

MAN AND HIS ENVIRONMENT

MULTIPLE CHOICE QUESTIONS

- (1) A group of organisms which can interbreed freely in nature and produce fertile offsprings:
(a) Community (b) Population (c) Biosphere (d) Species
- (2) An example of artificial ecosystem:
(a) River (b) Ocean (c) Rain forest (d) Aquarium
- (3) Thickness of biosphere:
(a) 10 Km (b) 15 Km (c) 20 Km (d) 25 Km
- (4) Which one is not a biotic component:
(a) Producer (b) Consumer (c) Decomposer (d) Air
- (5) The consumers that feed on plants:
(a) Omnivores (b) Carnivores (c) Herbivores (d) Insectivores
- (6) The first trophic level is made up of:
(a) Consumers (b) Producers (c) Herbivores (d) Carnivores
- (7) Man is:
(a) Omnivore (b) Carnivore (c) Insectivore (d) Herbivore
- (8) Which one is the primary source of energy?
(a) Moon (b) Mars (c) Sun (d) Mercury
- (9) A network of food chains which are interconnected at various trophic levels:
(a) Community (b) Population (c) Species (d) Food web
- (10) Who developed the concept of ecological pyramids?
(a) Charles Darwin (b) Charles Elton (c) Charles Brown (d) Charles Asker
- (11) Which one cycle is a perfect cycle in nature?
(a) Carbon (b) Oxygen (c) Nitrogen (d) Water
- (12) The green house effect and global warming are due to the increase in the concentration of:
(a) Sulphur (b) Carbon dioxide (c) Water vapours (d) Oxygen
- (13) Ammonia is converted into nitrites by:
(a) *Streptococcus* (b) *Penicillium* (c) *Nitrobacter* (d) *Nitrosomonas*
- (14) The biological process in which nitrates and nitrites are reduced to nitrogen gas:
(a) Ammonification (b) Nitrification (c) Denitrification (d) Assimilation
- (15) Excessive denitrification reduces soil fertility and is stimulated by:
(a) Water logging (b) Lack of aeration (c) Organic matter (d) All of these
- (16) Types of symbiosis:
(a) 1 (b) 2 (c) 3 (d) 4

- (17) Plants show competition for:
 (a) Space (b) Light (c) Water (d) All of these
- (18) Which one is an ectoparasite?
 (a) Leech (b) Liver fluke (c) Tape worm (d) *Ascaris*
- (19) Parasitic plants have special roots called:
 (a) Rhizoids (b) Adventitious (c) Tap (d) Haustoria
- (20) Small plants found growing on the other larger plants:
 (a) Lichens (b) Parasites (c) Epiphytes (d) Barnacles
- (21) Large mammals that feed on honey:
 (a) Lions (b) Badgers (c) Deer (d) Zebras
- (22) Which are green house gases?
 (a) Carbon dioxide (b) Methane (c) Ozone (d) All of these
- (23) Average sea level rising in a year:
 (a) 0.6 cm (b) 0.7 cm (c) 0.8 cm (d) 0.9 cm
- (24) Since 1800, the amount of carbon dioxide in atmosphere has increase up to:
 (a) 20% (b) 25% (c) 30% (d) 35%
- (25) Clearing of forests by natural causes or humans:
 (a) Deforestation (b) Afforestation (c) Forestation (d) None of these

ANSWER KEY

Q.No.	Ans								
1	d	2	d	3	c	4	d	5	c
6	c	7	a	8	c	9	d	10	b
11	a	12	b	13	d	14	c	15	d
16	c	17	d	18	a	19	d	20	c
21	b	22	d	23	d	24	c	25	a

SHORT QUESTIONS

Q. No. 1 Define environment

ENVIRONMENT

The sum of physical (abiotic) and biological (biotic) conditions which influence the organism is called the environment of that organism.

Q. No. 2 Define ecology.

ECOLOGY

The branch of Biology that deals with the study of the interrelationship between organisms and their environment is called ecology.

Q. No. 3 What are biogeochemical cycles?

BIOGEOCHEMICAL CYCLES

The cyclic pathways through which materials move from environment to organisms and back to environment are called biogeochemical cycles.

Q. No. 4 Why carbon cycle is called perfect cycle?

CARBON CYCLE AS PERFECT CYCLE

Carbon cycle is a perfect cycle in the sense that carbon is returned to atmosphere as soon as it is removed.

Q. No. 5 How the balance of carbon cycle has been upset by human activities?

UPSET OF CARBON CYCLE

The balance of carbon cycle has been upset by human activities such as:

- Deforestation
- Excessive burning of fossil fuels

Q. No. 6 What are the consequences of increasing concentration of carbon dioxide in atmosphere?

CONSEQUENCES OF INCREASED CONCENTRATION OF CARBON DIOXIDE

As a result, the amount of carbon dioxide in atmosphere is increasing, causing:

- The green house effect
- Global warming

Q. No. 7 How is denitrification stimulated?

STIMULATION OF DENITRIFICATION

Excessive denitrification reduces soil fertility and is stimulated by:

- Water logging
- Lack of aeration
- Accumulation of organic matter

Q. No. 8 In what things plants show competition?

COMPETITION IN PLANTS

Plants also show competition for:

- Space
- Light
- Water
- Minerals

Q. No. 9 What is the relationship between survival of host and parasite?

SURVIVAL OF HOST AND PARASITE

Host can survive without parasite, but parasite cannot survive without host.

Q. No. 10 Why biogeochemical cycles are called as nutrient cycles?

BIOGEOCHEMICAL CYCLES AS NUTRIENT CYCLES

The movement of elements and inorganic compounds is essential for maintenance of life, they are also called 'nutrient cycles'. Carbon cycle is a perfect cycle in the sense that carbon is returned to atmosphere as soon as it is removed.

Q. No. 11 What is the difference between intraspecific and interspecific interactions?

Intraspecific Interactions	Interspecific Interactions
The interactions between the members of the same species are called intraspecific interactions.	The interactions between the members of different species are called interspecific interactions.

Q. No. 12 What is Intergovernmental Panel on Climate Change (IPCC)?

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

In 1990, the United Nations established Intergovernmental Panel on Climate Change (IPCC). It provides scientific advice to the world leaders on issues like the build-up of greenhouse gases and its prevention. According to IPCC, Earth's surface temperature has increased 0.2°C per decade in the past 30 years

Q. No. 13 How Maldives' survival is on threat?

THE MALDIVES' SURVIVAL

Scientists fear that the sea level is rising up to 0.9cm a year. Rise in sea level has worst effects on coastal countries. Most of the islands of the Maldives are less than 1 metre above sea level. It is estimated that within 100 years, the Maldives might become uninhabitable and the citizens would be forced to evacuate.

Q. No. 14 What is the relationship between honeyguide bird and badgers?

HONEYGUIDE BIRD AND BADGERS

The honeyguide bird feeds on wax and the larvae present in honeycombs. It flies around looking for honeycombs. but it is not strong enough to open the comb. Badgers are large mammals that feed on honey. When a honeyguide bird goes to find honeycombs, the badger follows it. When the bird finds a honeycomb, it calls the badger. Sometimes the bird has to stop and wait for the slow-moving badger. After reaching there, the badger opens the honeycomb and both of them eat their foods together. Traditionally, humans have also used these birds to find honeybee colonies.

Q. No. 15 What are pollutants?

POLLUTANTS

The substances that actually cause pollution are called the pollutants.

