DAY THIRTY SIX

Biodiversity, its Conservation and Environmental Issues

Learning & Revision for the Day

- Concept of Biodiversity
- Patterns of Biodiversity
- Loss of Biodiversity
- Biodiversity Conservation
- Red Data Book
- Important Wildlife Projects of India
- Pollution
- Deforestation
- Case studies

Concept of Biodiversity

- Biodiversity is the heterogeneity which exists at different levels of biological organisations in our biosphere.
- The term **biodiversity** was popularised by the sociobiologist **Edward Wilson.**
- The scientific estimation of total number of species made by **Robert Mayer** is about 7 million.
- More than 70% of all the species recorded are animals, while plants (algae, fungi, bryophytes, gymnosperms and angiosperms) comprise not more than 22% of the total.
- Among animals, insects are the most species-rich taxonomic group making up more than 70% of the total.
- Fungi species in the world are more than the combined total of the species of fishes, amphibians, reptiles and mammals, i.e. they represent maximum number of species among global biodiversity.
- Maximum nutritional diversity is found in the group Monera.
- India shares 8.1% of global species diversity and it makes India one of the 12 mega diversity countries of the world.
- The biological diversity includes three hierarchical levels

  (i) **Genetic diversity** is the diversity in the number and types of genes present in different species and the genetic variations in the same species.

For example,

(a) Genetic variation in medicinal plant *Rauwolfia vomitoria* growing in different Himalayan ranges occurs in terms of the potency and concentration of reserpine (active chemical).

(b) In India, rice shows maximum genetic diversity with more than 50,000 different strains.

(ii) **Species diversity** is the variety of species within a region. It indicates the species richness in any habitat. For example, the Western Ghats have a greater amphibian species diversity than the Eastern Ghats.

(iii) **Ecological diversity** is the diversity at ecosystem level. Diversity at the level of community and ecosystem has three perspectives

- **α-diversity** also called as **local diversity,** is the diversity within a community.
- **β-diversity** is the diversity between two communities.
- **γ-diversity**, also called as **regional diversity**, represents the total richness of species in all the habitats found within a geographical region or landscape.

Patterns of Biodiversity

Species diversity decreases as we move away from the equator towards the poles.

The main reasons for more diversity in tropics than temperate regions are

(i) Unlike temperate regions subjected to frequent glaciation for much time period in the past, tropics remained relatively undisturbed for millions of years and favours species diversification.

(ii) Tropical environments are less seasonal, relatively more constant and predictable, which promote niche specialisation and lead to a greater species diversity.

(iii) There is more solar energy available in the tropics, which contributes to higher productivity and inturn greater diversity.

Therefore, according to non-uniform diversity on the earth, the biodiversity is divided into following patterns as

(i) **In latitudinal gradients**, tropics (latitudinal range of 23.5°N to 23.5°S) harbour more species than temperate or polar areas.

- India with much of its land area in the tropical latitudes, has more than 1200 species of birds.
- The **tropical Amazonian** rainforest in South America has the greatest biodiversity on earth.

(ii) **Species-area relationship** was first described by **Alexander von Humboldt**. He observed that within a region, species richness increase with increasing explored areas, but only upto a limit.

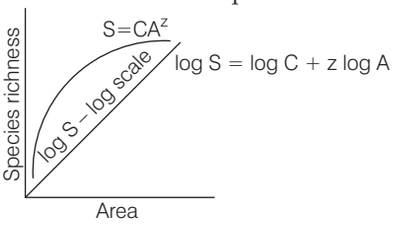
- On a logarithmic scale, the relationship is a straight line described by the equation

$$\log S = \log C + Z \log A$$

Where, S = Species richness, A = Area

Z = Slope of the line (regression coefficient)

C = Y-intercept



Loss of Biodiversity

IUCN (International Union for Conservation of Nature and Natural Resources), Red List (2004) documented the extinction of 784 species (338 vertebrates, 359 invertebrates and 87 plants) in the last 500 years.

The major causes of biodiversity loss (The Evil Quartet) are

(i) **Habitat loss and fragmentation** It results due to over population, urbanisation, industrialisation, etc., e.g. 90% of wetlands of New Zealand have been destroyed by European settlers.

(ii) **Overexploitation** Excessive exploitation of a species reduces its population size, so that it becomes vulnerable to extinction, e.g. Dodo, passenger pigeon, three subspecies of Tiger (Bali, Javan and Caspian) and Stellar's sea cow have become extinct due to overexploitation by humans.

(iii) **Alien species invasion** Non-native or alien species often become invasive and drive away the local population.

For example,

- *Eichhornia crassipes* killed several aquatic plants and animals.
- Nile perch killed small cichlid fishes in lake Victoria of South Africa.
- *Eupatorium hysterophorus* has reduced the population of *Tectona grandis* in North-East.
- *Parthenium hysterophorus* has pushed several herbs and shrubs from the plains.
- African catfish, *Clarias gariepinus* has threatened native catfishes, *Clarias bacterachus* in Indian rivers.

(iv) **Coextinction** Extinction of one species causes extinction of the other due to obligatory mutualistic relation between them, e.g. *Pronuba yuccaselles* and *Yucca*.

Biodiversity Conservation

Conservation means protection, upliftment and scientific management of biodiversity, so as to maintain it at its optimum level and derive sustainable benefits for the present as well as future generations

The following are the three major reasons to conserve biodiversity

1. **Narrowly utilitarian** The useful human products like food, fibres, drugs and medicines are obtained from biodiversity.
2. **Broadly utilitarian** Biodiversity provides ecosystem services like providing oxygen, pollinating crops and controlling floods, erosions, etc.
3. **Ethical utilitarian** Every living species has an intrinsic value, through it may not have direct economic value and also every species has right to live.

- The Convention of Biodiversity (CBD) came into force on 29th December, 1993. It has three objectives conservation, sustainable use and equitable sharing of benefits of biodiversity.
- **Biodiversity Act** of India was passed by the Parliament in 2002.
- Insularization is the reduction of species diversity in small patches.
- **World Wildlife Fund** (WWF) was established in 1961 at Switzerland and giant panda (*Ailuropoda melanoleuca*) was selected as its symbol. It aims at protection and preservation of wild plants and animals.
- World Wildlife week is celebrated in first week of October.

There are two major methods of biodiversity conservation, as discussed below

In Situ Conservation

It is the conservation of living resources through their maintenance within the natural ecosystem in which they occur. These include hotspots and Protected Area Network (PAN). PAN includes sacred lands, biosphere reserves, national parks and wildlife sanctuaries.

(i) **Hotspots** The concept of hotspot was given by Norman Myers in 1988. Hotspots are the areas that are extremely rich in species diversity, have high endemism, lesser interspecific competition and are under constant threat.

- Among the 34 hotspots (cover less than 2% of earth land area) of the world, two are found in India extending into neighbouring countries. These two are the **Western Ghats/Sri Lanka** and the **Indo-Burma Region** (covering the Eastern Himalayas also known as cradle of speciation).

The two hotspots in India are as follows

- **Eastern himalayas** It extends to the North-Eastern India and Bhutan. The temperate forests are found at altitudes of 1780-3500 metres.

  Many deep and semi-isolated valleys found in this region are exceptionally rich in endemic plant species. Besides being an active centre of evolution and rich diversity of flowering plants, the numerous primitive angiosperm families, e.g. Magnoliaceae and Winteraceae and primitive genera of plants, like *Magnolia* and *Betula* are found in Eastern Himalayas.
- **Western Ghats** This region lies parallel to the Western coast of Indian Peninsula for almost 1600 km in Maharashtra, Karnataka, Tamil Nadu and Kerala. These regions are rich in amphibians. The forests at low elevation (500 m above mean sea level) are mostly evergreen, while those found at 500-1500 m height are generally semi-evergreen forests.

(ii) **Biosphere reserves** were introduced under MAB (Man And Biosphere) programme of UNESCO. Biosphere reserve programme was started in India in 1986. Total biosphere reserves in India are 14.

- The first biosphere reserve established in 1986 was Nilgiri Biosphere Reserve.
- A biosphere reserve is made of core, buffer and manipulation zone.
- In the core zone, no human activity is allowed and hence, the area remains undisturbed and legally protected.
- In the buffer zone, limited human activities are involved for resource use strategies, research and education.
- In the manipulation zone, active cooperation is present between reserve management and local people for cropping, settlements, etc.

Some Biosphere Reserves in India

Site	Location (State)	Year	Area in km^2
Nilgiri	Karnataka, Kerala and Tamil Nadu	1986	5520
Nanda Devi	Uttarakhand	1988	5860
Norek	Meghalaya	1988	820
Manas	Assom	1989	2837
Sunderbans	West Bengal	1989	9630

(iii) **National parks** are an area strictly reserved for the protection and welfare of wildlife.

- In India, there are 96 national parks (April 2007) covering an area of 1.16% of India's total surface area.
- The first national park in the world, the **Yellowstone National Park,** was founded in 1872 in USA.
- In 1935, the first national park of India was established in the foothills of the Himalayas (Hailey National Park) presently known as **Corbett National Park.**
- A total of 166 National Parks have **been authorised**.

Some National Parks in India

Name	State	Famous for
Bandipur National Park	Karnataka	Elephant and tiger
Corbett National Park	Uttarakhand	Tiger
Dachigam National Park	Jammu and Kashmir	Hangul (Kashmir stag)
Gir National Park	Gujarat	Asiatic lion
Kanha National Park	Madhya Pradesh	Tiger
Kaziranga National Park	Assom	One-horned rhinoceros
Kanchenjunga National Park	Sikkim	Tiger and elephants
Madhav National Park	Madhya Pradesh	Chital, deer
Mahavir Harina Vanasthali National Park	Rajasthan	Deer
Manas National Park	Assom	Wild water buffalo
Keibul Lamjao National Park	Manipur	Brow antlered deer
Periyar National Park	Kerala	Elephant
Rajaji National Park	Uttarakhand	Elephant
Sariska National Park	Rajasthan	Tiger
Silent Valley National Park	Kerala	Lion tailed macaque
Sundarbans National Park	West Bengal	Royal Bengal tiger
Tadoba National Park	Maharashtra	Tiger

(iv) **Sanctuaries** are notified for the protection of wild animal and fauna. In India, there are over 500 sanctuaries in different states.

Among these, the 28 tiger reserves are governed by Project Tiger, one of special significance in the conservation of the tiger. Some wildlife sanctuaries are specifically named bird sanctuary.

