Chapter 15. Environmental Issues

Pollution, Solid and Radioactive Wastes

1 Mark Questions

1.State the cause of accelerated eutrophication. [Delhi 2014]

Ans. Effluents from industries and domestic sewage and other human activities are the causes of accelerated eutrophication,

2.Inspite of being non-polluting, why are there great apprehensions in using nuclear energy for generating electricity? [Foreign 2014]

Ans.Despite being non-polluting, there are great apprehensions in using nuclear energy for generating electricity because of

(i) danger of accidental leakage.

(ii) lack of safe disposal methods of radioactive waste.

3.Why is the use of unleaded petrol recommended for motor vehicles equipped with catalytic convertors? [All India 2013,2012 Foreign 2010] or

Why are owners of motor vehicles equipped with catalytic convertors advised to use unleaded petrol? [Delhi 2009]

Ans.Lead found in petrol corrode the catalytic rods of platinum, rhodium which act as the catalyst in catalytic convertor and decreases its efficiency. Thus, unleaded petrol is recommended for motor vehicles equipped with catalytic convertors

4.Why is Eichhornia crassipes nick named as Terror of Bengal? [Delhi 2012]

Ans. The plant Eichhornia crassipes is nick named as the Terror of Bengal' because it grows at an alarming rate and spreads on the surface of the water body. This cuts out light and also causes an increase in the oxygen demand. Thus, causing the death of fishes and other aquatic organisms,

5.How do algal blooms affect the life in water bodies? [All India 20113]

Ans.Algal blooms cause deterioration of the water quality. They reduce the dissolved oxygen content of water and cause mortality (death) of aquatic animals like fish. They also secrete chemicals, toxic to humans and many other animal

6.Eichhornia crassipes is an alien hydrophyte introduced in India. Mention the problems posed by this plant. [All India 2010c]

Ans. **Eichhornia crassipes** (water hyacinth) is the world's most problematic aquatic weed. It grows abundantly in eutrophic water bodies and imbalances water ecosystem. It blocks the water, ways and growth of other organisms due to its excessive growth

7.Given below are a few impurities in Urban wastewater. Select two colloidal impurities : ammonia, faecal matter, silt, bacteria, calcium. [All India 2009c]

Ans. Faecal matter and bacteria are two colloidal impurities suspended in urban waste

8.Name the world's most problematic aquatic weed. What is the nature of the waterbody in which the weeds grow abundantly? [Delhi 2008]

Ans. The world's most problematic weed is Eichhornia crassipes (water hyacinth). In Eutropic water bodies, weeds grow abundantly

2 Marks Questions

9.Name two metals used in a catalytic convertor. How do they help in keeping the environment clean? [Delhi 2014c]

Ans. The two metals used in a catalytic convertor are platinum palladium and rhodium (any two).

The catalytic convertors fitted in automobiles reduce the emission of poisonous gases by converting the unburnt hydrocarbons into $C0_2$ and water, carbon monoxide to $C0_2$ and Nitric oxide (NO) to nitrogen, while the exhaust is passed through them.

10.'Fish mortality increases with influx of nutrients in a freshwater body'. Write two reasons. How will the influx of nutrients affect the BOD level of this waterbody? [All India 2014c]

Ans. Fish mortality increases with influx of nutrients in a freshwater body because

(i) Abundant nutrients encourage the growth of free floating algae and plants, thereby increasing organic matter.

(ii) With the increase in organic matter and its deposition, the water body becomes shallows and warmer. Further deteroriation of organic matter makes the environment toxic and unfit for survival of aquatic life, i.e. fishes.

The influx of nutrients increases the BOD level of water body, as the microbes flourishing in it consume up all the oxygen in degrading the organic matter. As the Biochemical Oxygen Demand (BOD) increases, the Dissolved Oxygen (DO) decreases, making the water body unfit for aquatic life

11.Explain how does the inflow of large amount of nutrients like phosphates and nitrates into the water body drastically affects the aquatic life there. Name the phenomenon responsible. [Delhi 2014c]

Ans. The inflow of large amounts of nutrients like nitrates and phosphates initially encourages growth of aquatic organisms, plants and animals. With time as the organic matter increases, debris along with silt piles up at bottom making the water body shallower and warmer. This leads to gradual appearance of floating and marshy plants and is eventually converted into lake. Hence, the aquatic life gets severely affected and disrupted.