Examples:

They may be:

- Industrial effluents
- Domestic wastes
- Medical wastes

Q. No. 16 What are two types of pollutants?

TYPES OF POLLUTANTS

Pollutants are of two types:

- Biodegradable
- Non-biodegradable

Q. No. 17 What is noise? What are its bad effects?

NOISE

The unwanted, unpleasant and annoying sounds are termed as noise. Noise is also considered as a form of pollution.

Immediate Effects:

Immediate effects of noise pollution are:

- Annoyance
- Aggression

Long Term Effects:

The long term effects of noise pollution are:

- Hearing loss
- Depression
- Hypertension

Q. No. 18 What will be the increase in temperature in the next hundred years?

According to estimates, at the current rate of increase, the average global temperature will go up by 3°C to 8°C in the next 100 years.

Q. No. 19 In which countries the harmful effects of the UV rays are visible?

HARMFUL EFFECTS OF THE UV RAYS

The harmful effects of the UV rays are visible in the countries such as Australia and New Zealand where the rate of skin cancer is higher than the other regions of the world.

LONG QUESTIONS

Q. No. 1 Describe levels of ecological organization.

LEVELS OF ECOLOGICAL ORGANIZATION

In ecology, the levels of organization range from organism to biosphere.

Organism:

An organism may be unicellular or multicellular.

Species:

The first level of ecological organization is species. A species may be defined as: A group of organisms which can interbreed freely in nature to produce fertile offspring is called species.

Population:

A group of the organisms of the same species inhabiting a specific geographical area (habitat) at a particular time is called a population.

Community:

All the populations that live in a habitat and interact in various ways with one another are collectively called a community.

Ecosystem:

The self-sufficient unit of an environment that is formed as a result of interactions between its biotic community and the abiotic components is known as an ecosystem.

Explanation:

Living organisms cannot live isolated from the non-living part of their environment. The biotic and abiotic components of environment interact with each other to form an ecosystem.

Types of Ecosystem:

There are two types of ecosystems:

Natural Ecosystem:

The examples are:

- A pond
- A lake
- A forest

Artificial Ecosystem

Example:

- An aquarium

Biosphere:

All ecosystems of the world together form the biosphere. It includes all the ecosystems of the planet Earth. In other words, the biosphere consists of all organisms present on the Earth and all regions of the Earth where they live.

Range:

Biosphere ranges from the floor of oceans to the tops of the highest mountains.

Thickness:

It is about 20 kilometres thick. The biosphere makes a thin layer surrounding the planet Earth. If you consider the Earth as of the size of an apple, then the biosphere will be as thick as the apple's skin.

Q. No. 2 Write a note on components of an ecosystem.

COMPONENTS OF ECOSYSTEM

Ecosystem:

The self-sufficient unit of an environment that is formed as a result of interactions between its biotic community and the abiotic components is known as an ecosystem.

An ecosystem comprises of two basic parts:

1. Abiotic components
2. Biotic components

1. Abiotic Components:

Definition:

The non-living factors present in ecosystem are called abiotic components.

Examples:

The important non-living factors are:

- Light
- Air
- Water
- Soil
- Basic elements and compounds

2. Biotic Components:

Definition:

All the living parts (organisms) of the ecosystem are called as biotic components.

Classification:

Biotic components are further classified as:

- (i) Producers
- (ii) Consumers
- (iii) Decomposers

(i) Producers:

The producers are the autotrophs present in an ecosystem. These organisms are able to synthesize complex organic compounds (food) from inorganic raw materials. Producers form the basis of any ecosystem.

Examples:

Producers include:

- Plants
- Algae
- Photosynthetic bacteria

Terrestrial Ecosystem:

In terrestrial ecosystems, plants are the main producers.

Aquatic Ecosystem:

In aquatic ecosystems, the main producers are the floating photosynthetic organisms (mainly algae) called phytoplankton and shallow water rooted plants.

(ii) Consumers:

The consumers are heterotrophs. They cannot synthesize their food and so depend upon producers for food.

Examples:

Consumers include:

- All animals
- Fungi
- Protozoans
- Many of the bacteria

Classification of Animals:

The animals are the major consumers of ecosystems. They are further classified as:

Herbivores (Primary Consumers):

The animals that feed on plants are called herbivores. The herbivores are the primary consumers. They feed directly on plants or products of plants. For example:

- Cattle
- Deer
- Rabbit
- Grasshopper

Primary Carnivores:

Primary carnivores (secondary consumers) feed on herbivores. For example:

- Fox
- Frog
- Predatory birds
- Many fishes
- Snakes

Secondary Carnivores:

Secondary carnivores (tertiary consumers) feed on primary carnivores. For example:

- Wolf
- Owl

Tertiary Carnivores:

Tertiary carnivores feed on secondary carnivores. For example:

- Lion
- Tiger

(iii) Decomposers:

Decomposers or reducers break down the complex organic compounds of dead matter (of plants and animals) into simple compounds. They secrete digestive enzymes into dead and decaying plant and animal remains to digest the organic material. After digestion, decomposers absorb the products for their own use. The remaining substances are added to environment.

Examples:

- Bacteria
- Fungi

Q. No. 3 Describe flow of energy in an ecosystem.

FLOW OF ENERGY

In an ecosystem, energy travels from one trophic level to the next.

Trophic Level:

Trophic level is the level at which an organism feeds in food chain. The first trophic level is made of producers; the second of primary consumers and so on.

Unidirectional Flow:

The flow of energy in different trophic levels of ecosystem is unidirectional.

Primary Source:

The sun is the primary source of energy for all ecosystems.

Energy in Producers:

Producers get solar energy and transform it into chemical energy by the process of photosynthesis. They store their energy in their tissues and also transform it into mechanical and heat energy during their metabolic activities.

Energy in Herbivores:

The energy in producers' tissues flows to herbivores when producers are eaten. Herbivores transform it into mechanical and heat energy during their metabolic activities and store the rest in their tissues.

Energy in Carnivores:

Carnivores eat herbivores and get energy. They also use it for their body activities and store the rest in their tissues.

Energy in Decomposers:

After the death of producers and consumers, the energy stored in their tissues is used by decomposers.

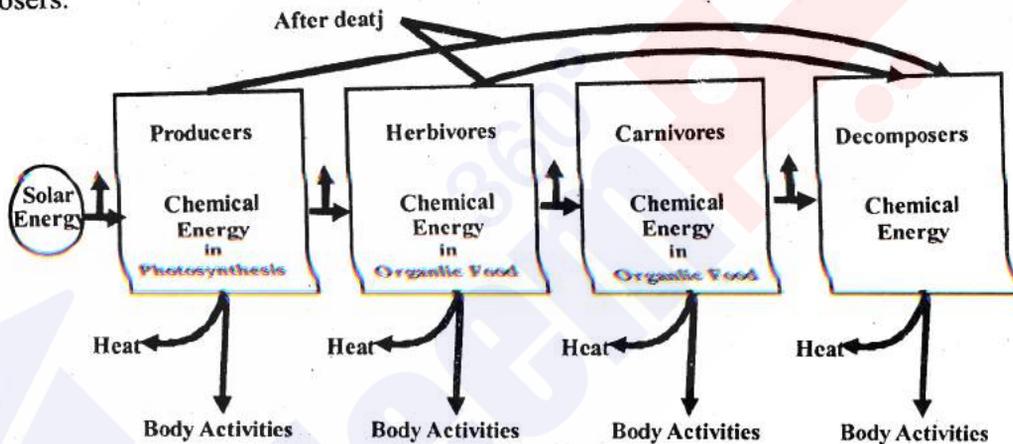


Figure: Energy Flow in an Ecosystem

Law of Thermodynamics:

The storage and expenditure of energy in an ecosystem is in accordance with the basic law of thermodynamics.