Some Important Sanctuaries of India

Name and Location	Area (in sq km)	Key Vertebrate Species being Protected
Chilka Lake (Odisha)	990	Flamingoes, sandpipers, ducks, water fowls, cranes, golden plovers and ospreys.
Keoladeo Ghana Bird Sanctuary (Rajasthan)	29	Siberian crane, spoon bill, herons, egrets and variety of other local birds. Blue bull, wild boar, black buck and spotted deer.
Mudumalai Wildlife Sanctuary, Nilgiri (Tamil Nadu)	520	Flying squirrel, porcupine, elephant, sambhar, cheetal, barking deer, mouse, deer, four-horned antelope, giant squirrel flying lizard and monitor lizard.
Manas Wildlife Sanctuary, Kamrup (Assom)	—	Tiger, wild boar, sambhar, golden langoor, one-horned rhino, panther, swamp deer, wild dog and wild buffalo.
Periyar Sanctuary (Kerala)	777	Elephants, leopard, black langoor, sambhar, gaur, bison, Egret and horn bills.
Sultanpur Lake Bird Sanctuary (Uttar Pradesh)	12	Cranes, duck, green pigeon, drake and spot bill, *Python* and crocodile.

(v) **Sacred forests** are undisturbed forests without any human intervention and highly surrounded by degraded lanseales. These forests contain number of rare, endangered and endemic species. Such sacred groves are found in

- Khasi and Jaintia Hills in Meghalaya
- Aravali Hills of Rajasthan
- Western Ghat regions of Karnataka and Maharashtra
- Sarguja, Chanda and Bastar areas of Madhya Pradesh

Ex Situ Conservation
(Off-site Conservation)

It means conservation outside the habitats by perpetuating sample population in genetic resource centres.

- **Botanical garden** is a collection of living plants maintained for both pure and applied studies.
- **Wildlife safari parks** are used for *ex situ* conservation of threatened animals and plants.
- In **seed banks**, germplasm is stored as seeds of various accessions. Under suitable conditions, seeds of many species can be stored for upto 50-100 year.
- **Pollen storage** is considerably important in the conservation of genetic diversity. The life of pollen has been reported 3 years in some species. They can be stored for several years in liquid nitrogen having temperature – 196°C.
- **Tissue culture** can be extended to endangered species as well as those which may otherwise require very rapid climatic condition and can be maintained at one place in aseptic cultures.

- **Zoo** is a place, where wild animals are kept for public showing. They have recorded success with captive breeding of animals.

Some Zoos in India

Name	City	State
Indira Gandhi Zoological Park	Visakhapattnam	Andhra Pradesh
Nehru Zoological Park	Hyderabad	Andhra Pradesh
Arignar Anna Zoological Park	Chennai	Tamil Nadu
Sri Chamarajendra Zoological Park	Mysore	Karnataka

Extinction of Species

The total elimination or dying out of a particular species from the earth leads to extinction of that species. Population traits, which make a species susceptible to extinction are

(i) Large body size, e.g. elephant, rhinoceros and lion.

(ii) Small population size.

(iii) Low reproductive potential, e.g. blue whale, giant panda.

(iv) Higher states of tropic level, e.g. Bengal tiger, bald eagle.

Red Data Book

A **Red Data Book** or **Red List** is a catalogue of taxa facing risk of extinction.

IUCN is International Union for Conservation of Nature and Natural Resources, which is now called World Conservation Union (WCU) maintains it.

The main objective of IUCN is to promote and support the conservation of wildlife and natural resources. WCU has its headquarter at **Morgan**, **Switzerland**.

Red List has following categories of species

(i) **Threatened species** liable to be extinct if not allowed to realise it's full biotic potential by providing protection from exotic species, e.g. mountain gorilla, Giant panda, rhinoceros, etc.

(ii) A taxon is **extinct**, when there is no reasonable doubt that it's last individual has died, e.g. passenger pigeon, Dodo, etc.

(iii) A taxon is **extinct in the wild**, when it is known only to survive in cultivation, in capacity or as a naturalised population, well outside the past range, e.g. Hawain crow, Pinta Island tortoise, etc.

(iv) A taxon is **critically endangered**, when it is facing an extremely high risk of extinction in the wild in the immediate future (925 animals and 1014 plants), e.g. Great Indian Bustard, Sumatran orangutan, etc.

(v) A taxon is **endangered**, when it is not critically endangered but facing a very high risk of extinction in the wild in the near future, e.g. Blue whale, black winged Indonesian parrot, etc.

(vi) A taxon is **vulnerable**, when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium term future, e.g. **Madagascar frog** (*Dyscophus antongilii*), **black-buck** (*Antilope cervicapra*).

(vii) Taxa that do not currently qualify as critically endangered, or vulnerable and may be classified as **conservation dependent**.

(viii) A taxon is **data deficient,** when there is inadequate information to make a direct or indirect assessment of it's risk of extinction based on it's distribution or population status.

(ix) A taxon is under the category **non-evaluated** when it has not yet been assessed against any criteria.

Important Wildlife Organisations of the World

- **CITES** Convention on International Trade in Endangered Species of Wild Fauna and Flora
- **IBWL** Indian Board for Wildlife
- **IUCN** International Union for Conservation of Nature and Natural Resources
- **NWAP** National Wildlife Action Plan
- **UNCED** United Nations Conference on Environment and Development
- **WPSI** Wildlife Preservation Society of India
- **WWF** World Wildlife Fund
- **NEERI** National Environment Engineering Research Institute

Important Wildlife Projects of India

- **Project tiger** (*Panthera tigris*) The project was started in 1973 in order to check depletion in population of tiger. Initially, it was undertaken in 17 National Parks. But recently the project has been extended to more National Parks (a total of 23).
- **Project lion** (*Panthera leo persica*) The project was started in 1972. It is located in Gir National Park, Junagarh (Gujarat).
- **Project snow leopard** (*Panthera uncia*) Throughout Himalayas, e.g. Khangchendzonga National Park (Gangtok).
- **Project musk deer** (*Moschus moschiferus*) Kedarnath Sanctuary (Uttarakhand), Manali Sanctuary (HP) and Shikari Devi Sanctuary (HP).
- **Project elephant** It was launched in 1992 and it covers both wild and domestic elephants.

Environmental issues include the aspects which adversely affect our biophysical environment. Pollution, global warming, deforestation, etc., are the topics of major concern in current perspective.

Pollution

- Any undesirable change in the physical, chemical or biological characteristics of the atmosphere (air), lithosphere (land) and hydrosphere (water), which is harmful to living organisms directly or indirectly is called **pollution**.
- Pollutants are divided into many types on the basis of several categories as given below

  (i) On the basis of natural degradation or disposal, pollutants are of two types
  - **Biodegradable** Degrades after sometime either automatically, e.g. by heat or through the agency of microorganisms, e.g. sewage, domestic wastes, etc.
  - **Non-biodegradable** Not degraded by living organisms. These are the most harmful environmental pollutants, e.g. DDT, glass, plastic, pesticides, radioactive substances, heavy metals like mercury, lead, cadmium, etc.

  (ii) On the basis of persistance, pollutants are of two types
  - **Primary pollutant** Persist in the atmosphere in same form in which they are released, e.g. CO, DDT, plastic ware, etc.
  - **Secondary pollutant** Formed by the interaction between primary pollutants and are more toxic than the primary pollutants, e.g. PAN, ozone, HNO_3, H_2SO_4, etc.

Types of Pollution

On the basis of location, reservoir or the area where the pollutants are present. The pollution can be of air pollution, water pollution, soil pollution, etc.

Air Pollution and its Control

It is undesirable change in the natural characteristics of the atmosphere due to contamination by any chemical, biological or physical agent.

Sources of Air Pollution

Various air pollutants, their origin and effects are described below

- **Particulate matter** These are solid or liquid particles found in air. Settleable particulate, (about $\geq 10\,\mu m$) settle out in less than a day. Suspended particulate (about $\leq 10\,\mu m$) remain suspended for weeks, e.g. aerosol, dust, mist, etc. Particles of $2.5\,\mu m$ or less in diameter cause greater harm to humans (as per CPCB–Central Pollution Control Board).
  These cause breathing and respiratory problems, irritation, inflammation and damage to lungs.
- **Fluorocarbon** Chemicals released with force in the form of mist or vapour, into the atmosphere. Released by jet planes and also called as **aerosols**.
- **Smog** It is a mixture of fog and smoke which occurs in some busy industrical cities. It can be of two types
  - **Photochemical/Los Angeles Smog** Nitrogen oxides, hydrocarbons and O_2 interact in the presence of sunlight to form ozone (corrodes the heritage building surfaces and marble statues) and Peroxy Acetyl Nitrate (PAN) which inhibits ETC as well as damage chloroplast.
  - **Classical/London Smog** Formed from reaction of smoke, dust, H_2S and SO_2. Also known as **sulphur smog,** it causes stone cancer.
- **Smoke** It is obtained by incomplete combustion of carboneous material and smoke stacks of thermal power plants.
- **Carbon Monoxide** (CO) It is formed due to incomplete combustion of fuels from motor vehicles and industries. It Combines with haemoglobin to form carboxyhaemoglobin (COHb) which reduces O_2 carrying capacity of blood.
- **Sulphur Dioxide** (SO_2) Gaseous pollutant released by combustion of sulphur containing fossil fuels, smelting of ore and from oil refineries.
  It causes membrane damage, inhibits electron transportation in plants and leads to respiratory problems in organisms.
- **Nitrogen Oxide** (NO_2) Released by combustion of fossil fuels at high temperature in automobile engines. Forms brown air that leads to various heart and lung problems.

Methods of Controlling Air Pollution

The air pollutants must be separated out before releasing the harmless gases into the atmosphere, which can be done by adopting these methods

- **Electrostatic Precipitator** (ESP) It is the most commonly used method for the removal of particulate matter. About 99% of particulate matter are removed from the exhaust of thermal power plant.
- **Scrubber** A scrubber can remove gases like sulphur dioxide from the industrial exhaust. The exhaust is passed through a spray of water or lime which reacts with sulphur dioxide to form a precipitate of calcium sulphate and sulphide.
- **Catalytic converters** They have expensive metals namely platinum, palladium and rhodium as the catalysts and are fitted into automobiles for reducing emission of poisonous gases.
  As the exhaust passes through the catalytic converter, unburnt hydrocarbons are converted into CO_2 and water and carbon monoxide and nitric oxide are changed to carbon dioxide and nitrogen, oxygen gas respectively.
  Motor vehicles equipped with catalytic converter should use unleaded petrol because lead in the petrol inactivates the catalyst.