This phenomenon is called eutrophication. It may be natural or artificial due to result of human activities.

12.How did Ahmad Khan, plastic sac manufacturer from Bengaluru, solve the ever-increasing problem of accumulating plastic waste? [All India 2012]

or

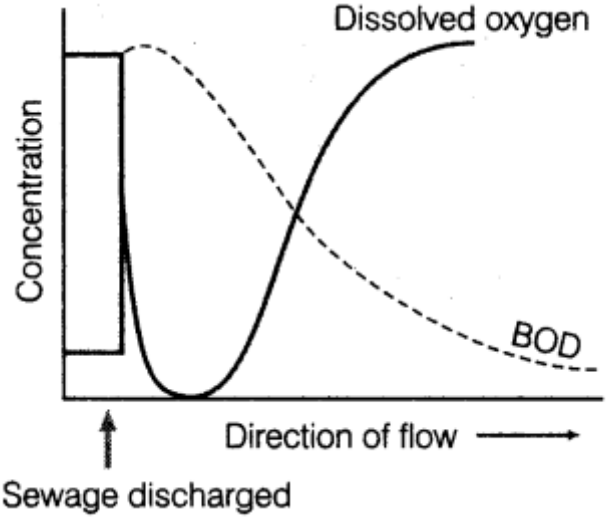
What is polyblend? Why did the plastic manufactures think of producing it? Write its usefulness? [All India 2011]

Ans. Ahmad Khan developed a fine powder called polyblend of recycled modified plastic. This mixture is mixed with the bitumen and used to lay roads. It enhanced the bitumen's water repellant properties and helped to increase road life by a factor of three. By this way, the problems created by plastic waste was solved.

13.State the function of a catalytic convertor in an automobile. [All India 2011C]

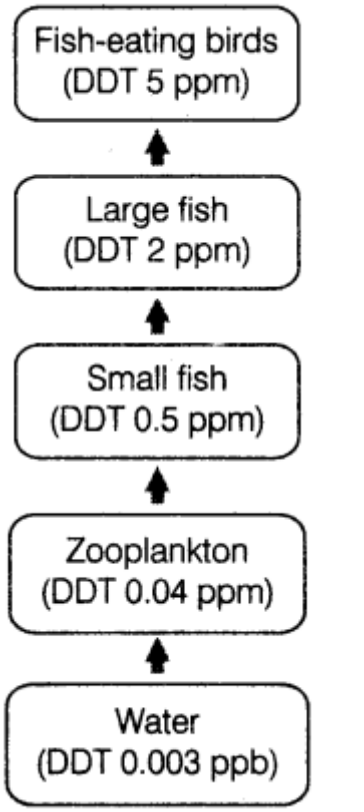
Ans.Catalytic convertor are used for reducing emission of poisonous gases like $N0_2$ and CO. When exhaust emission passes through catalytic convertor, nitric oxide splits into nitrogen and oxygen, carbon monoxide is oxidised into carbon dioxide and unburnt hydrocarbons get burnt completely into $C0_2$ and H_20

14.Study the graph given below. Explain how oxygen concentration is affected in the river, when sewage is discharged into it? [Delhi 2011]



Ans. The graph shows the decrease in dissolved oxygen due to sewage decomposition. When sewage is discharged into river, microorganisms present in water helps in biodegradation of organic matter. They consume a lot of oxygen. Therefore, there is a sharp decline in dissolved oxygen. When the sewage is completely degraded, oxygen concentration again increases.

15.Study the given aquatic food chain. Answer the question that follow [Delhi 2010]



(i) Give reason, why there is a continuous increase in the DDT content in different trophic levels of the chain?

(ii) Name the phenomenon responsible for the increase in DDT content.

Ans.

(i) Continuous increase in DDT concentration is becuase of following reasons:

- It cannot be metabolised.
- It is not excreted, but it is passed on to next higher tropic level.