Statement:

Energy can neither be created nor destroyed but can be transformed from one form into another.

Energy within Ecosystem:

In an ecosystem there is:

Constant Flow:

Constant flow or transfer of energy from the Sun through producers to consumers and decomposer

Decrease in Energy:

A significant decrease in useful energy during transfer of energy at each trophic level

Q. No. 4 Describe flow of materials in an ecosystem.

FLOW OF MATERIALS

The materials flow from one trophic level to the next by means of food chains and food webs.

Trophic Level:

Trophic level is the level at which an organism feeds in food chain. The first trophic level is made of producers; the second of primary consumers and so on.

FOOD CHAIN

Definition:

A series of organisms within an ecosystem, in which each organism feeds on the one before it and is fed by the one after it is called food chain.

Example:

Following is a food chain in an ecosystem:

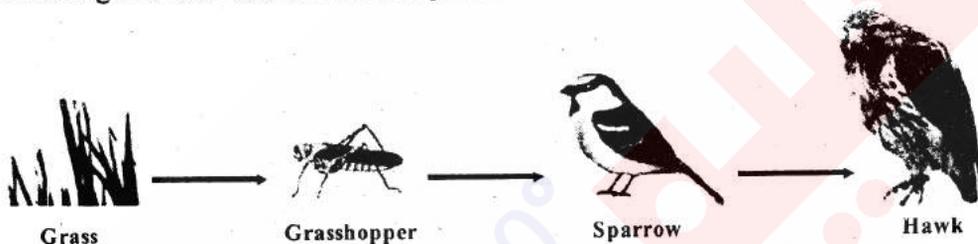


Figure: A Simple Food Chain

Explanation:

The base of food chain is always formed by a plant (producer). It is eaten by a primary consumer, which is preyed upon by a secondary consumer. The secondary consumer may be eaten by a tertiary consumer. A food chain, can therefore, be represented as,

Producer → Primary Consumer → Secondary Consumer → Tertiary Consumer

Advantage:

A food chain involves a nutritive interaction among the biotic components of an ecosystem.

Number of Trophic levels:

Usually there are 4 or 5 trophic levels. Shorter food chains provide greater available energy and vice-versa.

FOOD WEB

Definition:

A network of food chains which are interconnected at various trophic levels is called food web.

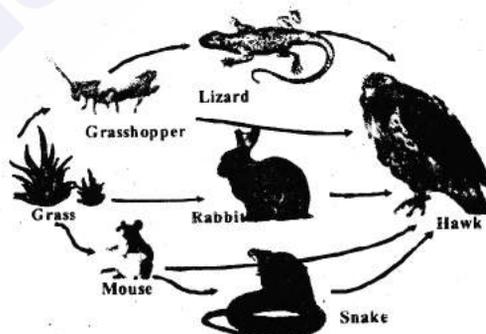


Figure: A Food Web in Grassland Ecosystem

Explanation:

In nature, food chains are very complex, as one organism may be the food source of many other organisms. Thus, instead of a simple linear food chain, there is a web-like structure formed by these interlinked food chains. Such interconnected food chains collectively make food web.

Q. No.5 Write a note on ecological pyramids.

ECOLOGICAL PYRAMIDS**Introduction:**

In 1927, Charles Elton (an English ecologist) developed the concept of ecological pyramids. Organisms in Food Chain:

Observation:

He noted that the animals present at the beginning of food chain are abundant in number while the animals present at the end of food chain are fewer in number.

Definition:

A representation of the number of individuals or amount of biomass or energy present in various trophic levels of a food chain.

TYPES OF PYRAMIDS

Ecological pyramids are of three types. The two are:

1. Pyramid of Numbers
2. Pyramid of Biomass

1. Pyramid of Numbers:**Definition:**

The graphic representation of the number of individuals per unit area at various trophic levels is called pyramid of numbers.

Explanation:

Usually, producers are present in large number, primary consumers are in lesser number, secondary consumers are fewer, and so on. So, the producers are of smallest size but maximum in number, while the tertiary consumers are larger in size but lesser in number.

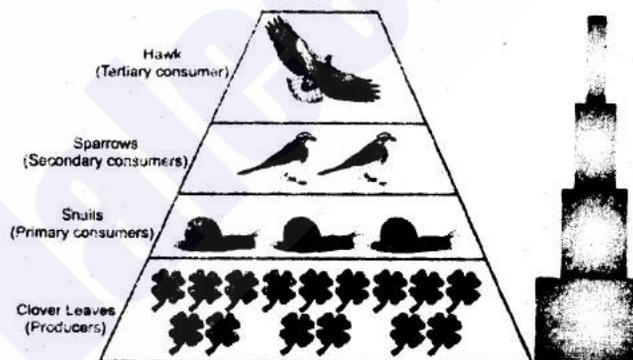


Figure: Pyramid of Numbers in an Ecosystem

2. Pyramid of Biomass:**Definition:**

The graphic representation of biomass present per unit area at different trophic levels is called pyramid of biomass.

Biomass:

The total amount of living organic matter in an ecosystem at any time is called biomass.

Explanation:

In a terrestrial ecosystem, the maximum biomass occurs in producers, and there is progressive decrease in biomass from lower to higher trophic levels.



Figure: Pyramid of Biomass in an Ecosystem

Q. No. 6 Write a note on carbon cycle.

CARBON CYCLE

Introduction:

Carbon atom is the principal building block of many kinds of biomolecules. Carbon is found as graphite and diamond in nature. It also occurs as carbon dioxide in atmosphere.

Sources:

Major source of carbon for the living world is carbon dioxide present in atmosphere and water. Carbonates of Earth's crust also give rise to carbon dioxide.

Fossil fuels also contain carbon like:

- Peat
- Coal
- Natural gas
- Petroleum

Photosynthesis:

The major process that brings carbon from atmosphere or water into living world is photosynthesis. Producers take in carbon dioxide from atmosphere and convert it into organic compounds. In this way, carbon becomes a part of the body of producers.

Carbon in Animals:

This carbon enters food chains and is passed to:

- Herbivores
- Carnivores
- Omnivores
- Decomposers

Respiration:

Carbon dioxide is released back to environment by respiration of producers and consumers.