- **Government's norms for emission** In the line of world standard, Government of India also formulate new fuel policy time to time. These fuel policies with their applicable regions are given below

Fuel policies

Standard	Reference	Year	Region
India 2000	Euro 1	2000 - 01	NCR*, Mumbai, Kolkata, Chennai
Bharat Stage II	Euro 2	2003 - 04 2005 - 04	NCR*, 10 cities + Nationwide
Bharat stage III	Euro 3	2005 - 04 2010 - 05	NCR*, 10, cities + Nationwide
Bharat stage IV	Euro 4	2010 - 04	NCR*, 10 cities +

* National Capital Region (Delhi).

\+ Mumbai, Kolkata, Chennai, Bengaluru, Hyderabad, Ahmedabad, Pune, Surat, Kanpur and Agra.

Effects of Air Pollution on Environment

Air pollution plays a major role indamaging environment and climate in the following ways:

Acid Rain (pH ≤ 5.65)

- The term acid rain was first proposed by **Robert August**. Precipitation of oxides of sulphur and nitrogen along with rain is termed as acid rain.
- It takes place when SO_2 and oxides of nitrogen such as N_2O (nitrous oxide) and NO (nitric oxide) present in air dissolve in rain water to form sulphuric acid (H_2SO_4) and nitric acid (HNO_3), respectively.
- Effects of acid rain are given below:
  - **Effect on aquatic life** Acidic deposition adversely affect the aquatic life by making water acidic. The water body in which the biodiversity is reduced at significant level, is called **Biologically dead** (completely eutrophic).
  - **Effects on forest** Acid deposition affect the forests negatively, e.g. the red spruce forest in tropical areas are killed severely.
  - **Effects on building and monuments** The oldest building and monuments all over the world are destroyed by atmospheric acid at an alarming rate, e.g. Taj Mahal.

Greenhouse Effect and Global Warming

The term greenhouse effect was coined by **Arrhenius**. It is a naturally occurring phenomenon that is responsible for heating of Earth's surface and atmosphere due to the presence of certain gases in the atmosphere.

Brief description of chief Greenhouse Gases (GHGs) with their sources and effects are given below

(i) **Carbon Dioxide** (CO_2) Present level in atmosphere is 380 ppm (parts per million). Atmospheric, lifetime is 5-200 yr. Its amount in atmosphere is increasing due to fossil fuel's burning, deforestation and change in land use. High concentration may cause effects such as increase in rate of photosynthesis and growth of plants, decrease in stomatal conductance and transpiration rate, etc.

(ii) **Nitrous Oxide** (N_2O) Present atmospheric concentration is 316 ppb (parts per billion). Major sources are agriculture, biomass burning, nylon industries, nitrogen rich fertilisers and fuels.

(iii) **Methane** (CH_4) Present level in atmosphere is 1750 ppb (parts per billion). **Methanogen** bacteria increase greenhouse effect by producing methane. The major sources are freshwater wetlands, enteric fermentation in cattle. Flooded rice fields along with biomass burning.

(iv) **Chlorofluorocarbons** (CFCs) Present atmospheric concentration is 282 ppt (part per trillion). **Atmospheric** lifetime is 45-260 yr. Major sources are leakage from air conditioners, refrigeration units, evaporation of industrial solvents, production of plastic foams and propellants in aerosol, spray cans.

- The gradual continuous increase in average temperature of surface of the earth as a result of increase in concentration of greenhouse gases is termed as global warming.
- During the past century, the temperature of earh has increased by 0.6°C, most of it during the last three decades.
- Effects of global warming are as follows
  - Earth's temperature has increased by 0.6°C in last three decades. This causes change in precipitation patterns.
  - The rise in temperature leads to harmful effects in environment leading to odd climatic changes, e.g. El Nino effect.
  - The high temperature will result in melting of polar ice caps, which will lead to rise in sea level and many coastal areas will be submerged.
  - The high levels of temperature lead to increased weed growth, eruption of diseases and pests. Thus, the crop productivity will decrease.
  - Reducing use of fossile fuels, improving efficiency of energy usage, reducing deforestation, planting trees and slowing down the growth of human population can control the global warming.

Ozone Depletion

- Ozone layer present in stratosphere protects us from harmful ultraviolet radiations coming from sun. Ozone gas is continuously formed by the action of UV rays on molecular

oxygen. The thickness of ozone is measured in **Dobson Units** (DU). Ozone can be

- **Bad ozone** Formed in troposphere and is harmful to plants and animals.
- **Good ozone** Present in stratosphere and acts as a shield, absorbing harmful UV radiations from the sun.

- This ozone layer is being destroyed by some pollution like CFCs. Harmful effects of ozone depletion are as follows
  - UV-B damages DNA, causing mutation.
  - Ageing of skin, damage to skin cells and various types of skin cancer.
  - High dose of UV-B causes inflammation of cornea. This is called snow-blindness, cataract, etc. Such exposure may permanently damage the cornea.

- The depletion of ozone is particularly marked over the Antarctic region.
- Ozone is commonly called as **chemical weed**.
- **Montreal Protocol**, was signed at Montreal (Canada) in 1987 (effective in 1989) to control the emission of ozone depleting substances.
- **Earth Summit** (1992), to reduce greenhouse gases.
- **Kyoto Protocol** (1997), convention on climate change, to reduce **greenhouse emission**.

Water Pollution and its Control

Water pollution is the undesirable presence of some organic, inorganic, biological or physical substances in water which makes it unfit for use.

Sources of Water Pollution

Various water pollutants are described below

- **Toxic Metals** Pb, Zn, Ar, Cu, Cd, Hg, Ni from electroplating, chemical and copper pickling industries inhibit self-purification of water body and lead to chromosomal damage and thus, interfere with heredity.
- **Acids** HNO_3, H_2SO_4 lowers the pH of water which is lethal to fishes, etc.
- **Alkalis** pH shocks, due to addition of alkaline water causes asphyxiation of fishes.
- **Coal** It interferes with self-purification of river water.
- **Dyes** These increase the BOD and change colour of water.
- **Gaseous pollutants** Major gaseous pollutants include
  - **NH_3** produced in fertiliser industry causes irritation, pulmonary oedema.
  - **Cl** Causes pulmonary oedema, corrosive, fatal for fishes.
  - **H_2S** Produces noxious smell, irritation, respiratory depressant.
- **Industrial agents** Major industrial agents include
  - **Paper and pulp** Produces free chlorine
  - **Textile** Minor acids, fats, oils and grease.
  - **Food Processing** produces starch.
  - **Chemicals** Like mineral acids OH, NH_3, tartaric acid and nitrocompounds P, S, F.
  - **Metals** Like fluorides, cyanogen and limestone are called nuisance.
- **Fertilisers** Phosphatic, nitrogenous fertilisers and potash when mixed with water through run off causes water pollution.
- **Pesticides** DDT, 2, 4-D, TEPP, Aldrin, BHC parathion do not degrade (biomagnification).

Effects of Water Pollution

The pollutants of water owing to their toxic effects have diverse effects on humans, environment and aquatic life, etc.

- Major toxic elements found in water and their various effects are as follows
  - **Aluminium** Interferes with phosphate metabolism, inhibit absorption of fluorides, Ca and iron compounds.
  - **Arsenic** Loss of appetite, copious secretion of mucus in respiratory tract, black foot disease.
  - **Cadmium** Itai-itai disease (Japan), kidney damage.
  - **Fluorine** Fluorosis, about 5-12 ppm is toxic, enamel becomes brittle, bones lose their elasticity and are prone to fractures, impairs glycolysis, knock-knee disease.
  - **Lead** Anaemia and mental retardation due to degenerative changes in motor nerves.
  - **Mercury** Minamata disease, main site of injury is CNS leading to tremors inability to coordinate, impairment of vision and loss of hearing.
    Two major episodes of mercury poisoning have occurred in Japan, in Minamata bay and Niigata. Mercury was absorbed, bioaccumulated and biomagnified to high levels. Fish collected from this bay had 10-12 mg of Hg per kg of their flesh and bones. The largest mercury epidemic occurred in 1971-72 in Iraq when 6000 people were affected and 500 died also. It causes infertility in human.
- Some important effect of water pollution on water bodies are as follows
  - **Dissolved Oxygen** (DO) It decreases due to increase in domestic sewage, toxic pollutants and microbes, thus threatening aquatic life. It decreases with rise in temperature.
  - **Biological Oxygen Demand** (BOD) It is defined as amount of oxygen (in mg) required to decompose organic matter present in one litre of water. It is expressed in parts per million (ppm). Its value increases when sewage is mixed with water bodies.

- **Chemical Oxygen Demand** (COD) It indicates the total oxygen required by organic matter (pollutants, etc) in a sample of water for its oxidation by a strong chemical oxidant. Its value is higher than BOD.
- **Eutrophication** Eutrophic (*eu* + *trophic* = truely nourished) water are rich in organisms and organic materials. Eutrophication is an increase in nutrient level and productivity. Along with BOD, eutrophication often results from nutrient enrichment. Sewage, fertiliser, run off and other human activities causing increase in biological productivity is called **cultural eutrophication**.

Methods of Controlling Water Pollution

Water pollution can be controlled through various measures. Some of them are discussed here

- Proper maintenance of water bodies.
- Reduced use of pesticides and chemical fertilisers in agriculture.
- Avoid the disposal of waste into water.
- Proper sewage treatment before disposal into large water bodies.
- Control of disposal of industrial waste into water.

Soil Pollution

It is alteration in soil caused by removal or addition of substances and factors which decrease its productivity, quality of plants and ground water.

Main Soil Pollutants, their Characteristics and Effects

Type of Pollutant	Characteristic and Effect
Pesticides (broad spectrum)	Insecticides (kill insects), fungicides (kill fungi), algicides (kill algal bloom), rodenticides (kill rodents), etc., reduce pest population but also other biota. Degraded products of pesticides are bioaccumulated by plants and passed on to food chain/web.
Fertilisers	Excessive use of fertilisers kills useful microbes, increases salinity, reduces soil productivity.
Manures	Excreta of livestock/human sewage, sludge pollutes/contaminates soil and crops from such areas if consumed can cause important health hazards.
Radioactive waste	Of nuclear plants, laboratories using them and from mining activities gets into soil and causes mutations/genomic changes, acid rain; weathering of rocks pollute soil.