(ii) Biomagnification is the phenomenon responsible for increase in DDT content

16.How does an electrostatic precipitator work to remove particulate pollutants released from the thermal power plants? [Delhi 2010]

Ans. Electrostatic Precipitator (ESP) is an electric device to remove particulate matter present in the exhaust of thermal power plants. ESP has electrode wires and a stage of collecting plafes. Wires are provided with an electric current of several thousands volts, which produces a corona that releases electrons^) These electrons attach to dust particles, giving them a negative charge within a very small fraction of a second. Collecting plates are earthed, so that they attract charged dust particles. The velocity of air passing through plates is slow enough to allow the dust particles to fall on them.

17.Mention the major cause of air pollution in metro cities. Write any three ways, which it can be reduced. [All India 2010]

Ans.Major causes of air pollution are:

(i) Smoke from thermal power plants, forest fires, volcanic eruptions.

(ii) Use of unleaded petrol.

(iii) Excessive use of fossil fuels by automobiles and industries releasing particulate and air pollutants.

Three control methods are:

(i) Using electrostatic precipitators to remove particulate matter from exhaust of industries and thermal power plant.

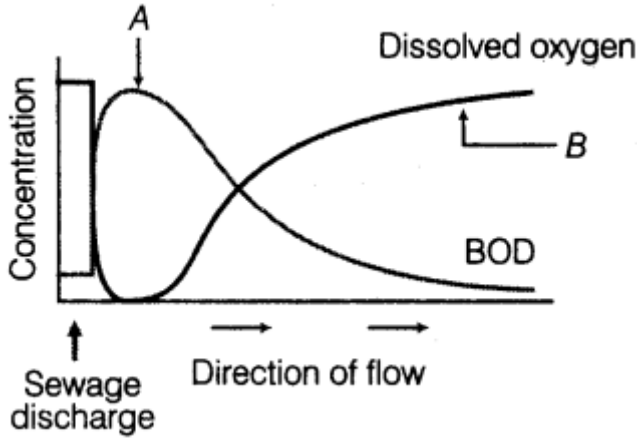
(ii) Using scrubber to remove gases like so_2.

(iii) Use of catalytic convertors in automobiles for reducing emission of poisonous gases.

18. Mention how e-waste is produced and disposed off? Write the solution for its treatment. [All India 2010]

Ans. Electronic wastes (e-waste) include irrepairable electronic goods and computers. E-wastes can be buried in landfills or incinerated. Recycling is the only solution for the treatment of e-wastes.

19. Explain giving reasons the cause of appearance of peaks A and B in the graph shown below.



Ans. A -High BOD due to sewage discharge complete.

B-Increase in dissolved oxygen due to sewage decomposition.

Microorganisms involved in biodegradation of organic matter consume a lot of oxygen. Therefore, there is a sharp decline in dissolved oxygen. When the sewage is completely degraded, oxygen concentration again increases.

20.Explain accelerated eutrophication. Mention any two consequences of this phenomenon. [Delhi 2009]

Ans.Accelerated eutrophication It is the phenomenon that accelerates the ageing process of a water body due to sewage, agricultural and industrial wastes.

Consequences

(i) The nitrates, phosphates that enter the water body stimulate the excess growth of algae and some plants. This causes unpleasant odour and scum formation.

(ii) Due to this, dissolved oxygen content of water decreases leading to death of aquatic organisms

21.A crane had DDT level as 5 ppm in its body. What would happen to the population of Such birds? Explain giving reasons. [Delhi 2009]

Ans. The high concentration of DDT (5 ppm) in cranes disturb their calcium metabolism, which causes thinning of egg shell and their premature breaking, thereby causing decline in bird population.

22.Explain the cause of algal bloom in a water body. How does it affect an ecosystem? [All India 2009]

Ans. Algal bloom is caused by excess the presence of nutrients (mainly nitrogen and phosphorus) in the water body. They cause

(i) Deterioration of water quality.

(ii) Fish mortality.

(iii) Toxic effect on aquatic animals and human beings.