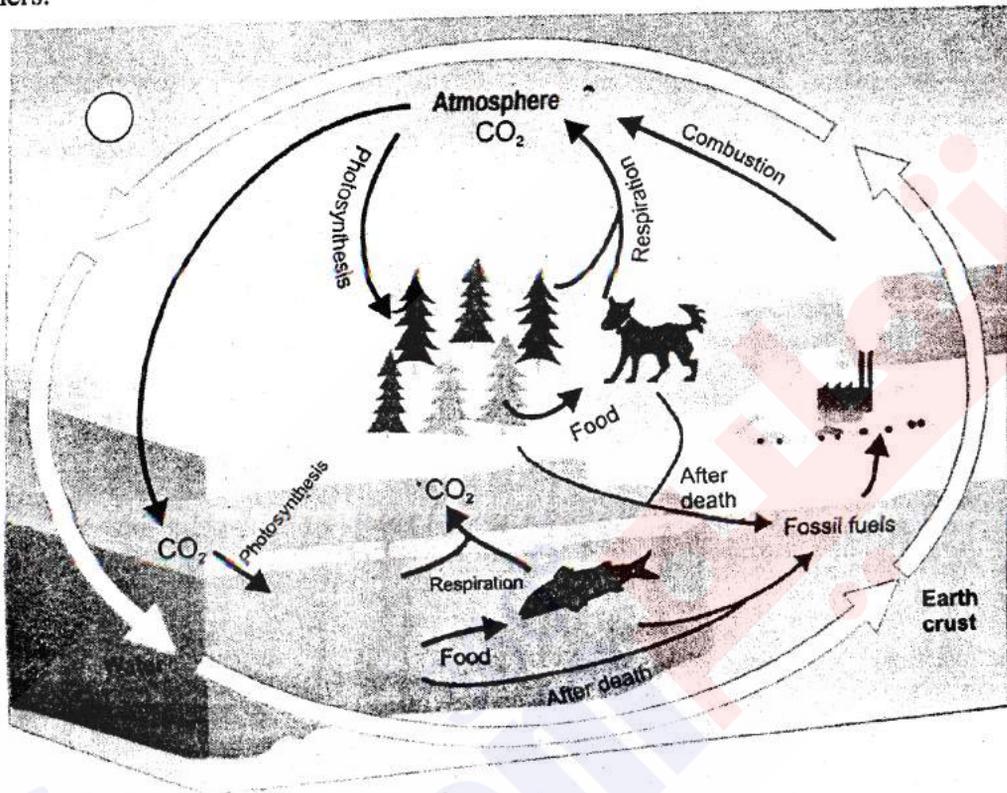


Figure: Carbon Cycle

Decomposition:

It is also released by the decomposition of organic wastes and dead bodies by decomposers.

Combustion:

Burning of wood and fossil fuels also adds large amount of carbon dioxide in atmosphere.

Perfect Cycle:

Carbon cycle is a perfect cycle in the sense that carbon is returned to atmosphere as soon as it is removed.

Upset of Carbon Cycle:

The balance of carbon cycle has been upset by human activities such as:

- Deforestation
- Excessive burning of fossil fuels

Consequences:

As a result, the amount of carbon dioxide in atmosphere is increasing, causing:

- The green house effect
- Global warming

Q. No. 7 Write a note on carbon cycle.

NITROGEN CYCLE

Occurrence:

Nitrogen is an important component of many biomolecules, like:

- Proteins
- Nucleic acids (DNA and RNA)
- Atmosphere is the reservoir of free gaseous nitrogen

Living organisms cannot pickup this gaseous nitrogen directly from atmosphere except for nitrogen fixing bacteria. It has to be converted into nitrates to be utilised by plants.

Nitrogen cycling involves several stages:

1. Formation of Nitrates:

It is done by the following ways:

Nitrogen Fixation:

The conversion of nitrogen gas into nitrates is called nitrogen fixation. It occurs in the following ways.

Atmospheric Nitrogen Fixation:

Thunderstorms and lightning convert atmospheric gaseous nitrogen to oxides of nitrogen. These oxides dissolve in water and form nitrous acid and nitric acid. The acids in turn combine with other salts to produce 'nitrates'. It is called as atmospheric nitrogen fixation.

Biological Nitrogen Fixation:

Some bacteria also have the ability to transform gaseous nitrogen into nitrates. It is called biological nitrogen fixation. Some of these nitrogen fixing bacteria live as symbionts and many are free-living.

Industrial Nitrogen Fixation:

Nitrogen fixation is also done in industries. In industrial nitrogen fixation, hydrogen is combined with atmospheric nitrogen under high pressure and temperature. It produces ammonia which is further converted into ammonium nitrate.

2. Ammonification and Nitrification:

The breakdown of the proteins of dead organisms and nitrogenous wastes (urea, uric acid etc.) to ammonia is called ammonification. It is done by ammonifying bacteria.

Nitrification:

The process of conversion of ammonia into nitrites and nitrates is called nitrification. It is done by nitrifying bacteria.

Formation of Nitrites:

First, ammonia is converted into nitrites by bacteria like:

- *Nitrosomonas*

Formation of Nitrates:

The nitrites are then converted into nitrates by other bacteria like:

- *Nitrobacter*

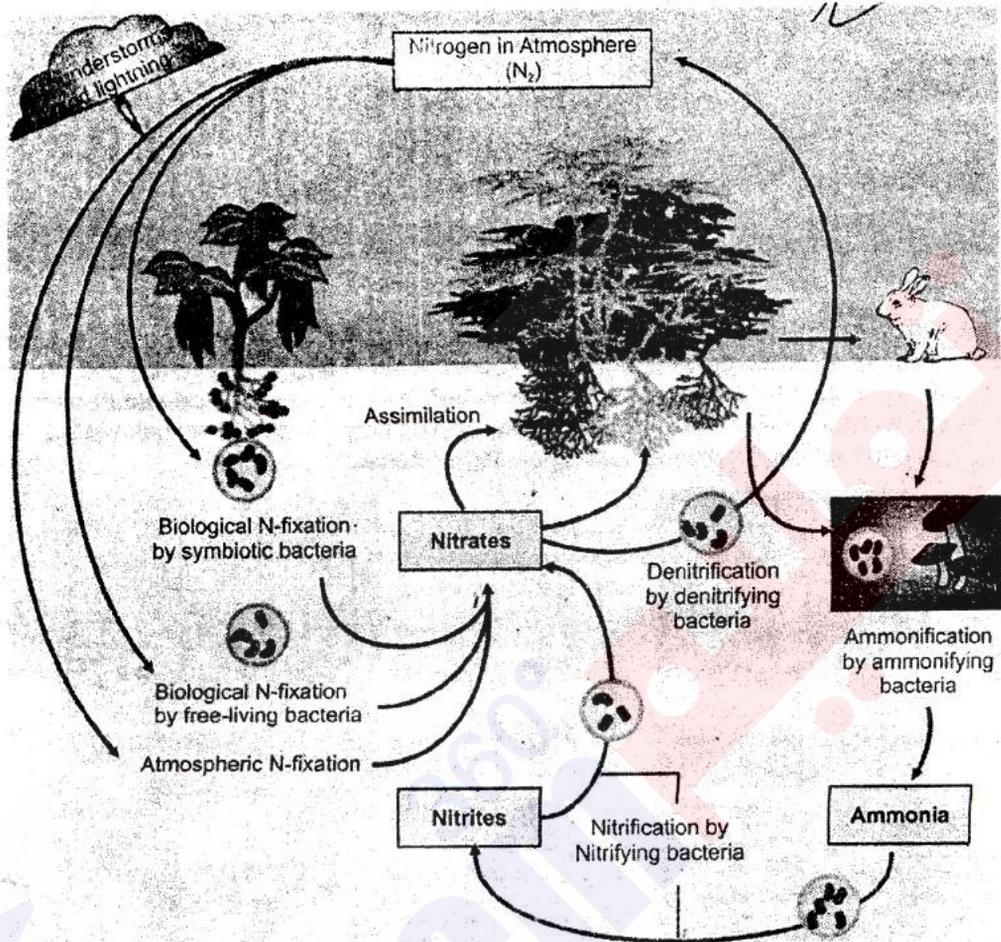


Figure: Nitrogen Cycle

3. Assimilation:

Definition:

The utilization of nitrates by organisms is called assimilation.

Explanation:

The nitrates formed by the processes of nitrification, are absorbed by plants and are utilized for making proteins etc. Animals take nitrogenous compounds from plants.

4. Denitrification:

The biological process in which nitrates and nitrites are reduced to nitrogen gas by denitrifying bacteria is called denitrification. By this process, nitrogen is returned to atmosphere.

Excessive denitrification reduces soil fertility and is stimulated by:

- Water logging
- Lack of aeration
- Accumulation of organic matter

Q. No. 8 Write a note on competition.

COMPETITION

In ecosystems, the natural resources e.g. nutrients, space etc. are usually in short supply. So there is a competition among the organisms of ecosystem for the utilization of resources.