Agro-Chemicals and Their Effects

- The increasing amount of agricultural chemicals like fertilisers can create biological magnification conditions in aquatic and terrestial ecosystems and destroy non-target organisms.
- **Biomagnification** occurs due to persistent pesticides such as DDT which have a long lifetime in the environment.
- They are fat soluble and generally non-biodegradable, therefore they can get incorporated into the food chain and ultimately deposited in the fatty tissues of animals and humans.
- The magnification of these pesticides in successive higher trophic levels is known as **biological magnification**.
- As a result of this, a decline in bird population in a region is observed.
- Agrochemical pollution can be controlled by adapting organic farming. It is a cyclic, zero-waste procedure, where waste products from one process are used as nutrients for other processes. This allows the maximum utilisation of resource and increases the efficiency of production.

Solid Waste Management

Solid waste means everything that goes out in trash, i.e.

(i) Municipal solid waste includes wastes from homes, offices, schools, etc., that are collected and disposed by the municipality.

(ii) Fly ash generated by thermal power plants, which is composed of oxides of silica, iron and aluminium.

(iii) Hospital wastes include hazardous wastes.

(iv) Industrial wastes include paper, rubber, pesticides, dye, etc.

Disposal of solid wastes is done by

- Burning the municipal waste to reduce volume.
- Sanitary landfills as open dumps.
- Fly ash is used in construction of industry or buried in landfills.
- E-wastes are buried in landfills.

Radioactive Waste Management

The release of radioactive material into environment is called radioactive pollution. Radioactivity is the property of certain elements (radium, thorium, etc) to spontaneously emit alpha (α) particles, beta (β) particles and gamma (γ) rays by disintegration of their atomic nuclei, Nuclear energy is now considered as the most potent pollutant. Earlier, it was assumed to be a natural, non-polluting way for electricity generation.

- Radioactive pollution is caused due to leakage of radioactive material from thermal power plants or due to unsafe disposal of radioactive wastes.
- It cause mutations at a very high rate. At high doses, nuclear radiation is lethal but a lower doses, it causes various disorders and cancer.
- Nuclear and radioactive waste must be deal with utmost caution, Nuclear waste should be pre-treated and stored in shielded containers and then buried about 500 m deep within the rocks.

Deforestation

- It is the conversion of forested areas to non-forested ones. In **India** at the beginning of 20th century, forests covered about 30% of total land but at the end of the century, it had shrunk to 19.4%.
- **National Forest Policy** (1988) of India has recommended 33% forest cover for plains and 67% for hills. Cutting of trees for timber, firewood, cattle ranching and Jhum cultivation are responsible for deforestation.
- **Slash and burn agriculture,** commonly called as **Jhum cultivation** is common in North-Eastern states of India. In Jhum cultivation, the farmers cut down the trees of the forest and burn the plant remains.
  The ash produced is used as a fertiliser and the land is then used for farming or cattle grazing.
- After cultivation, the area is left for several years so as to allow its recovery. The farmers move on to other areas and repeat this process.
- **Reforestation** is the process of restoring a forest that once existed but was removed in the past.

Case Studies

Three case studies addressing environmental issues are given below

1. People's Participation in Conservation of Forest

- A Bishnoi woman **Amrita Devi** showed exemplary courage by protecting trees from the men cutting them. She sacrified her life along with her three daughters, while hugging the trees to protect them from axemen.
- The Government of India has recently instituted the **Amrita Devi Bishnoi Wildlife Protection Award** for the individuals or communities from rural areas that have shown extraordinary courage and dedication in protecting wildlife.
- In 1973, the **Chipko Movement** was launched by **Chandi Prasad Bhatt** and **Sunder Lal Bahuguna** in Chamoli district of **Garhwal Himalayas**.
- During this movement, local women showed enormous bravery in protecting trees from the axemen of contractor by hugging the trees.
- The Government of India has introduced **Joint Forest Management** (JFM) so as to work closely with the local communities for protecting and managing forests. In return, the communities get benefit of various forest products.

2. Remedy of Plastic Waste

- **Ahmed Khan** a plastic sack manufacturer in Bengaluru has found and ideal solution to deal with the problem of plastic bags. His company developed polyblend, a fine powder of recycled modified plastic.
- Mixing this powder with bitumen, a blend was prepared, which when laid on the roads enhanced the bitumen's water repellant properties and helped to increase the life of the road three times. Using Khan's technique, by the year 2002, more than 40 km of road in Bengaluru has already been laid.

3. Controlling Vehicular Air Pollution : Delhi

- Delhi leads the country for its high level of air pollution. In 1990, It was the most polluted city of the world. After seeing the serious problem of air pollution, Public Interest Litigatin (PIT) was filed in supreme court of India and the strong steps controlled it to some extent. The result was that the entire fleet of public transport (buses etc.) were converted to run on CNG.

DAY PRACTICE SESSION 1

FOUNDATION QUESTIONS EXERCISE

1 Which of the following represents maximum number of species among global biodiversity? ➝ NEET 2018
(a) Algae (b) Lichens
(c) Fungi (d) Mosses and ferns

2 Which one of the following has the highest number of species in nature?
(a) Insects (b) Birds
(c) Angiosperms (d) Fungi

3 Maximum nutritional diversity is found in the group
(a) Fungi (b) Animalia (c) Monera (d) Plantae

4 Which one of the following shows maximum genetic diversity in India?
(a) Rice (b) Maize (c) Mango (d) Groundnut

5 Genetic diversity is related to
(a) types of species within a community
(b) types of community in an area
(c) gene based diversity
(d) diversity and evolution of species with a genus

6 In India, we find mangoes with different flavours, colours, fibre content, sugar content and even shelf life. The large variation is an account of
(a) species diversity (b) induced mutations
(c) genetic diversity (d) hybridisation

7 α-diversity is biodiversity present
(a) within community (b) between community
(c) ranges of community (d) All of these

8 Rate of replacement of species along a gradient of habitats/communities is called
(a) α-diversity (b) β-diversity
(c) γ-diversity (d) ω-diversity

9 Which of the following is called β-diversity?
(a) Habitat diversity (b) Differentiation diversity
(c) Resource diversity (d) Species diversity

10 Biodiversity is determined by
(a) number of individuals in an area
(b) species richness
(c) evenness
(d) Both (b) and (c)

11 Species diversity increases as one proceeds from
(a) high altitude to low altitude and high latitude to low latitude
(b) low altitude to high altitude and high latitude to low latitude
(c) low altitude to high altitude and low latitude to high latitude
(d) high altitude to low altitude and low latitude to high latitude

12 Which of the below mentioned regions exhibit less seasonal variations?
(a) Tropics (b) Temperates
(c) Alpines (d) Both (a) and (b)

13 Which of the following regions has the greatest biodiversity on earth?
(a) Moist deciduous forests (b) Northern boreal forest
(c) Amazon rainforest (d) None of these

14 Alexander von Humboldt described for the first time ➝ NEET 2017
(a) ecological biodiversity (b) law of limiting factor
(c) species-area relationships (d) population growth equation

15 Susceptibility to extinction is due to
(a) large body size (b) small population
(c) high trophic level (d) All of these

16 The cause of extinction of blue whale is
(a) small population size and low reproductive rate
(b) crushing of bones under body weight
(c) incapability to breath
(d) cracking of skin

17 Which of the following is the most important cause of animals and plants being driven to extinction? ➝ NEET-I 2016
(a) Alien species invasion
(b) Habitat loss and fragmentation
(c) Coextinctions
(d) Overexploitation

18 Which of the following is most dangerous to wildlife?
(a) Overexploitation
(b) Man-made forest
(c) Habitat destruction
(d) Introduction of foreign species

19 Which of the following statements is correct?
(a) Steller's sea cow is an extinct animal
(b) *Lantana* is popularly known as carrot grass
(c) *Parthenium* is an endemic species of our country
(d) African catfish is not a threat to indigenous catfishes

20 The extinction of passenger pigeon was due to
(a) increased number of predatory birds
(b) over-exploitation by humans
(c) non-availability of the food
(d) bird flu virus infection

21 Which one of the following pairs of organisms is exotic species introduced in India?
(a) *Ficus religiosa, Lantana camara*
(b) *Lantana camara*, Water hyacinth
(c) Water hyacinth, *Prosopis*, *Cinereria*
(d) Nile perch, *Ficus religiosa*

22 Which of the following is not an alien species?
(a) *Parthenium* (b) *Eichhornia*
(c) *Clarias gariepinus* (d) *Podophyllum*

23 Which of the following is correctly matched?
➡ NEET-II 2016
(a) Aerenchyma — *Opuntia*
(b) Age pyramid — Biome
(c) *Parthenium hysterophorus* — Threat to biodiversity
(d) Stratification — Population

24 The alien species introduced into Lake Victoria that was responsible for the extinction of cichlid fishes is
(a) Murrels (b) Nile perch
(c) Carrot grass (d) African catfish

25 Which of the following is not an invasive alien species in the Indian context?
(a) *Lantana* (b) *Cynodon* (c) *Parthenium* (d) *Eichhornia*

26 Match the following columns.

	Column I (Animals)		**Column II** (Location)
A.	Dodo	1.	Africa
B.	Quagga	2.	Russia
C.	Thylacine	3.	Mauritius
D.	Stellar's sea cow	4.	Australia

Codes

	A	B	C	D		A	B	C	D
(a)	3	1	2	4	(b)	3	1	4	2
(c)	1	3	2	4	(d)	4	3	1	2

27 How many hotspots of biodiversity in the world have been identified till date by Norman Myers?
➡ NEET-II 2016
(a) 17 (b) 25 (c) 34 (d) 43

28 The species confined to a particular region and not found elsewhere is termed as ➡ CBSE-AIPMT 2015
(a) keystone (b) alien
(c) endemic (d) rare

29 Which one of the following areas in India, is a hotspot of biodiversity? ➡ CBSE-AIPMT 2012
(a) Eastern Ghats (b) Gangetic plain
(c) Sunderbans (d) Western Ghats

30 Select the correct statement about biodiversity.
(a) The desert areas of Rajasthan and Gujarat have a very high level of desert animal species as well as numerous rare animals
(b) Large scale planting of *Bt* cotton has no adverse effect on biodiversity
(c) Western Ghats have a very high degree of species richness and endemism
(d) Conservation of biodiversity is just a fad pursued by the developed countries

31 The region of biosphere reserve, which is legally protected and where no human activity is allowed, is known as ➡ NEET 2017
(a) core zone (b) buffer zone
(c) transition zone (d) restoration zone

32 Buffer zone of biosphere reserve is where
(a) no human activity is allowed
(b) human activity is limited
(c) free human activity is allowed
(d) wild animals are absent

33 The first biosphere reserve established in India for conserving the gene pool of flora and fauna and the life style of tribals is
(a) Nilgiri biosphere reserve
(b) Nandadevi biosphere reserve
(c) Uttarakhand biosphere reserve
(d) Great Nicobar biosphere reserve