23.How do automobiles fitted with catalytic convertors reduce air pollution? Suggest the best fuel for such vehicles. [Foreign 2009]

Ans.Catalytic convertor are used for reducing emission of poisonous gases like $N0_2$ and CO. When exhaust emission passes through catalytic convertor, nitric oxide splits into nitrogen and oxygen, carbon monoxide is oxidised into carbon dioxide and unburnt hydrocarbons get burnt completely into $C0_2$ and H_20

24.Thermal power plants are inevitable in an industrial and densely populated country like ours. What harm they do the environment? Also mention any precaution that could be taken to save our environment. [Delhi 2008]

Ans.Thermal power plants have smoke stacks, which release particulate and gaseous air pollutants in the environment. When these pollutants are inhaled. They cause

(i) Breathing and respiratory problems.

(ii) Irritation, inflammation and damage to lung alveoli.

(iii) Premature death.

Precautionary measure: By use of electrostatic precipitators, 99% of the particulate matter can be removed

25.DDT content in the water of a lake that supplies drinking water to the nearby villages, is found to be 0.003 ppm. The kingfishers of that area are reported to have 2 ppm of DDT. Why has the concentration increased in these birds? What harm will this cause to the bird population? Name the phenomenon. [Ail India 2008]

Ans. DDT gets accumulated in the organisms and passes to next higher trophic level through food chain because it cannot be metabolised or excreted. Hence, concentration of DDT gets increased in birds. They disturb the calcium metabolism and causes thinning of egg shell and their premature breaking.

This eventually causes a decline in the bird population. This phenomenon is called biomagnification

26.Name any two sources of electronic wastes. Mention any one way each of its disposal in developing and developed countries. [Delhi 2008]

Ans. Sources of electronic wastes are irrepairable computers and other electronic goods.

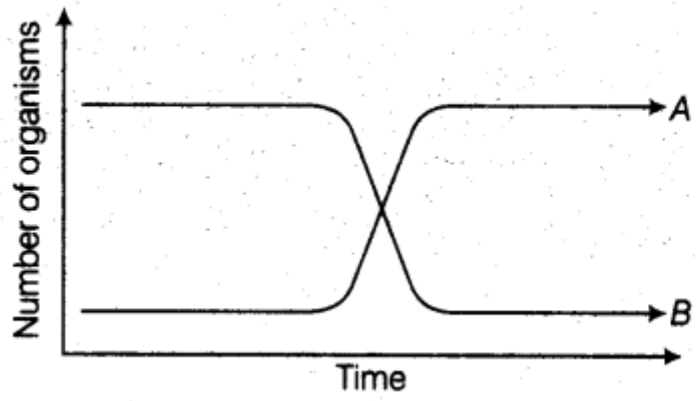
Disposal methods of E-waste.

In developed countries E-wastes are buried in landfills or incinerated.

In developing countries Developed countries export e-wastes mainly to China, India and Pakistan. Here, metals like copper, iron, silicon, nickel and gold are recovered during recycling process. It involves manual participation

3 Marks Questions

27.Two types of aquatic organisms in a lake show specific growth patterns as shown below, in a brief period of time. The lake is adjacent to an agricultural land extensively supplied with fertilisers.



Answer the questions based on the facts given above:

- **Name the organisms depicting the patterns A and**
- **State the reason for the growth pattern seen in**
- **Write the effects of the growth patterns seen above. [All India 2014]**

Ans. (i) The organisms depicting pattern A are microorganisms while B depicts-zooplanktons or fishes.

(ii) With the increase in organic matter of lake due to influx of nutrients from agricultural land, the number of microorganisms increases to degrade the organic matter.

(iii) From the above growth patterns, it can be concluded that

(a) With the increase in microbes in water body the BOD increases, making it unfit for aquatic life.

(b) Dissolved oxygen reduces drastically leading to mortality of aquatic organisms, i.e. fishes.

28.Presently, air quality of Delhi has significantly improved in comparison to what existed before 1997. This is the result of a lot of conscious human efforts. You are being asked to conduct an awareness programme in your locality wherein you will comment on the steps taken by the Delhi Government to improve the air quality. [Foreign 2014]

- **Write any two of your comments.**
- **List any two ways that you would include in your programme so as to ensure the maintenance of good quality of air.**
- **State any two values your programme will inculcate in the people of your locality. [Foreign 2014]**

Ans.(i) The comments on the steps taken by

Delhi Government to improve air quality are:

(a) Switching over of entire public transport from diesel or petrol to CNG.