Types of Competition:

The competition may be intraspecific or interspecific.

Intraspecific Competition:

The competition among the individuals of the same species is called intraspecific competition.

Interspecific Competition:

The competition among the individuals of the different species is called interspecific competition.

Comparison:

Intraspecific competition is always stronger and more severe than the interspecific competition.

Advantage:

Competition helps in maintaining a balance between the available resources and the number of individuals of a species.

Competition in Plants:

Plants also show competition for:

- Space
- Light
- Water
- Minerals

Q. No. 9 Write a note on predation.

PREDATION**Introduction:**

It is an interaction between two animals of different species or between a plant and an animal.

Definition:

The relationship between predator and prey is called predation.

Predator:

The organism that attacks, kills and feeds on other organism is called predator.

Prey:

The organism that is being hunted upon is called prey.

Examples:

All carnivore animals are predators. Some examples of predation are given below:

- Frog preys upon mosquito
- Fox preys upon rabbit

There are some examples where a predator is preyed upon by a second predator and then the second one is preyed upon by a third predator. For example, frog (predator 1) is preyed upon by a snake (predator 2) and the snake is preyed upon by an eagle (predator 3).

Predation in Plants:

Certain plants are carnivorous and live as predators. Such plants live in the areas where minerals and other nutrients are lacking. They feed on insects to fulfill their nitrogen requirements. These plants have mechanism to attract insects. For example, they secrete sweet nectar that attracts the insects searching for food. Their leaves are also modified to capture the prey.

Examples:

- Pitcher plant
- Sundew
- Venus fly trap

Advantage:

Predation keeps the prey population under check, so as to maintain an ecological balance. Humans benefit from this interaction in the biological control of weeds and pests. In order to control pests in an area, their predators are released there.

Q. No. 10 Write a note on symbiosis.

SYMBIOSIS**Definition:**

A relationship between members of different species, in which they live together for longer or shorter periods of time, is called symbiosis.

TYPES OF SYMBIOSIS

Symbiosis is of three types:

1. Parasitism
2. Mutualism
3. Commensalism

1. Parasitism:**Definition:**

A type of symbiosis between members of different species, in which smaller partner (parasite) derives food and shelter from the body of larger partner (host) and, in turn, harms it is called parasitism.

Temporary Parasitism:

In temporary parasitism, the parasite spends most of its life cycle as independent free-living organisms. Only a part of its life cycle is spent as a parasite. Some common temporary parasites of humans are:

- Leech
- Bed bug
- Mosquito

Permanent Parasitism:

In permanent parasitism, the parasites spend their whole life cycle as parasites. Some examples of permanent parasites are:

- Disease causing bacteria
- All viruses

Classification of parasites:

Parasites may also be classified as ectoparasites and endoparasites.

Ectoparasites:

The parasites that live outside i.e. on the surface of host's body and get food from there are called ectoparasites

Examples:

- Mosquitoes
- Leeches
- Lice

Endoparasites:

The parasites that live inside the body of host and get food and shelter are called endoparasites.

Examples:

- Bacteria
- Viruses
- Tapeworm
- *Ascaris*
- *Entamoeba*
- *Plasmodium*

Parasitic Plants:

Some plants are parasites on other plants. Parasitic plants grow special types of roots called haustoria into host body and suck the required nutrients from the vascular tissues of host.

Example:

- *Cuscuta*, also called dodder

Survival of Host and Parasite:

Host can survive without parasite, but parasite cannot survive without host.

2. Mutualism:**Definition:**

The type of symbiotic interaction in which both partners of different species get benefit and neither is harmed is called mutualism.

Examples:**Termites and Zooflagellates:**

Termites eat wood but are not able to digest it. A protozoan lives in its intestine. It secretes 'cellulase' enzyme to digest the cellulose of wood. In return, the termite provides food and shelter to the protozoan.

Root Nodules:

The nitrogen fixer bacteria *Rhizobium* live in the root nodules of leguminous plants like pea, gram etc. The bacteria obtain food and shelter from plants while in return they fix gaseous nitrogen into nitrates for the plant which is required for their growth.

3. Commensalism:**Definition:**

It is a type of symbiosis in which one partner is benefited while the other is neither benefited nor harmed.

Examples:**Epiphytes:**

Epiphytes are small plants found growing on other larger plants for space only. They absorb water and minerals from atmosphere and prepare their own food. The larger plants are neither benefited nor harmed in any way.

Sucker Fish:

Sucker fish attaches to the surface of sharks by its sucker. In this way, the shark provides easy transport to the sucker fish to new feeding grounds.

Q. No. 11 Write a note on global warming.

GLOBAL WARMING

Definition:

The increase in the temperature of the earth due to the accumulation of green house gases is called global warming.

Explanation:

The addition of greenhouse gases in atmosphere increases the temperature of the Earth. These green houses gases are:

- Carbon dioxide
- Methane
- Ozone

Reflecting Back of Solar Radiations:

These gases remain in the lowest part of Earth's atmosphere and do not allow solar radiations to reflect back into space. As a result, heat remains within the Earth's atmosphere and increases its temperature.

Effects:

Due to global warming:

- Polar ice-caps and glaciers are melting faster than the time taken for new ice layers to form.
- Sea water is also expanding causing sea levels to rise.
- Due to melting glaciers, rivers overflow and cause floods.

Q. No. 12 Write a note on green house effect.

GREEN HOUSE EFFECT

The term 'Greenhouse Effect' refers to the phenomenon in which certain gases called greenhouse gases trap heat in the atmosphere.

Escape of Heat:

These gases act like the glass in a greenhouse, which does not allow the inner heat to escape. When sunlight reaches the surface of the Earth, much of its energy is transformed into heat energy. The Earth surface reflects this heat energy towards space as infrared radiation. The greenhouse gases trap infrared radiation and send it back to Earth.

Green House Gases:

Some important green house gases are:

- Carbon dioxide
- Methane
- Nitrous oxide

Increase in Concentration:

Since 1800, there is remarkable increase in the amount of the following gases in atmosphere:

- Carbon dioxide 30 %
- Methane Doubled
- Nitrous oxide 8%

Q. No. 13 Write a note on acid rain.

ACID RAIN

Definition:

The rain consisting of sulphuric and nitric acids is called acid rain.

Formation of Acids:

When rain falls through polluted air, it comes across chemicals such as oxides of sulphur and nitrogen. These chemicals interact with water vapours in the presence of sunlight to form sulphuric acid and nitric acid. These acids remain as vapours at high temperatures.

pH Level:

As temperature falls, the acids begin to condense into liquid form and mix with rain or snow, on the way down to the Earth. This makes rain acidic with pH range of 3 to 6.

SIGNIFICANT ILL EFFECTS OF ACID RAIN

Some of the significant ill effects of acid rain are:

Destruction of Nutrients:

Acid rain destroys the necessary nutrients present in the waters of rivers and lakes. Acid rain washes nutrients out of soil.

Lowering pH Level:

It also lowers the pH of water. Most of the aquatic animals cannot survive at this pH.

Damage to Trees:

It damages the bark and leaves of trees and harms root hairs. Leaf pigments like chlorophyll are also destroyed.

Corrosion:

Metallic surfaces exposed to acid rain are easily corroded.

Loss of Strength:

The following products lose their material strength or disintegrate easily due to acid rains:

- Fabrics
- Paper
- Leather

Damage to Building Materials:

Building materials are weakened with acid rains because of the formation of soluble compounds such as:

- Limestone
- Marble
- Dolomite
- Mortar
- Slate

Damage to Historical Monuments:

Acid rain is dangerous for historical monuments. The building of famous Taj Mahal has been corroded at many places, due to acid rains.

