silencers of high quality.
3) Reducing the high frequency speakers usage.
4) Implementation of new strategies to Control Noise pollution by Government.
5) Fixing a recommended noise levels for various areas.

(b) What is disaster? Enlist types of disasters and explain any one in detail? Pg no:- 7

A) Disaster :- Any occurance causing damage, great loss to wealth, (or) life (or) both with no expectations and occurs suddenly. ~~without any~~

Types of disaster:

1) Flash floods.
2) Tropical cyclones.
3) Droughts.
4) Tsunamis
5) Earth quakes.
6) Volcanoes.
7) Land slides

Tsunamis

* It is Japanese word which mean harbour wave.
* It occurs due to the underwater earthquakes, landslides (or) volcanic erruptions etc.
* The tsunami waves travel with a speed of 500 - 1000 Km and destroys every thing in its path. causing a great loss of life and wealth.
* waves even rise to 30 - 50m height.
* The tsunami on 26 December killed 3,10,000 people making a record as Deadliest Tsunami.

Drought

* An area with lower than average rainfall is termed as Drought prone area.
* In india 16% of geographical area under drough prone.
* All the rivers, lakes, dries up, grond water depletes. It is mostly lie in arid and semi arid regions.

11) Enlist different Environment and Related acts? Explain any one in detail?

A) 1) The wild life protection Act, 1972.
2) The water (prevention and control of pollution) Act, 1974.
3) The Forest conservation Act, 1980.
4) The Air prevention and control of pollution Act 1981.
5) The Environment (protection) Act, 1986.

Environment protection Act, 1986.

Need :- To protect environment and increase the environment quality by Reforestation, protective measures in small and large scales.

Rule to regulate environmental pollution.
1) The standards of quality of air, water, soil etc.
2) Safe handling of hazardous wastes.
3) prohibition in the location of industries.
4) Procedures and safe gaurds for prevention of accidents which cause environmental pollution.

Central government rules.
1) Environment Protection rules, 1986.
2) Hazardous waste management and Handling Rules, 2006.
3) Manufacture, storage and import of Hazardous chemical Rules 1989.
4) The Biomedical waste Disposal management and Handling Rules, 1998.

(12) Define information technology? Enlist its Role (or) importance with short explanation.

A) Information Technology :- The study, management, development of supportive computer based information systems.

(or)

Application of computers and other technologies to the acquistion, organisation, Retrival and dissemination of information.

Importance

1) In Forestry → Satellite remote sensing is used to map forest.

2) Biodiversity conservation → Remote sensing is utilised to conduct detailed survey and inventory of existing bio resources.

3) Environmental Management :- Remote sensing technology along with GIS, GPS has proved its capability to identify pollution sources.

4) Water Pollution :- Satellite remote sensing techniques provide information about water quality parameters.

5) Air Pollution :- Monitering the acid rain, impact of super power thermal power complexes on vegetation.

6) Land Pollution :- Remote sensing technology play a role in determining environmental impact on open cast mining and mine fires.

7) Natural Resource management :- Remote sensing provides useful information related to agriculture, forestry, Land resources etc.

8) Environmental impact Assessment (EIA) :- It is an activity designed to identify, asses and predict the impact of human actions on environment.

13) Write short notes on :-

a) Gree house Effect.
b) Remote sensing.
c) Biogeo chemical cycles.
d) water shed management.
e) Acid rains.

A) a) Green house Effect.

* The heating of earth by rise in the temperature by resisting the heat solar waves to reflect back by the atmospheric gases is termed as Global warming (or) Green house Effect.
* The CO_2, CF, Cl, water vapour are the main gases for Green house effect.
* Industrialisation, Deforestation and Burning of Fossil fuels are main causes.
* Adversly affects the Agriculture by lowering the frequency of rainfall.

b) Remote sensing :- Acquistion of the physical data of an object without touch (or) contact is called as Remote sensing.

* It supplies temporal information and data of environment of large scale through the satellites to ground.

c) Biogeochemical cycles

The cyclic movements of the chemical elements (C, H, O, N, P and S) etc through various forms i.e from one tertiary level to other are called bio-geo chemical cycles.

Ex:- N_2 cycle.
O_2 cycle.
Sulpur cycle.
Carbon cycle

d) Watershed Management.

* It is an integrated decision making process regarding uses and modification of land, and waters within a watershed.
* various components of watershed interact with each other.
* Control floods, erosion, etc. and other forms of tragedies.
* provides water for livestock, irrigation, and for other purposes.

e) Acid Rains

* Rain water having pH less than 5.6 called as Acid rain.
* It is caused by the dissolution of oxides of sulphur and nitrogen in Rainwater.
* SO_2, N_2O are main oxides.
* Effects on agriculture, by crop damaging
* Acid rain damages buildings and Monements.
* Effects soil by reducing the soil fertility
* Affects the pond ecosystem.

Definitions

1) Environmental science :- Defined as an applied science which with multidisciplinary approach to study and management of Environment.

2) Ecological sucession :- The occurence of relatively definite sequence of communities over a period of time in the same area.

3) Food chain :- The transffer of food energy from one trophic level to other by repeated process of eating and to be eaten.

4) Bioenergetics :- Study of energy transformations in living systems.

5) Biota :- The flora and fauna of an area.

6) Community :- A group of species living in a common environment.

7) Hazardous waste :- Any substance which by reason of its physical, chemical, physio-chemical properties cause harm to human beings, plants, organisms, microorganism etc.

(or)

substances which cause harm to humans or the environment.

8) Adaptation :- Stable performance of a specie over wide range of new areas. (or) Environmental Conditions.

9) Biocoenosis :- A community of organisms occupying an area.

Prepared by:-
Anoop Reddy Kuthuru
C.D.M.V.M. College,
Narayanpet