(b) Use of unleaded and low-sulphur petrol by vehicles.

(ii) The other two ways that can be included in the programme, so as to ensure maintenance of good quality of air can be:

- Create awareness among people to switch over to CNG as it is less polluting as well as cost effective and phasing out of old vehicles.
- Follow the routine pollution check according to pollution-level norms for vehicles and use catalytic convertors.

(iii) The programme can inculcate following values:

- The people will become more responsible and guard their contributions towards air pollution.
- Knowing the hazards and various consequences of pollutants, they will not indulge in activities esp. unauthorised and without having permission and prevent others from doing so.

29.A few residents in your locality, for business gains, have established small scale indsutrial/commercial activities such as pathological labs and fabric dyeing centres without obtaining 'No objection certificates' from municipal authorities. Would you support these activities? Give any three reasons in support of your answer. [All India 2014C]

Ans. No, these activities would not be supported, because

(i) The industrial activities will release its toxic gases into the atmosphere and other chemicals into the nearby water bodies without treating it and thus, causing pollution of air, water and soil.

(ii) The land acquired for operating these activities should be at a location where people or neighbourhood are least affected, so prior permission is mandatory.

(iii) Disposable waste of path labs can be infectious and toxic, also those including from other industries, so there needs to be a check on how the wastes are disposed off, segregated and recycled. (3)

30.Why should the spraying of DDT as an insecticide on vegetable crops be banned? Explain. [Delhi 2013c]

Ans. Spraying of DDT as an insecticide on vegetable crops should be banned because our foodgrains such as wheat, rice, fruits and vegetables accumulate the varying amount of insecticide residues and that enter the human body through food chain. As these chemicals are toxic and non-biodegradable, they get accumulated in organisms body and are difficult to excrete and their concentration goes on increasing

31.By the end of 2002, the public transport of Delhi switched over to a new fuel. Name the fuel. Why is this fuel considered better? Explain. [Delhi 2012]

Ans. Delhi had been categorised as the fourth most polluted city of the world in a list of 41 cities in the 1990s. Vehicular pollution has added to the pollution of air in Delhi. So, in year 2002, it switched over to a new fuel CNG (Compressed Natural Gas), Reasons of CNG being better fuel

(i) It is a clean fuel that produces very little unburnt particles. Hence, it is ecofriendly.

(ii) It burns most efficiently. Unlike petrol or diesel, very little is left unburnt.

(iii) It is cheaper and cannot be siphoned off by thieves and adulterated like petrol or diesel.

32.How does on algal bloom cause eutrophication of a water body? Name the weed that can grow in such a eutrophic lake. [Delhi 2012]

Ans. Algae are the major producers of any aquatic ecosystem. Run-off of nutrients such as animal wastes, fertilisers (N and P) and sewage from land leads to an increase in the fertility of the lake. It causes a tremendous increase in the primary productivity of the water body leading to increased growth of algae, resulting into algal bloom.

Later, the decomposition of these algae depletes the supply of oxygen, leading to the death of other aquatic animal life. This is called eutrophication.

Eichhornia crassipes (water hyacinth) also called Terror of Bengal can grow in such eutrophic lake

33.(i) Why are colourful polysterene and plastic packaging used for protecting the food, considered an environmental menace?

(ii) Write about the remedy found for the efficient use of plastic wastes by Ahmad Khan of Bengaluru. [Delhi 2012]

Ans. (i) Because polysterene and plastic are non-biodegradable, they accumulate and add to environmental pollution, hence are considered a menace.

(ii) Ahmad Khan developed a fine powder called polyblend of recycled modified plastic. This mixture is mixed with the bitumen and used to lay roads. It enhanced the bitumen's water repellant properties and helped to increase road life by a factor of three. By this way, the problems created by plastic waste was solved.

34. (i) State the consequence if the electrostatic precipitator of a thermal plant fails to function.

(ii) Mention any four methods by which the vehicular air pollution can be controlled. [All India 2011]

Ans. (i) In the absence of electrostatic precipitator, the particulate pollutants and gaseous pollutants of the exhaust will enter into atmosphere. In case of ESPs, about 99% of particulate matter is absorbed.