Q. No. 14 Write a note on deforestation.

DEFORESTATION

Definition:

The clearing of forests by natural causes or humans is called deforestation.

Purposes:

Large areas of forests have been cleaned for:

- Agriculture
- Factories
- Roads
- Rail tracks
- Mining

Wood:

Humans cut trees for getting wood (lumber), which is then used for making structures and for heat production.

Animals:

Humans prey upon forest animals which are the predators of many insect pests. In this way, insect pests destroy forests by eating the shoots and spreading diseases.

Effects:

The effects of deforestation include:

- Floods
- Droughts
- Landslides
- Soil erosions
- Global warming
- Loss of habitat of many species

Q. No. 15 Write a note on overpopulation.

OVERPOPULATION

Population:

A group of the organisms of the same species inhabiting a specific geographical area (habitat) at a particular time is called a population.

World Population:

Past:

When the industrial revolution started some 250 years ago, the world population was 600 million.

Present:

Now the world population is almost ten times at 6 billion.

Future:

The population will grow to 8 billion by 2025.

Reasons:

The following things have contributed in population growth:

- Better health facilities
- Lowered mortality rates

Q. No. 16 Write a note on urbanization.

URBANIZATION

Definition:

The growing of cities is called urbanization.

Reasons:

People move from rural areas to cities in search of:

- Better jobs
- Education opportunities
- Higher standards of living

Problems for Government:

If there is rapid urban growth, the governments find it difficult to provide even the basic facilities like:

- Health
- Education
- Shelter
- Water
- Electricity

Urban Poverty:

Most of the migrants in cities do not find good jobs and become the part of urban poor.

Overcrowding:

There is overcrowding in schools, hospitals etc. The slum areas increase in number and people living there are at greater risk of diseases.

Global Problem:

Urbanization is a global problem and cannot be stopped but it can be managed.

Urbanization in Pakistan:

The current level of urbanization in Pakistan is about 32% which is not high by global standards.

Planned Urbanization:

A planned urbanization can solve many problems.

- The cities should have thick green belts in their surroundings to control pollution.
- The open spaces in cities should be reserved through zoning and land plans.
- The urban spread-out should also be controlled.
- Utilization of public transport instead of individual transports also proves effective way to manage urbanization.

Q. No. 17 Write a note on air pollution.

Definition:

Any undesirable change in the physical, chemical or biological characteristics of air, water and land that may harmfully affect living organisms and natural resources is called pollution.

AIR POLLUTION

Major Issue:

Air pollution is one of the major environmental issues of today.

Definition:

The change of composition of air by the addition of harmful substances is called air pollution.

Harmful Substances:

The harmful substances causing air pollution may be:

- Industrial gases
- Automobile gases
- Particulate matter

Sources:

All sources of air pollution are related to human activities.

Combustion:

Burning of coal produces a lot of smoke and dust whereas burning of petroleum produces sulphur dioxide.

Air Pollutants:

In addition to these, air pollutants include:

- Carbon monoxide
- Carbon dioxide
- Nitrogen oxides
- Hydrocarbons
- Particulate matter
- Traces of metals

Industrial Air Pollution:

Different industries produce air pollution in the following way:

Fertilizer Industries:

Fertilizer industries release:

- Oxides of sulphur and nitrogen
- Hydrocarbons
- Particulate matter
- Fluorine

Thermal Industries:

Thermal industries are coal based and their pollutants are:

- Fly ash
- Soot
- Sulphur dioxide

Textile Industries:

Textile industries release:

- Cotton dust
- Nitrogen oxides
- Chlorine
- Smoke
- Sulphur dioxide

Steel Industries:

Steel industries release:

- Carbon monoxide
- Carbon dioxide
- Sulphur dioxide
- Phenol
- Fluorine
- Cyanide
- Particulate matter

EFFECTS OF AIR POLLUTION**Global Warming:**

Global warming is one of the consequences of air pollution.

Smog Formation:

When pollutants like hydrocarbons and nitrogen oxides combine in the presence of sunlight, smog is formed. This is a mixture of gases. It forms a yellowish brown haze especially during winter.

Effects:

The bad effects of smog are:

- It hampers visibility during winter.
- It causes many respiratory disorders.
- It causes allergies as it contains polluting gases.

Acid Rains:

The air pollutants like sulphur dioxide and nitrogen oxides react with water in the atmosphere producing acid rains.

Ozone depletion:

The upper layer (stratosphere) of the atmosphere has ozone (O_3) which absorbs ultraviolet (UV) rays present in the sun's radiation. However, the air pollutants like chlorofluorocarbons (CFCs) destroy the ozone molecules and so break the ozone layer. Ozone holes are created which permit UV rays to reach the Earth's surface. The UV rays increase the temperature and also cause skin cancers.

CONTROL OF AIR POLLUTION

For effective control of air pollution, it is important to create public awareness about the ill-effects of air pollution. Air pollution can be controlled by the following ways:

Afforestation:

The establishment of new forests by planting on non-forest areas is called afforestation. Forests are effective means to control air pollution because plants can filter and absorb air pollutants.

Modification of Industrial Effluents:

The air pollutants coming from industries should be passed through filters and other devices, so that the particulate matter is removed before the waste gases are released out. The smoke producing units should have long chimneys to take the polluting gases far above and then disperse over a larger area.

Industries should also invest for solar cookers or for producing bio gas.

Environment Friendly Fuels:

Lead-free fuels should be used in automobiles. Similarly, sulphur-free fuel should be used in coal-based industry to reduce pollution by sulphur dioxide. •

Q. No. 18 Write a note on water pollution.

WATER POLLUTION

Definition:

The change in the composition of water by the addition of harmful substances is called water pollution.

SOURCES OF WATER POLLUTION

Following are the important sources of water pollution:

Sewage:

Sewage is one of the major pollutants of water. It contains organic matter and the excreta of human and other animals. Organic matter encourages the growth of micro-organisms which spread diseases.

Industrial Wastes:

The wastes of industries (acids, alkalis, dyes and other chemicals) are disposed in nearby water bodies. These wastes change the pH of water and are harmful or even fatal to aquatic organisms.

Hot Water:

Certain industries release a lot of hot water from their cooling plants. It results in heating up of water bodies and kills aquatic life.

Fertilizers and Pesticides:

Fertilizers and pesticides enter into water bodies with the rain water flow and the ground water by seepage. These chemicals remain in water for a long time and can enter food chains. They cause a number of diseases in animals.

Oil Leakage:

Oil tankers and offshore petroleum refineries cause oil leakage into water. Oil floats on the water surface and prevents atmospheric oxygen from mixing in water. So, aquatic animals begin to die due to oxygen shortage.

Heavy Metals:

Some heavy metals e.g. lead, mercury, arsenic and cadmium also make the water polluted. Such metals can be present in the water, released from industrial and urban areas.

EFFECTS OF WATER POLLUTION

Water pollution severely affects the health of people.

The following are major effects of water pollution.

Eutrophication:

The enrichment of water with inorganic nutrients like nitrates and phosphates is called eutrophication.

Algal Blooms:

The sewage and fertilizers contain large amount of inorganic material (nutrients). When sewage and fertilizers reach water bodies, the nutrients present in them promote algal blooms (excessive growth) there. Rich algal growth leads to increase in the number of the decomposers. Decomposers use the oxygen present in water and it results in the depletion of oxygen. Algal bloom also reduces the light reaching the lower layers in water.