34 Which one of these is an *in situ* method of conservation?
(a) National park (b) Botanical garden
(c) Tissue culture (d) Genetic engineering

35 Which of the following will help most in conservation of wildlife?
(a) Making stringent laws
(b) Making numerous zoos
(c) Making numerous sanctuaries
(d) All of the above

36 First National Park of India was
(a) Jim Corbett National Park (b) Kaziranga National Park
(c) Panna National Park (d) Gir National Park

37 Simlipal is
(a) sanctuary (b) biosphere reserve
(c) only national park (d) zoo

38 Asiatic lion is protected in
(a) Kaziranga National Park (b) Gir National Park
(c) Kanha National Park (d) Desert National Park

39 Identify the odd combination of the habitat and the particular animal concerned.
(a) Dachigam National Park — Snow leopard
(b) Sunderbans — Bengal tiger
(c) Periyar — Elephant
(d) Rann of Kutch — Wild ass

40 Tiger is not a resident in which one of the following national parks? ➡ CBSE-AIPMT 2009
(a) Ranthambhor (b) Sunderbans
(c) Gir (d) Jim Corbett

41 Which of the following national parks is home to the famous musk deer or hangul? ➡ NEET-II 2016
(a) Keibul Lamjao National Park, Manipur
(b) Bandhavgarh Naitonal Park, Madhya Pradesh
(c) Eaglenest Wildlife Sancturay, Arunachal Pradesh
(d) Dachigam Naitonal Park, Jammu and Kashmir

42 Brow antlered deer is one of the rarest mammal found in India. It is found in
(a) Nanda Devi — Himachal Pradesh
(b) Keibul Lamjao National Park — Manipur
(c) Dudhwa National Park — Uttar Pradesh
(d) Periyar Wildlife Sanctuary — Kerala

43 Biosphere reserves differ from National Parks and Wildlife Sanctuaries because in the former,
(a) human beings are not allowed to enter
(b) people are an integral part of the system
(c) plants are paid greater attention than the animals
(d) living organisms are brought from all over the world and preserved for posterity

44 Bandipur (Karnataka) National Park is the site of
(a) Deer project (b) Peacock project
(c) Elephant project (d) Tiger project

45 Hoolock Gibbon (India's only ape) is found in
(a) Kaziranga Bird Sanctuary (b) Hazaribagh National Park
(c) Corbett National Park (d) Gir National Park

46 Rajaji National Park is situated in
(a) Tamil Nadu (b) Karnataka
(c) Uttarakhand (d) Rajasthan

47 What is true of National Park?
(a) Tourism is allowed in buffer zone
(b) No human activity is allowed
(c) Cattle grazing is allowed in buffer zone
(d) Hunting is allowed in core zone

48 Biosphere reserves are different from National Parks as
(a) plants and animals are protected in biosphere reserves
(b) humans are integral part of biosphere reserves
(c) humans are not involved in biosphere reserves
(d) None of the above

49 Kanha National Park is located in
(a) Assom (b) Rajasthan
(c) Uttar Pradesh (d) Madhya Pradesh

50 Rare animal Hispid hare *(Caprologus hispidus)* is found in
(a) Dachigam National Park (b) Kaziranga National Park
(c) Manas National Park (d) Kanha National Park

51 National park and sanctuary have the common characteristic as
(a) boundries are circumscribed by state legislation
(b) there is biotic interference
(c) tourism is permissible
(d) research and scientific management is possible

52 'Hangul Project' was started by government to save Hangul *(Cervus hangul)* in 1970. The sanctuary, where it is started is
(a) National Chambal Sanctuary
(b) Dachigam Sanctuary
(c) Corbett National Park
(d) Bandipur National Park

53 Ranganathitu sanctuary (Mysore) is known for population of
(a) bison (b) tigers (c) goats (d) birds

54 Sanctuary which has maximum number of rare animals is
(a) Manas National Park (b) Kaziranga National Park
(c) Dudhwa National Park (d) Corbett National Park

55 The one-horned rhinoceros is specific to which of the following sanctuary?
(a) Bhitar Kanika (b) Bandipur
(c) Kaziranga (d) Corbett Park

56 Which of the following is correctly matched?

Sanctuary		Animal
(a) Gir	—	Lion
(b) Kaziranga	—	Musk deer
(c) Sunderbans	—	Rhino
(d) NE Himalayan region	—	Sambar

57 Which among the following is a sacred lake?
(a) Dal lake
(b) Khecheopalri lake of Sikkim
(c) Surajkund lake
(d) Chilka lake

58 Rare endangered and endemic taxa can be found intact and flourishing in
(a) sacred groves (b) buffer zone
(c) tropical forests (d) temperate forests

59 Significant wetlands of India have been declared as
(a) Bastic sites (b) Gaston sites
(c) Ramsar sites (d) Spicer sites

60 Breeding place of flamingo (hansawar) in India is
(a) Chilka Lake (b) Sambhar Lake
(c) Rann of Kutch (d) Ghana Vihar

61 All of the following are included in *ex situ* conservation except ➝ NEET-II 2016
(a) botanical gardens (b) sacred groves
(c) wildlife safari parks (d) seed banks

62 The first white tiger safari in the world is in
(a) Nagarjuna sagar — Andhra Pradesh
(b) Kalkad Mundan thurai — Tamil Nadu
(c) Periyar — Kerala
(d) Nandan Kanan Zoo Park — Odisha

63 In which of the following both pairs has correct combination? ➝ CBSE-AIPMT 2015
(a) *In situ* conservation/National park
Ex situ conservation/Botanical garden
(b) *In situ* conservation/Cryopreservation
Ex situ conservation/Wildlife sanctuary
(c) In situ conservation/Seed bank
Ex situ conservation/National park
(d) *In situ* conservation Tissue culture
Ex situ conservation/Sacred groves

64 Which one of the following is related to *ex situ* conservation of threatened animals and plants? ➝ NEET 2017
(a) Wildlife safari parks (b) Biodiversity hotspots
(c) Amazon rainforest (d) Himalayan region

65 Which one of the following is not used for *ex situ* plant conservation? ➝ NEET 2013
(a) Field gene banks (b) Seed banks
(c) Shifting cultivation (d) Botanical gardens

66 Pollen grains can be stored for several years in liquid nitrogen having temperature of → NEET 2018

(a) –196°C (b) – 80°C
(c) –120°C (d) –160°C

67 Cryopreservation of gametes of threatened species in viable and fertile condition can be referred to as → CBSE-AIPMT 2015

(a) *in situ* conservation of biodiversity
(b) advanced *ex situ* conservation of biodiversity
(c) *in situ* conservation by sacred groves
(d) *in situ* cryoconservation of biodiversity

68 A collection of plants and seeds having diverse alleles of all the genes of a crop is called → CBSE-AIPMT 2011

(a) germplasm (b) gene library
(c) genome (d) herbarium

69 The organisation which publishes the Red List of species is → CBSE-AIPMT 2014

(a) ICFRE (b) IUCN
(c) UNED (d) WWF

70 IUCN, now called World Conservation Union (WCU) has its headquarter at

(a) South Africa (b) America
(c) India (d) Switzerland

71 A species facing extremely high risk of extinction in the immediate future is called → CBSE-AIPMT 2014

(a) vulnerable
(b) endemic
(c) critically endangered
(d) extinct

72 Red List contains data or information on → NEET-II 2016

(a) all economically important plants
(b) plants whose products are in international trade
(c) threatened species
(d) marine vertebrates only

73 Amongst the animal groups given below, which one has the highest percentage of endangered species?

(a) Insects (b) Reptiles
(c) Mammals (d) Amphibians

74 Which one of the following is an endangered plant species of India?

(a) *Santalum album* (Sandal wood)
(b) *Rauwolfia serpentina*
(c) *Cycas beddonei*
(d) All of the above

75 Which one of the following sets consists entirely of endangered wildlife species of India?

(a) Egret, Black boar, Bison, Spotted deer
(b) Himalayan musk deer, Black buck, Indian lion, Rhino, Sambar
(c) Himalayan musk deer, Indian lion, Rhino, Wild buffalo, Golden cat
(d) Himalayan musk deer, Great Indian bustard, Snow leopard, Kashmir stag, Wild ass

76 Which of the following pairs of an animal and a plant represents endangered organisms in India?

(a) *Cinchona* and Leopard
(b) Banyan and Black buck
(c) Tamarind and Rhesus monkey
(d) *Bentinckia nicobarica* and Red panda

77 Which endangered animal is the source of the world's finest, lightest, warmest and most expensive wool-the shahtoosh?

(a) Nilgai (b) Cheetal
(c) Kashmiri goat (d) Chiru

78 The endangered largest living lemur *Idri idri* is inhabitant of

(a) Madagascar (b) Mauritius (c) Sri Lanka (d) India

79 The historic convention on Biological Diversity held in Rio de Janeiro in 1992 is known as

(a) G-16 Summit (b) CITES Convention
(c) The Earth Summit (d) MAB Programme

80 Earth summit at Rio de Janeiro was related to

(a) soil fertility (b) conservation of environment
(c) afforestation (d) natural resources

81 Which animal is the symbol of the World Wildlife Fund?

(a) Tiger (b) Hornbill
(c) Giant panda (d) White bear

82 Match the following columns. → NEET-II 2016

	Column I		Column II
A.	Biosphere reserves	1.	Wild animals
B.	MAB	2.	1992
C.	Sanctuaries	3.	1994
D.	Project elephant	4.	1986
		5.	1971

Codes

	A	B	C	D		A	B	C	D
(a)	4	5	1	2	(b)	1	2	3	4
(c)	5	4	2	1	(d)	1	4	5	2

83 In 1984, the Bhopal gas tragedy occurred because gas Methyl Isocyanate reacted (MIC) chemically with

(a) DDT (b) ammonia (c) CO_2 (d) water

84 Photochemical smog is formed due to emission of primary air pollutants

(a) SO_2 and CO (b) O_3 and PAN
(c) NO_2 and hydrocarbons (d) CO_2

85 Nitrogen oxides produced from the emission of automobiles and power plants are the source of fine air borne particles which lead to

(a) photochemical smog (b) dry acid deposition
(c) wet acid deposition (d) Both (b) and (c)

86 Suspended particles such as ash, soot smoke may affect human body as they cause

(a) eye irritation (b) emphysema
(c) mutations (d) Both (a) and (b)

