

Full Marks: 80

Answer any five Questions including Q No.1 & 2  
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10
- a. Define acid rain.
  - b. What is ecological succession?
  - c. What do you mean by soil erosion?
  - d. Define genetics and species.
  - e. Mention any two causes of marine pollution.
  - f. Define environment.
  - g. What is mortality?
  - h. What do you mean by sustainable development?
  - i. What leads to conflicts over water?
  - j. Define water pollution.
2. Answer **Any Six** Questions 6 x 5
- a. Define and explain food chain with at least one example.
  - b. Explain the changes caused by modern agriculture.
  - c. Explain Biodiversity at National level.
  - d. Give a brief note on ozone layer depletion along with its consequences.
  - e. Discuss in brief 'Human Rights'.
  - f. Discuss the needs of public awareness towards environment.
  - g. Explain cyclone disaster management.
3. Explain the effects of mine extraction on environment and tribal people. 10
4. Explain different threats to biodiversity. 10
5. Describe forest ecosystem. 10
6. Write down the causes, effects and controlling measures of soil pollution. 10
7. a. Urban problems related to energy. 5
- b. Family welfare program. 5



3rd Sem

Th-5 Environmental Studies

1/ (a) Define acid rain.

Ans:- Acid rain :- In a broad sense, acid rain refers to several ways in which acid from the atmosphere are deposited on the earth.

- (i) Acid deposition includes wet and dry deposition.
- (ii) Wet deposition refers to acidic water received through rain, fog and snow.
- (iii) Dry deposition relates to the wind blown acidic gases and particles in the atmosphere which settle down on the ground.
- (iv) About 60% of the acidity is due to sulphur gases and about 40% is due to nitrogen gases.
- (v) Normally rain water is slightly acidic (pH = 4.0 - 4.5) because water of  $\text{CO}_2$  combines in air to form a weak acid. The pH of acid rain may be as low as 2.0.

(b) What is ecological succession?

Ans:- Ecological succession :- The gradual and progressive growth of a species in any given area with respect to its changing surroundings is called an ecological succession.

- (i) It is an anticipated change that beholds the biotic components being an inevitable part of them in the environment.
- (ii) Ecological succession aims at reaching the equilibrium in the ecological system.



Q) What do you mean by soil erosion?

Ans:- Soil erosion :- Soil erosion is one form of soil degradation due to removal of vegetation cover from over the land. The soil becomes highly susceptible to erosion by winds in addition it also erodes by surface runoff and by rain fall.

ii) This makes the soil infertile, since the top fertile soil layer containing nutrients is washed away.

Q) Define genetics and species.

Ans:- Genetics :- Genetics is the scientific study of genes and heredity or how certain qualities or traits are passed from parents to offspring as a result of changes in DNA.

Species :- A species is often defined as a group of organisms that can be reproduce naturally with one another and create fertile offspring.

Q) Mention any two causes of marine pollution.

Ans:- Marine pollution :- Marine pollution can be defined as the introduction of substances to the marine environment directly or indirectly by humans resulting in adverse effects such as hazards to human health, obstruction of marine activities and lowering of the quality of a sea water.

ii) While the causes of marine pollution may be similar to those of general water pollution, there are some specific causes that pollute marine water.

\* Two causes of marine water pollution are :-



\* The most obvious impact of waste is through pipes directly discharging waste into the sea. Very often, municipal waste and sewage from residences and hotels in coastal towns are directly discharged into the sea.

\* Pesticides and fertilisers from agriculture which are washed off the land by rain, enter water courses and eventually reach the sea.

⑤ Define environment.

Ans:- Environment:- Environment is derived from the French word 'Environer' which means to encircle or surround.

⑥ All the biological and non-biological things surrounding an organism are thus included in environment.

⑦ According to Environment Protection Act, 1986 Environment is sum of total, water, air and land, inter relationship among themselves and also with the human beings, other living organism and property.

⑧ Thus we can say Environment means our "Surrounding".

⑨ What is mortality?

Ans:- Mortality:- It is the number of deaths in one period of time or in one place.