(ii) General steps to reduce vehicular air pollution

- Phasing out of old vehicles.
- Use of unleaded petrol and low sulphur petrol and diesel.
- Use of catalytic convertors in vehicles.
- Application of Euro II norms for vehicles.

35. Eutrophication is the natural ageing of a lake. Explain. [Foreign 2011]

or

How does eutrophication lake take place? Explain. [Delhi 2011c]

Ans. The natural ageing of a lake is called eutrophication. In a young lake, there is very little life. Over the time, streams drain into it and water becomes enriched with nutrients like phosphate and nitrates.

As a result, phytoplanktons and some other plants flourish well. Due to this, the organic matter increases in lake, water becomes warmer and shallower. Hence, decomposers also start growing.

The high numbers of decomposers make use of large quantity of oxygen for decomposition. This leads to depletion of dissolved oxygen of the water and mortality of fish and other aquatic organisms. The eutrophied water bodies can lead to algal blooms, which further add organic matter in lake. These consume more oxygen leading to its depletion.

36.Explain biomagnification. How does the biomagnification of DDT affect the population of fish eating birds? [Foreign 2010]

or

Why is there a decline in the population of the fish eating birds, when the water body in amidst agricultural fields? [Delhi 2010c]

or

Ornithologists observed decline in the bird population in an area near a lake after the setting of an industrial unit in the same area. Explain the cause responsible for the decline observed. [All India 2009]

Ans. (i) Biomagnification can be defined as the

increase in concentration of toxicants at successive trophic levels.

(ii) Toxic substances accumulated by organism cannot be metabolised or excreted. Therefore, they get accumulated in an organism and passes on to higher trophic levels.

The population of fish eating birds living on the bank of a contaminated lake gets affected adversely by DDT. Being highly poisonous, DDT disturbs the calcium metabolism in birds which causes thinning of their egg shells and premature breaking of such eggs.

It leads to decline in the bird population.

37.A factory drains its waste water into the nearby lake. It has caused algal bloom.

- **How was the algal bloom caused?**
- **What would be the consequences?**
- **Name the phenomenon that caused it. [All India 2008]**

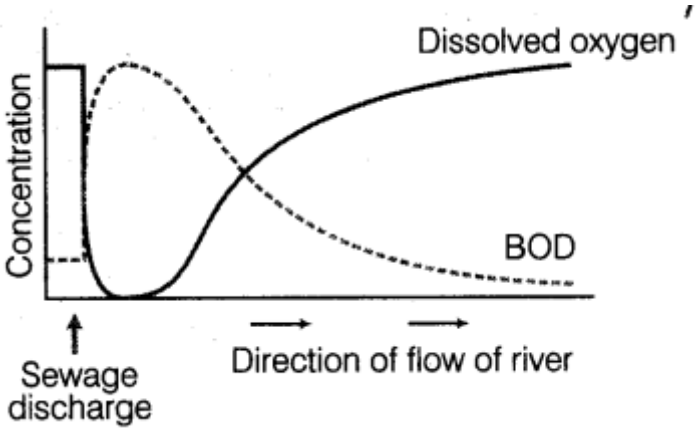
Ans. (i) Due to large amount of nutrients like nitrate and phosphates present in waste water, algal blooms are formed.

(ii) Consequences of algal bloom

- Deterioration of water quality.
- Increased fish rnortility rate.
- Some bloom-forming algae are toxic to human beings ar d animals.

(iii) This phenomenon is called accelerated eutrophication.

38.Study the graph given below and answer the questions that follow.



- **What is the relationship between dissolved oxygen and Biochemical Oxygen Demand (BOD)?**
- **Mention their effect on aquatic life in the river. [All India 2008]**

Ans. (i) As the BOD increase ., the amount of dissolved oxygen in the water body decreases sharply frcm the point of sewage discharge.

(ii) Effects on aquatic life

- Causes high mortality of aquatic animals.
- Algal blooms occur due to excessive growth of algae as the amount of nutrients is high.