87 Which one of the following statements is not valid for aerosols? ➜ NEET 2017
(a) They are harmful to human health
(b) They alter rainfall and monsoon patterns
(c) They cause increased agricultural productivity
(d) They have negative impact on agricultural land

88 In almost all Indian metropolitan cities like Delhi, the major atmospheric pollutant(s) is/are
(a) Suspended Particulate Matter (SPM)
(b) oxides of sulphur
(c) carbon dioxide and carbon monoxide
(d) oxides of nitrogen

89 Burning sensation of throat, eyes and nausea is associated with …… present in air.
(a) hydrogen sulphide (b) sulphur
(c) hydrogen cyanide (d) arsenic

90 Carbon dioxide, methane, nitrogen oxide and chlorofluorocarbons are called greenhouse gases because they can absorb
(a) ultraviolet radiations (b) visible light radiations
(c) γ-rays radiations (d) long wave infrared radiations

91 If there was no carbon dioxide on the earth's atmosphere, the temperature of the earth's surface would be
(a) same as the present level
(b) more than the present level
(c) less than the present level
(d) dependent on the oxygen content in the atmosphere

92 At present, the concentration of CO_2 in the atmosphere is about
(a) 100 ppm (b) 240 ppm
(c) 380 ppm (d) 520 pmm

93 Greenhouse effect with respect to global climate refers to
(a) cooling and moist condition
(b) warming effect
(c) increase rainfall and greenery
(d) desertification

94 Which one of the following is the correct percentage of the two (out of the total of four) greenhouse gases that contribute to the total global warming? ➜ CBSE-AIPMT 2008
(a) CFCs 14% and CH_4 20% (b) CO_2 40% and CFCs 30%
(c) N_2O 6% and CO_2 86% (d) CH_4 20% and N_2O 18%

95 Carbon dioxide is called greenhouse gas because it is
(a) used in greenhouse to increase plant growth
(b) transparent to heat but traps sunlight
(c) transparent to sunlight but traps heat
(d) transparent to both sunlight and heat

96 According to Kyoto protocol, the major nations abide to reduce concentration of greenhouse gases by
(a) 2008 (b) 2010
(c) 2012 (d) 2018

97 Which of the following is not thought to be a possible consequence of rising CO_2 levels?
(a) C_4 crops, such as corn, being replaced by more C_3 plants such as wheat and soybean
(b) Rising global temperature
(c) Increased breakdown of atmosphere ozone
(d) Increased vegetative productivity

98 Global warming can be controlled by ➜ NEET 2013
(a) reducing deforestation, cutting down use of fossil fuel
(b) reducing reforestation, increasing the use of fossil fuel.
(c) increasing deforestation, slowing down the growth of human population
(d) increasing deforestation, reducing efficiency of energy usage

99 The UN conference of Parties on climate change in the year 2012 was held at ➜ NEET 2015
(a) Durban (b) Doha
(c) Lima (d) Warsaw

100 World Ozone day is celebrated on ➜ NEET 2018
(a) 16th September (b) 21th April
(c) 5th June (d) 22nd April

101 Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancers? ➜ NEET 2016
(a) Ozone (b) Ammonia
(c) Methane (d) Nitrous oxide

102 The destruction of the ozone layer is most directly linked to the
(a) destruction of tropical rainforests
(b) release of Chlorofluorocarbons (CFCs) into the atmosphere
(c) decrease in the production of ozone precursors by chemical production plants
(d) global warming

103 In stratosphere, which one of the following elements acts as catalyst in degradation of ozone and release of molecular oxygen? ➜ NEET 2018
(a) Fe (b) Cl
(c) Carbon (d) Oxygen

104 Ozone layer is found in two atmospheric layers of atmosphere, identify the option which associates with good ozone.
(a) Troposphere
(b) Mesosphere
(c) Stratosphere
(d) Thermosphere

105 Ozone layer thickness is measured in
(a) decibels (b) millimetrer
(c) Dobson units (d) centimetre

106 In 1975, atmospheric scientists first discovered the formation of ozone hole, maximum over
(a) Arctic (b) Antarctica
(c) India (d) Pakistan

107 Global agreement in specific control strategies to reduce the release of ozone depleting substances, was adopted by ➝ CBSE-AIPMT 2009

(a) Rio de Janeiro Conference
(b) Montreal Protocol
(c) Kyoto Protocol
(d) Vienna Convention

108 Which of the following is not correct?

(a) Greenhouse effect is related to global warming
(b) First earth summit held at Rio de Janeiro (Brazil) in 1992
(c) Kyoto protocol held in Japan
(d) Montreal protocol is related to greenhouse gases

109 Which of the following is not one of prime health risks associated with greater UV radiation through the atmosphere due to the depletion of stratospheric zone? ➝ CBSE-AIPMT 2015

(a) Increased skin cancer (b) Reduced immune system
(c) Damage to eyes (d) Increased liver cancer

110 The molecular action of ultraviolet light is mainly reflected through

(a) destruction of hydrogen bonds between DNA strands
(b) photodynamic action
(c) formation of pyrimidine
(d) formation of sticky metaphase

111 A substantial fall in CO_2 and SO_2 level has been found in Delhi between 1997 and 2005 due to

(a) use of purified, unleaded petrol
(b) use of purified, unleaded diesel
(c) use of Compressed Natural Gas (CNG) in public transports
(d) use of Liquified Petroleum Gas (LPG) in public transports

112 A chemical industrial plant is releasing large amount of exhaust in the atmosphere. As a control method, scrubber in the exhaust was advised because it removes ➝ CBSE-AIPMT 2015

(a) gases like sulphur dioxide
(b) particulate matter of the size 5 micrometre or above
(c) gases like ozone and methane
(d) particulate matter of the size 2.5 micrometre or less

113 The Air Prevention and Control of Pollution Act came into force in ➝ NEET 2013

(a) 1975 (b) 1981 (c) 1985 (d) 1990

114 Catalytic converters are fitted into automobiles to reduce emission of harmful gases. Catalytic converters change unburnt hydrocarbons into

(a) carbon dioxide and water (b) carbon monooxide
(c) methane (d) carbon dioxide and methane

115 Match the following columns.

	Column I		Column II
A.	Electrostatic precipitator	1.	Removes gases like SO_2
B.	Scrubber	2.	Reduces automobile emission
C.	Catalytic converter	3.	Removes particulate matter

Codes

	A	B	C		A	B	C
(a)	3	2	1	(b)	1	2	3
(c)	3	1	2	(d)	1	3	2

116 Steps taken by the Government of India to control air pollution include ➝ CBSE-AIPMT 2009

(a) compulsory mixing of 20% ethyl alcohol with petrol and 20% biodiesel with diesel
(b) compulsory Pollution Under Control (PUC) certification of petrol driven vehicles, which tests for carbon monoxide and hydrocarbons
(c) permission to use only pure diesel with a maximum of 500 ppm sulphur as fuel for vehicles
(d) use of non-polluting Compressed Natural Gas (CNG) only as fuel by all buses and trucks

117 Which one of the following statements pertaining to water pollutants is correct?

(a) DDT is a non-biodegradable pollutant
(b) Excess fluoride in drinking water causes osteoporosis
(c) Excess cadmium in drinking water causes black foot disease
(d) Methylmercury in water may cause 'itai-itai' disease

118 Addition of phosphate and nitrates rich fertiliser into water bodies which ultimately lead into lake, first affects the

(a) growth of aquatic organisms in lake
(b) eutrophication rate of lake
(c) environment of lake
(d) organic remains deposited on the bottom of lake

119 The presence of large amounts of nutrients in water causes excessive growth of planktonic algae, called

(a) algal bloom
(b) eutrophication
(c) biomagnification
(d) acidification

120 A lake which is rich in organic waste may results in ➝ NEET-II 2016

(a) increased population of aquatic organisms due to minerals
(b) drying of the lake due to algal bloom
(c) increased population of fish due to lots of nutrients
(d) mortality of fish due to lack of oxygen

121 The green scum seen in the freshwater bodies is

(a) blue-green algae
(b) red algae
(c) green algae
(d) Both (a) and (c)

122 Eutrophication of water bodies leading to killing of fishes is mainly due to non-availability of

(a) food (b) light
(c) essential minerals (d) oxygen

123 The highest DDT concentration in aquatic food chain shall occur in

(a) phytoplankton (b) seagull
(c) crab (d) eel

124 If we continuously add sewage water in a river, the BOD of river will
(a) decrease continuously
(b) increase continuously
(c) be higher before addition of sewage water
(d) be lower after addition of sewage water

125 BOD is
(a) amount of oxygen utilised by microorganisms
(b) amount of oxygen utilised by organisms in water
(c) total amount of oxygen present in water
(d) All of the above

126 A river with an inflow of domestic sewage rich in organic waste may result in ➜ NEET-I 2016
(a) an increased population of aquatic food web organisms
(b) an increased production of fish due to biodegradable nutrients
(c) death of fish due to lack of oxygen
(d) drying of the river very soon due to algal bloom

127 A water body is polluted, this can be confirmed by the presence of
(a) *Lemna pancicostata*
(b) *Eichhornia crassipes*
(c) *Escherichia coli*
(d) *Entamoeba histolytica*

128 Sewage water can be purified for recycling with the action of
(a) microorganisms (b) penicillin
(c) fishes (d) aquatic plants

129 A sewage treatment process in which a portion of the decomposer bacteria present in the waste is recycled into the beginning of the process, is called
(a) cyclic treatment
(b) primary treatment
(c) activated sludge treatment
(d) tertiary treatment

130 DDT has been a major pollutant because it
(a) kills aquatic animals
(b) kills pests
(c) destroys many valuable species
(d) is non-biodegradable

131 Some possible properties of modern insecticides are listed below. When these insecticides are used, which property helps to keep environmental pollution at the lowest level?
(a) Accumulates in the bodies of predators
(b) Broken down by soil bacteria
(c) Easily washed into lakes and rivers
(d) Taken up by the plant roots

132 Formation of non-functional methaemoglobin causes blue-baby syndrome. This is due to
(a) excess of arsenic concentration in drinking water
(b) excess of nitrates in drinking water
(c) deficiency of iron in food
(d) increased methane content in the atmosphere

133 Itai-itai disease which results in kidney damage is caused by the poisoning of
(a) mercury (b) lead (c) chromium (d) cadmium

134 In a polluted environment, the maximum pollutant will occur in
(a) primary producers (b) tertiary producers
(c) secondary producers (d) primary consumers

135 Bad taste and odour of the water bodies of tanks, ponds, etc. is due to
(a) acids and grease (b) free chlorine
(c) fats (d) starch