Food Chain Contamination:

The non-biodegradable water pollutants may stay in water for long times. From water, they enter into small organisms, which are fed upon by fish. The fish in turn are fed upon by land animals including human.

Epidemics:

Organic pollutants in water facilitate the growth of germs. Such polluted water causes epidemics like cholera, gastroenteritis etc.

Effect of Heavy Metals:

If water with such heavy metals is given to plants, the metals enter the vegetables that grow on these plants. Such contaminated vegetables are harmful for human health. Following are the adverse effects of heavy metals:

- Reduce growth and development
- Cause cancer
- Damage to nervous system

Effect of Mercury and Lead:

Mercury and lead can cause:

- Joint diseases such as rheumatoid arthritis
- Diseases of kidneys
- Diseases of circulatory system and nervous system

CONTROL OF WATER POLLUTION

Public Awareness:

Public should be made aware of the dangers of water pollution.

Sewage Treatment:

Before releasing the sewage into water bodies, it must be purified through sewage treatment techniques.

Industrial Waste Treatment:

Industrial wastes should also be treated before they are released into water bodies.

Q. No. 19 Write a note on land pollution.

LAND POLLUTION

Definition:

The change in the composition of soil by the addition of harmful substances is called land pollution.

Importance of Land:

Land (soil) is an important resource as it is the basis for the growth of producers. In the recent times, soil has been subjected to pollution.

SOURCES OF LAND POLLUTION

Following are the main sources of land pollution:

Pesticides:

The pesticides used in agriculture have chemicals that stay in soil for long times.

Acid Rains:

The acid rains change the pH of soil making it unsuitable for cultivation.

Garbage:

The household and other city garbage lies scattered in soil in the absence of a proper disposal system.

Polythene Materials:

Materials like polythene block the passage of water into soil and so decrease the water-holding capacity of soil.

Industrial Wastes:

Many industries produce harmful chemicals which are disposed of without being treated.

Nuclear Wastes:

Improper disposal of nuclear wastes also causes radioactive substances to remain in soil for a long time.

Improper Sewerage System:

Open latrines in villages and some parts of cities are also the source of land pollution.

CONTROL OF LAND POLLUTION**Disposal of Wastes:**

There should be suitable and safe disposal of wastes including nuclear wastes.

Recycling:

Non-biodegradable materials like plastic, glass, metals etc. should be recovered and recycled.

Less use of Inorganic Pesticides:

Inorganic pesticides should be replaced by organic pesticides.

Q. No. 20 Write a short note on Kasur tanneries.

KASUR TANNERIES**Tannery:**

The industry where raw skin is treated to make leather is called tannery.

Number:

There are more than 200 tanneries operating in Kasur city.

Quantity of Waste:

The industry discharges 9000 cubic metres of waste water daily into the nearby water bodies. This water contains heavy metals and becomes a part of the underground water.

Adverse Effects:

In 2003, a survey showed that two-thirds of residents and 72 percent of tannery workers suffered from:

- Cancer
- Infections of the kidney
- Loss of eye sight

Cause:

Tests showed that the drinking water was contaminated with:

- Lead
- Mercury
- *Chromium*

Step Taken:

The Pakistan government and the United Nations Development Programme (UNDP) launched the Kasur Tannery Pollution Control Project. The project has established an effluent treatment plant, chromium plant and a solid waste disposal site.

Q. No. 21 Write a note on conservation of nature and explain 3R Principle.

CONSERVATION OF NATURE

Meaning:

Conservation of nature means the conservation of natural resources.

Need of Conservation:

Everything that we use or consume e.g. food, petrol etc. is obtained from natural resources. The renewable natural resources e.g. air are reproduced easily but the 'non-renewable resources (e.g. minerals and fossil fuels) are not replenished once they get depleted. We have to conserve the non-renewable resources because their reserves are limited' and humans are heavily dependent on them for daily needs. The renewable resources too have to be judiciously used.

3R PRINCIPLE

To ensure sustainable use of resources in our environment, we should act upon the principle of the 3R' i.e. Reduce, Reuse, and Recycle.'

The R1: Reduce:

- We should use the natural resources less and should not waste them.
- We should use this principle at different places, in our daily lives.
- We should not waste water, electricity, fuel etc.
- We should turn off the tap when not in use.
- We should bathe with a bucket instead of shower.
- The lights and fans should be off, when we are not in room.
- We should take public transport (like buses) or walk short distances instead of using motor fuel.
- We should not waste food and should give unused food to poor people.

The R2: Reuse:

We should use things again and again. We should not throw away materials such as glass containers, plastic bags, paper, cloth etc. These should be reused at domestic levels rather than being thrown. It also reduces solid waste pollution.

The R3: Recycle:

Materials such as paper, plastic, glass etc. can be recycled. This decreases the volume of refuse and helps in the conservation of natural resources. A recycling of one tonne of paper can save 17 trees.

Addition of R4: Reforest:

We can add the R4 i.e. Reforest. Trees should be planted during the rains. Trees make our environment more cool, shady and green.

Q. No. 22 Describe the plans for the conservation of nature.

PLANS FOR THE CONSERVATION OF NATURE

The following are the projects and plans of our government for the conservation of resources.

National Conservation Strategy:

In 1992, Pakistan developed the National Conservation Strategy. The main objectives of the strategy are conservation of natural resources and improved efficiency in the use of resources. It also covers the policies for promoting efficiency and conservation of energy resources.

National Drinking Water and Sanitation Policy:

The Federal Ministry of Environment has launched the National Drinking Water and Sanitation Policy. It focuses on the provision of clean drinking water to entire population and the conservation of water resources. Water purification plants are being installed all over the country.

Mass Awareness for Water Conservation and Management:

In 2006, the UNDP launched the project "Mass Awareness for Water Conservation and Management". The objective of the project was to launch a comprehensive awareness campaign for the conservation and management of water resources in Pakistan.

Role of SCOPE:

The organization SCOPE (Society for Conservation and Protection of Environment) works with government for mass awareness and research for the conservation of natural resources in Pakistan.

Role of World Wide Fund for Nature:

The WWF (old name is World Wildlife Fund but now it is called World Wide Fund for Nature) is working on many projects related to the conservation of nature.

The following are some important programmes of WWF-Pakistan in collaboration with the government of Pakistan:

- Improving sub-watershed management and environmental awareness around Ayubia National Park
- Plantation of the trees of Jatropha and Mangroves at District Thatta, Sindh
- District-wise forest cover assessment of Pakistan
- Saving Wetlands Sky High Programme (for the conservation and management high altitude wetlands)
- Indus Basin Water Security Project (to protect the water-flow needed for the maintenance of river ecosystem and for the benefit of nearby areas)
- Regional Climate Risk Reduction in Himalayas

Q No. 23 Write a note on Dengue Fever.

DENGUE FEVER

Causative Organism:

Dengue fever is a viral infection transmitted through a mosquito *Aedes aegypti*.

Major Health Problem:

It has become a major health problem in tropical and sub-tropical countries, including Pakistan.

Viral Attack and Immunity:

There are four types of dengue virus. Recovery from infection by one provides lifelong immunity against that virus but provides no protection against infection by the other three viruses.

Incidence:

According to the World Health Organization, there are 50 million dengue infections worldwide every year. Now, there are 2.5 billion people at risk from dengue.

Spread of Disease:

The female *Aedes* mosquito gets the virus when it bites an infected person. When an infected mosquito bites another person, viruses enter his/her blood and attack white blood cells. Inside WBCs, viruses reproduce and destroy them.

Symptoms:

In severe cases, the virus affects liver and bone marrow. As a result there is a decrease in the production of blood platelets and patient suffers from bleeding.