⑩ Mortality rate or death rate is measure of the number of deaths in a particular population scaled to the size of that population per unit of time.

⑪ Mortality rate is typically expressed in units of deaths per 1000 individual per year.



- (iv) Thus ~~the~~ a mortality rate of 9.5 (out of 1000) in a population of 1000 would mean 9.5 deaths per year in that entire population, or 0.95% out of the total.
- (v) It is distinct from morbidity, which is either the prevalence or incidence of a disease.
- (vi) Factors affecting mortality are age, sex, disease heredity, nutritional level, health facility and services and health education etc.

(h) What do you mean by <sup>sustainable</sup> ~~sustainable~~ development?

Ans! - Sustainable development: - It is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspiration.

- (i) To build a sustainable world - world which should last for ever.
- (ii) There should be a fair sharing of global resources among the living beings of the world.

(g) What leads to conflicts over water?

Ans! - Water conflicts over because the demand for water resources and potable water can exceed supply or because control over access and allocation of water may be disputed or because water management institutions are weak or missing.



Q) Define water pollution.

Ans:- Water pollution :- Water pollution is defined as the alterations in the physical, chemical or biological characteristics of water due to the presence of solid, liquid, or gaseous substances in as much quantity as to make it harmful to public health or to the health of other biotic life, including animals, plants, or aquatic organisms.

Q) Such a polluted or contaminated water becomes unsuitable for domestic, commercial, industrial, agricultural or other legitimate uses.

Q) Define and explain food chain with at least one example.

Ans:- The most obvious aspect of nature is that energy must pass from one living organism to another. When herbivorous animals feed on plants, energy is transferred from the plant to the animals. In an ecosystem, some of the animals feed on other living organisms, while some feed on dead organic matter; the latter from the detritus of the food chain. At each link in the chain a large part of the energy from the food is lost through daily activities. Each chain usually has only four to five such links. However, a single species may be linked to a large number of species.

Ex:- Plant  $\rightarrow$  Herbivore  $\rightarrow$  Carnivore.



(b) Explain the changes caused by modern agriculture.

Ans: - During the Green revolution the agriculture sector was characterised by a phenomenal increase of productivity. It makes use of hybrid seeds or selected and single crop variety, high-tech equipments and lots of energy subsidies in the form of fertilizers pesticides and irrigation. However, it also gave rise to several problems or shoots as mention below: -

- (i) Impacts related to High yielding varieties. Since HYV were more prone to pests and diseases, use of pesticides increased and this brought about widespread occurrence of pesticides residue in nearly every agricultural commodity resistance in vectors.
- (ii) Fertilizer related problems: - Use of more chemical fertilizer degrades the soil fertility kills the micro-organisms in soil, water pollution etc.
- (iii) Biological magnification: - Many of the pesticides are non-biodegradable and keep on accumulating in the food chain a process called biological magnification.
- (iv) Water logging: - It occurs when the water table rises and eventually approaches the soil surface rendering the root zone unsuitable for crop growth. Excessive wetting and water-logging are generally accompanied by oxygen deficiency, because most of the pores are filled with water and the soil-air gets depleted.



(V) Salinity problem :- This term is commonly used to refer to the soluble salt content of the soil. When soil salinity increases to harmful levels, plants are generally accompanied by subject to reduce osmotic potential of the soil solution and to toxicity of specific ions such as sodium and chlorine.

(VI) Eutrophication :- Enrichment of water bodies by input of organic materials containing nitrates and phosphates due to use of chemical fertilizers. It leads to increase the growth of aquatic plants and often to algal blooms which have resulted in killing of fishes.

(VII) Imbalance in micro-nutrient in soil.

(VIII) Use of pesticides cause the death of non-target organisms.

(IX) creating resistance in pests and producing new pests which have become immune to all types of pesticides.

(X) Causes of various incurable diseases like cancer in human and animals etc.

© Explain Biodiversity at National level.

Ans :- Biodiversity at National level :-

There are at present 1.8 million known species that have been documented by scientists in the world. However they have estimated that the number of species of plants and animals on earth could vary from 1.5 to 20 billion. This means that the majority of species are yet to be discovered.