39 Expand BOD.

- **At a particular segment of a river near a sugar factory, the BOD is much higher than the normal level. What is it indicative of? What will happen to the living organism in this part of the river?**
- **Under what conditions will the BOD be lowered in the river? How will it affect the aquatic life? [Foreign 2008]**

Ans. (i) BOD – Biochemical Ocygen Demand

(ii) It indicates the addtion of alot of organic matter. Microorganisms degrade it in the water body. Due to maximum consumption of oxygen by microbes during degradation process, dissolved oxygen gets reduced This leads to mortality of fish and other aquatic life.

(iii) When organic matter decrease and microbes do not require oxygen to further decompose it. the BOD will decrease, As a result, aquatic life will start flourishing again and the dissolved oxygen increases.

5 Marks Questions

40.(i) Why are catalytic convertors recommended for vehicles?

(ii) Why should such vehicles use only unleaded petrol?

(iii) Why is CNG preferred to diesel as a fuel in vehicles? [Delhi 2010]

Ans. (i) Catalytic convertor are used for reducing emission of poisonous gases like $N0_2$ and CO. When exhaust emission passes through catalytic convertor, nitric oxide splits into nitrogen and oxygen, carbon monoxide is oxidised into carbon dioxide and unburnt hydrocarbons get burnt completely into $C0_2$ and H_20

(ii) Such vehicles (with catalytic convertor)

should use unleaded petrol as leaded petrol inactivates the catalyst.

(iii) Delhi had been categorised as the fourth most polluted city of the world in a list of 41 cities in the 1990s. Vehicular pollution has added to the pollution of air in Delhi. So, in year 2002, it switched over to a new fuel CNG (Compressed Natural Gas), Reasons of CNG being better fuel

(i) It is a clean fuel that produces very little unburnt particles. Hence, it is ecofriendly.

(ii) It burns most efficiently. Unlike petrol or diesel, very little is left unburnt.

(iii) It is cheaper and cannot be siphoned off by thieves and adulterated like petrol or diesel.

Greenhouse Effect, Ozone Depletion and Deforestation

1 Mark Questions

1.Why is Gambusia introduced into drains and ponds? [All India 2014]

Ans. Gambusia is introduced into drains and ponds to control breeding and propagation of mosquitoes as they feed on mosquito larva. Thus, controls mosquito population.

2.Name the greenhouse gases that contribute to global warming. [Delhi 2014]

Ans. The greenhouse gases that contribute to global warming are $C0_2$, CH_4, N_20 and CFCs.

3. State the purpose of signing the Montreal Protocol. [Foreign 2014]

Ans. The purpose of signing the Montreal Protocol is to control the emission of ozone depleting substances.

4. Where is good ozone present? Why is it called SO? [All India 2014C]

Ans. Good ozone is present in stratosphere, the upper part of atmosphere.

It is called 'good ozone' because it acts as a shield absorbing ultraviolet radiations from sun.

5. Name the two gases contributing maximum to the greenhouse effect. [Delhi 2014C]

Ans. The two gases contributing maximum to greenhouse effect are $C0_2$ and CH_4.

6. Write the unit used for measuring ozone thickness. [Delhi 2011]

Ans. Dobson Unit (DU) is used for measuring ozone thickness.

7. How does jhum cultivation promotes deforestation? [All India 2011c]

Ans. In jhum cultivation, the farmers cut down the trees of forest and burn the plant remains. The ash is used as fertiliser and land is used for farming. After cultivation the area is left free for several years for recovery. The recovery phase is often ignored leading to deforestation.

8. How is snow blindness caused in humans? [All India 2010]

Ans. Snow blindness is caused by absorption of UV-B radiation.

9. Name two greenhouse gases produced by anaerobic microbes. [Foreign 2010]

Ans. Carbon dioxide and methane are the green house gases produced by anaerobic microbes.

10. Mention the causes of thinning of ozone layer. [Delhi 2010c]

Ans. CFCs release chlorine atoms, when UV-rays act on them. Chlorine degrades the ozone into molecular oxygen. Thus, causing thinning of ozone layer.