136 Aluminium in drinking water may influence …… metabolism.
(a) nitrate (b) phosphate
(c) calcium (d) fluorine

137 Eutrophic lakes are highly
(a) productive (b) enriched with phosphates
(c) Both (a) and (b) (d) None of these

138 The index of pollution in a polluted lake is
(a) *Daphnia* (b) BOD
(c) Stoneflies (d) All of these

139 During sewage treatment, biogases are produced which include ➜ NEET 2013
(a) methane, oxygen, hydrogen sulphide
(b) hydrogen sulphide, methane, sulphur dioxide
(c) hydrogen sulphide, nitrogen, methane
(d) methane, hydrogen sulphide, carbon dioxide

140 Lead, a toxic chemical is mainly considered as
(a) air pollutant (b) water pollutant
(c) soil pollutant (d) noise pollutant

141 Which of the following is/are responsible for increased soil pollution?
(a) Excreta of human and other living beings
(b) Radioactive wastes as C^{14}
(c) Fertilisers, pesticides, etc
(d) All of the above

142 Soil pollution more often results in
(a) changing the chemistry of soil
(b) decreased soil fertility
(c) increased crop yield
(d) Both (a) and (b)

143 The chemicals released due to unsustainable agricultural practices and causing soil pollution are
(a) pathogens (b) chemical fertilisers
(c) strontium-90 (d) None of these

144 Organic farming is an excellent substitute for increased chemical use in agriculture. Select an option which justifies the above statement.
(a) Waste of one process is cycled as nutrients in other processes
(b) It is a zero waste procedure
(c) Both (a) and (b)
(d) It is carried out at high temperatures

145 Percentage of forest area recommended by the national forest policy in plains is

(a) 33% (b) 67%
(c) 30% (d) 10%

146 Chipko movement, a first of its kind public campaign first occurred in

(a) Sundarban area in Bengal (b) Tehri Garhwal of UK
(c) Rajasthan (d) None of these

147 The practice of restoring a forest cover over an area where one existed previously but was removed at some time, in the past is

(a) afforestation
(b) reforestation
(c) desertification
(d) deforestation

148 Polyblend is a fine powder of recycled modified plastic which

(a) enhance the bitumen's water repellant properties
(b) helps to increase the life of road
(c) Both (a) and (b)
(d) is a type of magnet and helps to improve blood circulation when applied on human body

149 Steps taken by the Government of india to control air pollution includes

(a) complulsory mixing of 20% ethyl alcohol with petrol and 20% biodiesel with diesel
(b) compulsory PUC (Pollution Under Control) certification of petrol driven vehicles, which tests for carbon monoxide and hydrocarbons
(c) permission to use only pure diesel with a miximum of 500 ppm sulphur as fuel for vehicles
(d) use of non-polluting compressed Natural Gas (CNG) only as fuel by all buses and trucks

150 Match the following columns.

Column I		Column II	
A.	Bishnoi Community	1.	1988
B.	Chipko movement	2.	1980
C.	Joint Forest Management	3.	1974
D.	The National Forest Policy	4.	1731

Codes

	A	B	C	D
(a)	1	4	3	2
(b)	4	3	2	1
(c)	3	2	1	4
(d)	4	1	2	3

Directions (Q. Nos. 151-158) *In each of the following questions a statement of Assertion is given followed by a corresponding statement of Reason. Of the statements, mark the correct answer as*

(a) If both Assertion and Reason are true and Reason is the correct explanation of the Assertion
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) If Assertion is true but Reason is false
(d) If both Assertion and Reason are false

151 **Assertion** Garden is an example of *ex situ* conservation.
Reason Garden is an artificial habitat resembling to the natural habitat of organisms.

152 **Assertion** A Suspended Particulate Matter (SPM) is an important pollutant released by diesel vehicles.
Reason Catalytic converters greatly reduce pollution caused by automobiles.

153 **Assertion** Agricultural output increased several times after introduction of DDT.
Reason DDT was the first insecticide used on a wide scale.

154 **Assertion** A concentration of methane in the atmosphere has more than doubled in the last 250 years.
Reason Wetlands and rice fields are the major sources of methane.

155 **Assertion** Methane component of greenhouse gases contribution to global warming is about 20%.
Reason Introduction of multipoint fuel injection engines in automobiles has decreased methane content in the exhausts.

156 **Assertion** Presently, the global atmosphere is warming up.
Reason The depletion of stratospheric ozone layer has resulted in increase in ultraviolet radiations reaching the earth.

157 **Assertion** UV radiation causes photodissociation of ozone into O_2 and O, thus causing damage to the stratospheric ozone layer.
Reason Ozone hole is resulting in global warming and climate change.

158 **Assertion** Deforestation is one of the main factors contributing to global warming.
Reason Besides CO_2, two other gases methane and CFCs are also included under greenhouse gases.

DAY PRACTICE SESSION 2

PROGRESSIVE QUESTIONS EXERCISE

1 Name the medicinal plant growing in different Himalayan ranges.
(a) *Plantago ovata* (b) *Atropa belladona*
(c) *Rauwolfia vomitoria* (d) *Cinchona officinalis*

2 Hotspots of biodiversity mean
(a) species in particular niche/area
(b) species diversity at particular area
(c) areas of the earth that contain many endemic species
(d) species serves as proxy for entire communities in particular area

3 Oran is a
(a) sacred grove (b) sacred landscape
(c) sacred animal (d) endangered animal

4 Which of the following animals has become extinct from India?
(a) Snow leopard (b) *Hippopotamus*
(c) Wolf (d) Cheetah

5 Maximum species diversity is seen in latitudinal range of
(a) 23.5° N to 66.5° N (b) 23.5° N to 23.5°S
(c) 23.5° S to 66.5° N (d) 66.5° N to 90° N

6 Which one of the following is not included under *in situ* conservation?
(a) Sanctuary (b) Botanical garden
(c) Biosphere reserve (d) National park

7 Plant species on verge of extinction due to overexploitation is
(a) *Centella* (b) *Podophyllum*
(c) *Gloriosa* (d) All of these

8 The venue and year of the Earth Summit Conservation of Biodiversity was
(a) Ramsar, 1974 (b) Stockholm, 1974
(c) South Africa, 2002 (d) Rio de Janeiro, 1992

9 'Evil Quartet' is related with
(a) loss of biodiversity (b) loss of standing crop
(c) loss of alien species (d) loss of climax community

10 Which of the following is *ex situ* conservation?
(a) Protecting fishing in Bhitar kanika
(b) Banning of Akhard Sikar in Simlipal
(c) Breeding of animals in Nandankanan
(d) Protecting migration of birds in Chilka lake

11 Which of the following has the greatest biodiversity on earth?
(a) Tropical Amazonian rainforests in South America
(b) Eastern Ghats and Western Himalayas
(c) Sahara deserts
(d) Savanna forests

12 Which one of the following is a pair of endangered species?
(a) Garden lizard and Mexican poppy
(b) Rhesus monkey and Sal tree
(c) Indian peacock and Carrot grass
(d) Hornbill and Indian aconite

13 An institution, where valuable plant material likely to become irretrievably lost in the wild or in cultivation is preserved in a viable condition is known as
(a) genome (b) gene library
(c) gene bank (d) herbarium

14 Which one of the following is not a wildlife conservation project?
(a) Project Dodo (b) Project Tiger
(c) Project Hangul (d) Project Indian Bustard

15 What are large undisturbed areas where wildlife is protected in its natural habitat?
(a) Biosphere reserves
(b) National parks
(c) Sacred landscapes
(d) Wildlife sanctuaries

16 'Project Tiger' was launched following the recommendations of
(a) IBWL (b) BNHS
(c) CITES (d) NWAP

17 Endangered or threatened animals are protected from extinction by *ex situ* conservation in
(a) national parks (b) zoological parks
(c) wildlife sanctuary (d) biosphere reserves

18 Which one of the following is not observed in biodiversity hotspot?
(a) Endemism
(b) Species richness
(c) Accelerated species loss
(d) Lesser interspecific competition

19 Most recently notified biosphere reserve in India is
(a) Cold desert (b) Seshachalam
(c) Dehang Debang (d) Agasthyamalai

20 Which of the following statements is not true?
(a) Robert May places the global species diversity at about 7 million
(b) More than 70 per cent of all the species recorded are animals
(c) Plants comprise not more than 22 per cent of the total recorded global species
(d) Eastern Ghats have a greater amphibian species diversity than the Western Ghats

21 Select the incorrect statement.

(a) Stellar's sea cow and passenger pigeon got extinct due to overexploitation by man
(b) *Lantana* and *Eichhornia* are invasive weed species in India
(c) Species diversity increases as we move away from the equator towards the poles
(d) The historic convention on biological diversity was held in 1992

22 What is common to *Lantana*, *Eichhornia* and African catfish?

(a) All are endangered species of India
(b) All the species are neither threatened nor indigenous species of India
(c) All are keystone species
(d) All are mammals found in India

23 India now has

(a) 10 Biosphere Reserves, 50 National Parks and 400 Wildlife Sanctuaries
(b) 14 Biosphere Reserves, 50 National Parks and 400 Wildlife Sanctuaries
(c) 10 Biosphere Reserves, 90 National Parks and 448 Wildlife Sanctuaries
(d) 17 Biosphere Reserves, 96 National Parks and 441 Wildlife Sanctuaries

24 Match the following columns.

	Column I (Category)		Column II (Example)
A.	Extinct	1.	Polar bear
B.	Endangered	2.	Tiger shark
C.	Vulnerable	3.	Mammoth
D.	Near threatened	4.	Giant panda

Codes

	A	B	C	D		A	B	C	D
(a)	3	1	4	2	(b)	1	2	3	4
(c)	3	4	1	2	(d)	3	2	1	4

25 From the point of view of rhinoceros reserve which one of the following is correct?

(a) Corbett — Punjab
(b) Palamou — Odisha
(c) Kaziranga — Assom
(d) Nandan Kanan — Rajasthan

26 Which one of the following is the correctly matched pair of an endangered animal and a National Park?

(a) Lion — Corbett National Park
(b) Rhinoceros — Kaziranga National Park
(c) Wild ass — Dudhwa National Park
(d) Great Indian bustard — Keoladeo National Park

27 Choose the incorrect matched pair.

(a) Carrot grass — *Lantana*
(b) Wildlife safari parks — *Ex situ* conservation
(c) Amazon rainforest — Lungs of the planet
(d) Khasi and Jaintia hills — Meghalaya