Most of the world's bio-rich nations are in the south. In other words they are the



developing nation. In contrast, the majority of the countries capable of exploiting biodiversity are the northern nations in the economically developed world.

However, if biodiversity should a common property resource to be shared by all nations there is no reason to exclude oil or uranium or even intellectual and technological expertise as global assets. India's sovereignty over its biological diversity cannot be compromised without a revolutionary change in world thinking about sharing of all types of natural resources.

While few of the other mega-diversity nations have developed the technology to exploit their species for biotechnology and genetic engineering India is capable of doing so.

Throughout the world, the value of biologically rich natural areas is now being increasingly appreciated as being of unimaginable value. International agreements, like the world Heritage Convention attempt to protect ~~area~~ and support such areas. India is a signatory to the convention and has included several protected areas as world heritage sites.

These include Nagas on the border between Bhutan and India, Kaziranga in Assam, Bharatpur in UP, Mandadevi in the Himalayas and the Sunderbans in the Ganges delta in West Bengal. These are the <sup>bio</sup>diversity at national level.



Q Give a brief note on ozone layer depletion along with its consequences.

Ans:- Ozone layer depletion :-

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

In the 1970s scientists discovered that chemicals called chlorofluorocarbons or CFCs, which are used as refrigerants and aerosol spray propellants pose a threat to the ozone layer. The CFC molecules are virtually indestructible until they reach the atmosphere, where UV radiation breaks them down to release chlorine atoms. These chlorine atoms react with ozone molecules to break them into down into oxygen molecules. These oxygen molecules do not absorb UV radiation.



Since the early 1980s scientists have detected a thinning of the ozone layer in the atmosphere above Antarctica.

This phenomenon is now being detected in other places as well including Australia.

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

Although the use of CFCs has been reduced and is now banned in most countries other chemicals and industrial compounds such as bromine halocarbons and nitrous oxides from fertilisers continue to attack the ozone layer.

© Discuss in brief 'Human Rights'.

Ans:- Human Right:- Several environmental issues are closely linked to human rights. These include the equitable distribution of environmental resources, the utilisation of resources and Intellectual Property Rights (IPRs) conflicts between people and wildlife especially around PAs resettlement issue, around development projects such as dam and mines and access to health to prevent environment related diseases.



⑤. Discuss the needs of public awareness towards environment.

Ans:- Need of public awareness towards environment :- As the earth's natural resources are rapidly dwindling and our environment is being increasingly degraded by human activities it is evident that something need to be done. We often feel that managing all this something that the Government should do. But if we continue to endanger our environment, there is no way by which the Government can perform all these clean-up functions. It is the prevention of environmental degradation that must become a part of all our lives. Just as for any disease, prevention is better than cure, protecting our environment is economically more viable than cleaning it up once it is damaged. Individually we can play a major role in environment management. We can reduce wastage of natural resources and we can act as watch dogs that inform the Government about sources that lead to pollution and degradation of the environment.

This can only be made possible through public awareness. Mass media such as newspapers, radio and television strongly influence public opinion. However someone has to bring this about. If each of us feels strongly about the environment, the press and media will add to our efforts. Politicians in a democracy always respond positively to a strong publicity - supported movement. Thus, if we join an NGO that supports conservation, we might be able to influence politicians to make green policies. We are living on 'spaceship earth' with a



limited supply of resources. Each of us is responsible for spreading this message to as many people as possible. There are several Government and Non-Government organisations (NGOs) working towards environmental protection in our country. They have created a growing interest in environmental protection and conservation of natural and natural resources.

(9) Explain cyclone disaster management.

Ans:- Cyclone disaster management:-

The Indian Subcontinent is very vulnerable to droughts, floods, cyclones, earthquakes, landslides, avalanches and forest fires.

Among the 36 states and union territories in the country 22 are prone to disasters.

Among all the disasters floods are the most frequently occurring natural disasters due to the irregularities of the Indian monsoon.

India has a long coastline of 5700 km, which is exposed to tropical cyclones arising from the Bay of Bengal and the Arabian Sea.