Other symptoms of dengue include:

- High fever
- Severe headache
- Pain behind the eyes
- Muscle and joint pains
- Rash

Complications:

Sometimes, dengue fever converts into:

Dengue Haemorrhagic Fever (DHF):

DHF results in:

- Bleeding
- Low levels of blood platelets
- Blood plasma leakage

Dengue Shock Syndrome (DSS):

In DSS the blood pressure falls dangerously low.

Prevention:

There is no vaccine for dengue fever.

Treatment:

There is no treatment of dengue fever.

Control:

At present, the only method of controlling dengue virus transmission is to check the spread of *Aedes* mosquitoes.

Breeding of *Aedes aegypti*:

Aedes aegypti breeds primarily in the:

- Containers used for water storage
- Discarded plastic containers
- Used automobile tyres
- Items that collect rain water

Control over Mosquitoes:

The mosquitoes can be controlled through:

- Proper solid waste disposal
- Improved water storage practices

Use of Predators:

Small fish and crustaceans have also been used for killing the larvae of the mosquito.

Use of Insecticides:

Insecticide sprays have not proved efficient in killing the mosquitoes, because spray does not penetrate all habitats of adult mosquitoes.

REVIEW QUESTION:**MULTIPLE CHOICE QUESTIONS**

- Which of the following is the abiotic component of the ecosystem?
 - Producers
 - Herbivores
 - Carnivores
 - Oxygen
- When we eat onions, our trophic level is;
 - Primary consumer
 - Secondary consumer
 - Decomposer
 - Producer
- Identify the correctly matched pair:
 - Rainfall - biotic factors in ecosystem
 - Global warming - formation of fossil fuels
 - Renewable natural resource - air
 - Corn - secondary consumer
- In the food chain tree → caterpillar → robin → hawk → coyote, which is the secondary consumer?
 - Caterpillar
 - Robin
 - Hawk
 - Coyote
- In ecosystems, the flow of ----- is one way, while ----- is/are constantly recycled.
 - Minerals, energy
 - Energy, minerals
 - Oxygen, energy
 - Glucose, water
- In the food chain "grass → rabbit → fox → bear → mushroom", how many types of decomposers are present?
 - 1
 - 2
 - 3
 - 4
- Organisms in the ecosystem that are responsible for the recycling of plant and animal wastes are:
 - Producers
 - Consumers
 - Decomposers
 - Competitors
- Which form of Nitrogen is taken by the producers of the ecosystem?
 - Nitrogen gas
 - Ammonia
 - Nitrites
 - Nitrates

ANSWER KEY

Q.No.	Ans	Q.No.	Ans	Q.No.	Ans	Q.No.	Ans
1	d	2	a	3	c	4	b
5	b	6	a	7	c	8	d

SHORT QUESTIONS

1. What are the different levels of ecological organization?
Consult Long Question No. 1
2. Define ecosystem and its components.
Consult Long Question No. 2
3. How the flow of energy is different from that of materials?
Consult Long Question No. 3
4. Define food chain and food web.
Consult Long Question No. 4
5. What do you mean by the concept of 3Rs with reference to the conservation of natural resources?
Consult Long Question No. 21

UNDERSTANDING THE CONCEPT

1. Explain what do you mean by the pyramids of number and biomass?
Consult Long Question No. 5
2. Write a note on Carbon cycle.
Consult Long Question No. 6
3. What are the different stages of Nitrogen cycle?
Consult Long Question No. 7
4. Write notes on competition, predation and symbiosis.
Consult Long Question No. 8, 9 and 10
5. Explain how human activities have contributed to the loss of balance in nature.
Consult Long Question No. 14 to 19
6. Write note on the causes and effects of the air and water pollutions.
Consult Long Question No. 17 and 18

THE TERMS TO KNOW

Abiotic:

The non-living components of the environment like water, sunlight, soil, heat etc.

Acid Rain:

The rain containing sulphuric acid and nitric acid; with pH range of 3 to 6

Ammonification:

The decomposition of protein of dead plants and animals, and nitrogenous wastes to ammonia by ammonifying bacteria.

Atmospheric nitrogen fixation:

The conversion of atmospheric gaseous nitrogen to nitrates by thunderstorms and lightning.

Biogeochemical Cycle:

The cyclic pathway through which chemical elements move from environment to organisms and back to the environment.

Biosphere:

The last level of ecological organization; all the ecosystems of the world together form the biosphere.

Biotic:

The living components of the environment; include producers, consumers and decomposers.

Carbon Cycle:

The biogeochemical cycle in which carbon flows between organisms and the environment.

Carnivore:

The consumers which eat only animal flesh

Commensalism:

A type of symbiosis in which one of the partners gets benefit while the other is neither benefited nor harmed.

Consumer:

The part of the biotic components of the ecosystem that consists of animals.

Decomposer:

An organism which decomposes the dead bodies and dead matter.

Deforestation:

Clearing of forests by natural causes or by humans.

Denitrification:

The conversion of nitrites and nitrates into nitrogen gas.

Ecological pyramid:

A representation of the number of individuals or amount of biomass or energy present in various trophic levels of a food chain.

Environment:

The sum total of physical (abiotic) and biotic conditions which influence the organism.

Eutrophication:

The enrichment of water with inorganic nutrients; the nutrients promote the growth of algae and it leads to increase in the number of the decomposers and depletion of oxygen.

Food chain:

The series of organisms in an ecosystem, in which an organism eats the preceding one and is eaten by the next one.

Food Web:

A network of interconnected food chains; has a number of feeding connections amongst different organisms of a community.

Global Warming:

Increase in the temperature of the Earth; due to the addition of greenhouse gases in atmosphere, which do not allow solar radiations to reflect back into the space.

Interspecific interaction:

Interactions between the members of the different species.

Intraspecific interactions:

Interactions between the members of the same species.

Mutualism:

The symbiotic association in which both the partners get benefits and neither is harmed.

Natural resources:

The resources on Earth, which provide everything the humans use or consume

Nitrification:

The oxidation of ammonia to nitrites and nitrates by the nitrifying bacteria.

Nitrogen Cycle:

The flow of nitrogen between environment and the organisms.

Nitrogen fixation:

Conversion of nitrogen into nitrates.

Non-renewable resource:

A resource that is formed over very long periods; the rate of formation is extremely slow so cannot be replaced; e.g. minerals and fossil fuels.

Overpopulation:

Increase in population beyond the carrying capacity of an area or environment.

Ozone:

The O₃ gas; also present in the upper layer of the atmosphere where it absorbs the ultraviolet rays present in the sun's radiation.

Parasitism:

A type of interspecific interaction in which smaller partner (parasite) derives food and shelter from the body of larger partner (host) and harms the host.

Phytoplankton:

Photosynthetic organisms that float on the surface of water.

Pollutant:

The substance that causes pollution.

Pollution:

Undesirable change in the physical, chemical or biological characteristics of air, water and land that may harmfully affect living organisms and other resources.

Predation:

An interaction between animals of two species or a plant and an animal, in which the predator attacks, kills and feeds on the smaller animal called prey.

Producer:

An organism that produces organic compounds from inorganic compound; an autotroph

Pyramid of biomass:

The graphic representation of biomass present per unit area at different trophic levels in an ecosystem.

Pyramid of numbers:

The graphic representation of the number of individuals per unit area at various trophic levels in an ecosystem.

Renewable resources:

The resources which are replenished or reproduced easily e.g. sunlight, air, wind etc.

Symbiosis:

Long or short term relationship between members of different species; three forms are parasitism, commensalism and mutualism.