28 Match the following columns.

	Column I (Reserve area)		Column II (State)
A.	Keoladeo Bird Sanctuary	1.	Asom
B.	Dudhwa National Park	2.	Chhattisgarh
C.	Kanha National Park	3.	Rajasthan
D.	Kaziranga National Park	4.	Uttar Pradesh

Codes

	A	B	C	D		A	B	C	D
(a)	1	2	4	3	(b)	3	4	2	1
(c)	2	3	1	4	(d)	4	1	3	2

29 Which of the following is a secondary pollutant?

(a) SO_2 (b) CO_2
(c) CO (d) O_3

30 Anxiety and stress reactions are common in people exposed to increased levels of

(a) air pollution (b) noise pollution
(c) water pollution (d) nuclear pollution

31 According to the Central Pollution Control Board, particles that are responsible for causing great harm to human health are of diameter

(a) 2.50 micrometres (b) 5.00 micrometres
(c) 10.00 micrometres (d) 7.5 micrometres

32 Carbon monoxide combines with haemoglobin at an increased rate to form

(a) carboxyhaemoglobin (b) leghaemoglobin
(c) haemocyanin (d) methaemoglobin

33 Ecosanitation is a sustainable system for handling …… to reduce its level in water bodies.

(a) soil (b) human excreta
(c) water (d) radioactive materials

34 An effective method used for disposing off the infections and hazardous hospital wastes is

(a) recycling (b) open dumping
(c) burning (d) None of these

35 World's most problematic aquatic weed responsible for killing aquatic biodiversity by suffocating them.

(a) *Azolla* (b) *Wolffia* (c) *Eichhornia* (d) *Trapa*

36 Joint Forest Management (JFM) concept was introduced in India during

(a) 1970s (b) 1980s
(c) 1990s (d) 1960s

37 Acid rain is caused by increase in the atmospheric concentration of

(a) SO_2 and NO_2 (b) SO_3 and CO
(c) CO_2 and CO (d) O_3 and dust

38 The two gases making highest relative concentration to the greenhouse gases are

(a) CO_2 and CH_4 (b) CH_4 and NO_2
(c) CFCs and N_2O (d) CO_2 and N_2O

39 In a coal fired power plant, electrostatic precipitators are installed to control emission of

(a) SO_2 (b) NO_x
(c) SPM (d) CO

40 Indicator plants, which can be used to indicate atmospheric pollution by SO_2 are

(a) grassland like *Deschampsia*
(b) moss like *Sphagnum*
(c) lichens like *Usnea*
(d) climbers like *Cucurbita*

41 Accodring to Euro II norms (1993), content of sulphur in diesel should be

(a) 350 ppm (b) 150 ppm
(c) 25 ppm (d) 5ppm

42 The presence of water blooms in a lake indicates

(a) excessive nutrient
(b) nutrient deficiency
(c) oxygen deficiency
(d) the absence of herbivores

43 Limit of BOD prescribed by Central Pollution Control Board for the discharge of industrial and municipal waste water into natural surface water, is

(a) < 3.0 ppm (b) < 10 ppm
(c) < 100 ppm (d) < 30 ppm

44 Biochemical Oxygen Demand (BOD) may not be a good index for pollution in water bodies receiving effluents from

(a) domestic sewage (b) dairy industry
(c) petroleum industry (d) sugar industry

45 'Chipko Movement' launched in Uttarakhand hills is connected with

(a) project tiger
(b) plant breeding
(c) plant/forest conservation
(d) conservation of natural resources

46 DDT residues are rapidly passed through food chain causing biomagnification because DDT is

(a) liposoluble
(b) moderately toxic
(c) non-toxic to aquatic animals
(d) water soluble

47 UV rays are non-ionising type and are lethal due to inactivation of

(a) proteins (b) pigments
(c) nucleic acid (d) All of these

48 Which of the following is correct?

(a) PAN (Peroxy Acetyl Nitrate) is a secondary pollutant
(b) Photochemical smog was first observed in Los Angeles
(c) Carbon monoxide has about 200 times greater affinity for haemoglobin as compared to oxygen
(d) All of the above

49 Recent reports of acid rains in big industrial cities are due to the effect of atmospheric pollution by

(a) more release of NO_2 and SO_2 by burning of fossil fuels
(b) more release of CO_2 by burning of coal/wood cutting of forests and increasing populations
(c) excessive release of NH_3 by coal gas/industries
(d) excessive release of CO by incomplete combustion of carbonaceous fuels

50 Pollution from animal excreta and organic waste from kitchen can be most profitably minimised by

(a) stroring them in underground storage tanks
(b) using them for producing biogas
(c) vermiculture
(d) using them directly as biofertilisers

51 Greenhouse effect is due to the presence of

(a) ozone layer in the atmosphere
(b) moisture layer in the atmosphere
(c) CO_2 layer in the atmosphere
(d) infrared light reaching the earth

52 Minamata disease was caused due to the consumption of

(a) sea food containing lot of cadmium
(b) fish contaminated with mercury
(c) oysters with lot of pesticide
(d) sea food contaminated with sellenium

53 Global warming can be controlled by

(a) reducing reforestation, increasing the use of fossil fuel
(b) increasing deforestation, slowing down the growth of human population
(c) increasing deforestation, reducing efficiency of energy usage
(d) reducing deforestation, cutting down use of fossil fuel

54 Choose the incorrect statement.

(a) The Montreal Protocol is associated with the control of emission of ozone depleting substance
(b) Methane and carbon dioxide are greenhouse gases
(c) Dobson units are used to measure oxygen content
(d) Use of incinerators is crucial to disposal of hospital wastes

55 'Kyoto Protocol' is multinational international treaty for

(a) phasing out greenhouse gases
(b) controlling ozone destroying substances
(c) management of hazardous wastes
(d) conservation of biodiversity

56 Match the following columns.

	Column I		Column II
A.	DDT	1.	Snow blindness
B.	Biodegradable organic waste	2.	Algal bloom
C.	UV	3.	BOD
D.	Phophates and nitrates	4.	Biomagnification

Codes

	A	B	C	D		A	B	C	D
(a)	1	2	3	4	(b)	2	1	4	3
(c)	4	3	1	2	(d)	1	4	3	2

Directions (Q. Nos. 57-59) *In each of the following questions a statement of Assertion is given followed by the corresponding statement of Reason. Of the statements, mark the correct answer as*

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion
(c) If Assertion is true but Reason is false
(d) If both Assertion and Reason are false

57 **Assertion** In tropical rainforests, O-horizon and A-horizon of soil profile are shallow and nutrient poor.
Reason Excessive growth of microorganisms in the soil depletes its organic content.

58 **Assertion** Increase in ozone concentration near the earth's surface affects crop yield.
Reason The crop yield reduces because UV rays reach the earth's surface unfiltered.

59 **Assertion** Kyoto protocol an international conference was initiated to discuss global warming.
Reason According to this protocol, the major nations abide to reduce concentration of greenhouse gases by 2012.

ANSWERS

SESSION 1

1 (c)	**2** (a)	**3** (c)	**4** (a)	**5** (c)	**6** (c)	**7** (a)	**8** (b)	**9** (b)	**10** (d)
11 (a)	**12** (a)	**13** (c)	**14** (c)	**15** (d)	**16** (a)	**17** (b)	**18** (c)	**19** (a)	**20** (b)
21 (b)	**22** (d)	**23** (c)	**24** (b)	**25** (b)	**26** (b)	**27** (c)	**28** (c)	**29** (d)	**30** (c)
31 (a)	**32** (b)	**33** (a)	**34** (a)	**35** (d)	**36** (a)	**37** (b)	**38** (b)	**39** (a)	**40** (c)
41 (d)	**42** (b)	**43** (b)	**44** (c)	**45** (b)	**46** (c)	**47** (b)	**48** (b)	**49** (d)	**50** (c)
51 (c)	**52** (b)	**53** (d)	**54** (a)	**55** (c)	**56** (a)	**57** (b)	**58** (a)	**59** (c)	**60** (a)
61 (b)	**62** (d)	**63** (a)	**64** (a)	**65** (c)	**66** (a)	**67** (b)	**68** (a)	**69** (b)	**70** (d)
71 (c)	**72** (c)	**73** (d)	**74** (c)	**75** (d)	**76** (d)	**77** (d)	**78** (c)	**79** (c)	**80** (d)
81 (c)	**82** (d)	**83** (d)	**84** (b)	**85** (a)	**86** (d)	**87** (c)	**88** (a)	**89** (a)	**90** (d)
91 (c)	**92** (c)	**93** (b)	**94** (a)	**95** (c)	**96** (c)	**97** (c)	**98** (a)	**99** (b)	**100** (a)
101 (a)	**102** (b)	**103** (b)	**104** (c)	**105** (c)	**106** (b)	**107** (b)	**108** (d)	**109** (b)	**110** (a)
111 (c)	**112** (b)	**113** (a)	**114** (a)	**115** (c)	**116** (d)	**117** (a)	**118** (a)	**119** (a)	**120** (d)
121 (d)	**122** (d)	**123** (d)	**124** (b)	**125** (a)	**126** (c)	**127** (b)	**128** (a)	**129** (c)	**130** (d)
131 (b)	**132** (b)	**133** (d)	**134** (c)	**135** (a)	**136** (d)	**137** (c)	**138** (a)	**139** (d)	**140** (c)
141 (d)	**142** (d)	**143** (b)	**144** (c)	**145** (a)	**146** (b)	**147** (b)	**148** (c)	**149** (d)	**150** (b)
151 (a)	**152** (b)	**153** (a)	**154** (a)	**155** (b)	**156** (b)	**157** (d)	**158** (b)		

SESSION 2

1 (c)	**2** (c)	**3** (a)	**4** (d)	**5** (b)	**6** (b)	**7** (a)	**8** (d)	**9** (a)	**10** (c)
11 (a)	**12** (d)	**13** (c)	**14** (a)	**15** (a)	**16** (a)	**17** (b)	**18** (d)	**19** (b)	**20** (d)
21 (c)	**22** (b)	**23** (d)	**24** (c)	**25** (c)	**26** (b)	**27** (a)	**28** (b)	**29** (d)	**30** (b)
31 (a)	**32** (d)	**33** (b)	**34** (c)	**35** (c)	**36** (b)	**37** (b)	**38** (a)	**39** (c)	**40** (c)
41 (a)	**42** (a)	**43** (b)	**44** (c)	**45** (c)	**46** (a)	**47** (d)	**48** (d)	**49** (a)	**50** (b)
51 (c)	**52** (b)	**53** (d)	**54** (c)	**55** (a)	**56** (c)	**57** (b)	**58** (a)	**59** (a)	