The Indian Ocean is one of the six major cyclone prone regions of the world. In India cyclone occurs usually between April and May and also between October and December.

The eastern coastline is more prone to cyclones as it is hit by about 80% of the total cyclones generated in the region.



Q) Explain different threats to biodiversity.

Ans: - Bio-diversity is the congregation of populations of plants animal and micro-organisms in an ecosystem and also known as biological community. There are a number of issues threatening our planet's biodiversity. The major threat to biodiversity is human intervention in the natural ecosystems. Several factors in multiple cause and effect model affect the biodiversity. Few of them are discussed below:

(i) Climate change :-

change in climate throughout our planet's history have of course altered life on earth in the long-run. ecosystems have come and gone and species routinely go extinct.

(ii) For example rising ocean temperatures and diminishing Arctic sea ice affects marine biodiversity and can shift vegetation zones having global implications.

(iii) Habitat Destruction and Fragmentation :-

(i) These are considered as prime reasons to the biodiversity loss. An estimated 18 million acres of forest are lost each year, due to drainage or filling of wet lands overgrazing expanding agriculture, urban development construction of highway, building of dam mining forest fire flood land slides etc.

(ii) Over exploitation :-

Overhaunting overfishing and over-harvesting contribute greatly to the loss of biodiversity. Killing of numerous species over the past several hundred years. Poaching and other



forms of hunting for profit, sports  
illegal trades of fur, skulls, meat  
etc. increase the risk of extinction  
of many animals and birds like  
Jaguar, cheetah, lion, elephants etc.

#### (iv) Invasive species :-

The introduction of non-native species  
into an ecosystem can threaten endemic  
wildlife affect human health and upset  
economies.

(v) Pollution :- Burning of fossil fuels used  
of plastics etc. cause air, water and soil  
pollution, leading to cause various disruptions  
in Earth's ecosystem due to ozone layer  
depletion, global warming, acid rain etc.

(ii) These affecting negatively some species by  
changing breeding and feeding habits which  
affecting potentially their extinction.

(vi) Man-wildlife conflict :- Human beings is  
continuously interacting with many ecosystems  
for his day to day affairs through several  
activities like hunting, food and fuel recreation,  
urban development, waste disposal etc. Each  
activity is responsible directly or indirectly  
to create sufficient disturbance to many wild  
life species. The craze for personal and  
societal developments lead to extinction and  
resource depletion. Other factors responsible  
for loss of biodiversity are :-

- (a) Natural calamities such as floods, cyclones  
earthquake, volcanism etc.
- (b) Over-use of natural resources.
- (c) Global warming.
- (d) Use of high yielding varieties of plant  
and animal species etc.



5) Describe forest ecosystem :

Ans:- A forest ecosystem has two parts:-

① The non-living or abiotic aspects of the forest:-  
The types of forest depends on the abiotic conditions at the site. Forests on mountains and hills differ from those along river valleys. The vegetation is specific to the amount of rainfall and local temperature, which vary according to latitude, altitude and soil types.

② The living or biotic aspects of the forest :-  
The plants and animals from communities that are specific to each forest types. For instance coniferous trees occurs in the Himalayas. mangrove trees in river deltas; thorn trees in arid areas. The snow leopard lives in the Himalayas while the leopard and tiger lives in the forests in the rest of India. Wild sheep and goats live high up in the Himalayas and many of the birds of the Himalayan forests are different from those in the rest of India. The evergreen forests of the Western Ghats and Northeast India have the richest diversity of plant and animal species.

The biotic component includes both large and microscopic plants and animals.  
Plant include the trees shrubs, climbers grasses and herbs in the forest. These include species that flower and are non-flowering such as ferns bryophytes fungi and algae. The animals include species of mammals birds reptiles amphibians fish insects and other invertebrates and variety of microscopic animals.



As the plant and animal species are closely dependent on each other together they form different types of forest communities. Humans are a part of these forest ecosystems and the local people depends directly on the forest for several natural resources that act as their life support systems. People who do not live in the forest buy forest products such as wood and paper extracted from the forest. Thus they use forest produce indirectly from the market.

The forest is a natural ecosystem but now-a-days the artificial ecosystems are produced which functions like natural forest ecosystem.



⑥ Write down the causes, effects and controlling measures of soil pollution.  
Ans:- We can no more manufacture soil with a tank of chemicals than we can invent a rain forest or produce a single bird. We may enhance the soil by helping its processes along but we can never create what we destroy. The soil is a resource for which there is no substitute. Fertilisers are not a substitute for fertile soil.

The soil is a thin covering over the land consisting of a mixture of minerals, organic material, living organisms, air and water, that together support the growth of plant life. Several factors contribute to the formation of soil from the parent material. This includes the mechanical weathering of rocks due to temperature changes and abrasion, wind moving water (glaciers) chemical weathering activities and lichen, climate and time. and also important in the development of soils. In extremely dry or cold climates soils develop very slowly, while in humid and warm climates they develop more rapidly. Under ideal climatic conditions soft parent material may develop into 1 cm of soil within 15 years. Under poor climate conditions hard parent material may require hundreds of years to develop into soil.



The uppermost layer of the soil, called the A-horizon, consists of partially decomposed organic matter and some inorganic mineral particles. It is usually darker and looser than the deeper layers. The roots of most plants are found in these two upper layers. As long as these layers are anchored by vegetation, the soil stores water and releases it in a trickle throughout the year instead of in a force like a flood. These two layers also contain a large amount of bacteria, fungi, earthworms and other small insects, which form complex food webs in the soil helps recycle soil nutrients and contribute soil fertility.

- \* Control Soil pollution:- These are some measures to controlling soil pollution:-
- ⇒ Effluent should be properly treated before discharging them on/into the soil.
  - ⇒ Solid waste should be properly collected and disposed off by appropriate method.
  - ⇒ From the waste recovery or useful products should be done.
  - ⇒ Biodegradable organic waste should be used for generation of biogas.
  - ⇒ Cattle dung should be used for methane generation.
  - ⇒ There should be optimum use of fertilizers and pesticides.
  - ⇒ By bioremediation i.e. treatment process that uses micro-organisms to break down or degrade hazardous substance into less toxic or non-toxic substances.



## Q@ Urban problems related to energy

Ans:- In the past urban housing in India required relatively smaller amounts of energy than we use at present.

Traditional housing in India required very little temperature adjustments as the materials used such as wood and bricks handled temperature changes better than the current concrete, glass and steel of ultra-modern buildings.

On the 1950s many kitchens were based on fuelwood or charcoal. This was possible and practical when homes had chimneys and kitchens were isolated from the rest of the house. Smoke became a problem once this changed to apartment blocks.

Kerosene thus became a popular urban fuel. This changed to electrical energy and increasingly to natural gas by the 1970s in most parts of urban India.

Urban centers in hot climates need energy for cooling. The early systems of fans changed into air conditioning, which consumes enormous quantities of energy, thus increasing natural resource use.

Each of us as environmentally conscious individuals must reduce our use of energy. An unnecessary light left carelessly on adds to energy use. If we learned to save electricity, would begin to have a more sustainable lifestyle.



## ⑥ Family welfare program.

Ans:- In response to an phenomenal population growth, India seriously took up an effective Family welfare programme (FWP) in 1951. This programme's objective is to reduce birth rates to the extent necessary to stabilise the population at a level which is consistent with the requirement of the national economy, slogan such as Hum do hamare do indicated that each family should not have more than two children. The best decision for the method to be used by a couple must be based on good advice from doctors or trained social workers who can suggest the full range of methods available for them to choose from.

Informing the public about the various contraceptive measures that are available, is of primary importance. This must be done actively by government agencies such as Health and Family welfare as well as education extension workers. The media must keep people informed about the need to limit family size and the ill effects of a growing population on the world's resources.

The decision to limit family size depends on a couple's background and education. This is related to government policy the effective ness of FWPs the educational level and information levels in mass communication.

The free access to family welfare information provided through the health care system is in some case unfortunately counteracted by cultural attitudes. With all these links between population growth and the environment FWPs have become critical to human existence.