2 Marks Questions

11. Write, what was the percentage of forest cover of India at the beginning and at the end of twentieth century? How different is it from the one recommended by National Forest Policy? [Foreign 2014]

Ans. In the beginning of the twentieth century, the forest cover was about 30% while towards its end is reduced to only 19.4%. The National Forest Policy of India recommends approximately 60% forest cover for hilly regions including Himalayas, while 33% for plains. However, the situation is contrastingly different as the production of forests in India is very slow.

12. (i) State the cause of depletion of ozone layer.

(ii) Specify any two ill effects that it can cause in the human body. [Foreign 2014]

Ans. (i) The main cause of depletion of ozone layer is due to imbalance between production and degradation of ozone in the stratosphere. This balance is disrupted mainly due to increase in ozone degradation by GFCs.

(ii) The two ill-effects that ozone depletion can cause in human body are:

- Allows UV-B radiation to enter atmosphere that increases mutation and damages DNA.

- Causes ageing of skin and damage to skin cells and cancer.
- Inflammation of cornea (snow blindness), cataract, etc.

13. Refrigerants are considered to be a necessity in modem living, but are said to be responsible for ozone holes detected in Antarctica. Justify. [Foreign 2012]

or

Chlorofluorocarbons (CFCs) are widely used as refrigerants. Then why it is suggested to reduce its emission as far as possible? Explain. [Delhi 2010]

Ans. (i) Refrigerants contain CFCs which are released in lower part of the atmosphere. (/) They move upward and reach the stratosphere.

(ii) In stratosphere, UV-rays act on them releasing Cl atoms. Cl degrade ozone and releases molecular oxygen.

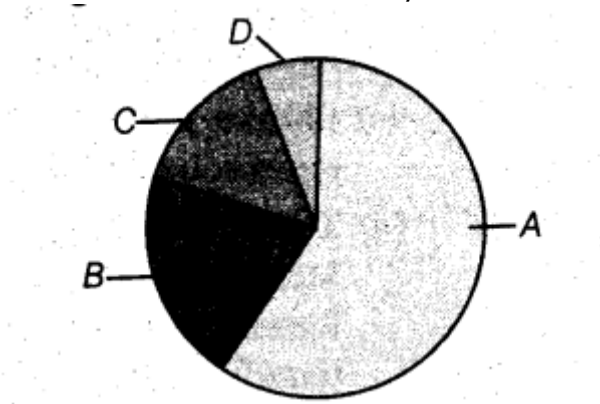
(iii) Cl atoms act only as catalysts, the CFCs have a permanent damaging effect on ozone.

14. The figure given below shows the relative contribution of four greenhouse gases to global warming

- **Identify the gases A and G.**
- **Why are these four gases called greenhouse gases? [Foreign 2011]**

Ans. (i) A- Carbon dioxide ($C0_2$) C – Chlorofluorocarbons CFCs.

(ii) These for gases ($C0_2$, CH_4, N_20 and CFCs) are called greenhouse gases, as they absorb infrared radiations emitted by the earth's surface.



15. (i) Name the greenhouse gases that caused global warming.

(ii) Which of them has caused ozone hole and how? [Foreign 2008]

Ans. Greenhouse gases that caused global warming, i.e. carbon dioxide, methane, Chlorofluorocarbons (CFCs) and nitrous oxide.

(ii) CFCs cause ozone hole. These are degraded in the stratosphere in the presence of UV-radiation, releasing Cl atom. Cl atoms act as catalyst in the degradation of ozone releasing molecular oxygen. Since, all Cl atoms are not used up in the reaction, they continue to affect the ozone.

16. How does global warming pose a threat to the coastal areas of the earth? Explain. [All India 2008C]

Ans. Rise in global temperature is causing deleterious changes in the environment resulting in odd climatic changes (El Nino effect). It leads to melting of ice caps as well as of Himalayan snow caps. Over many years, this will result in a rise in sea leve! that may submerge many coastal areas. Hence, it is a threat to coastal areas

3 Marks Questions

17. How do human activities cause desertification? [Delhi 2009c]

Ans. The human activities like over-cultivation, unrestricted grazing, poor irrigation practices, results in arid patches of land (deforestation). When these large barren patches extend and remain unattended for long, a desert is created. Because the formation of fertile top layer of soil takes millions of years, desertification easily takes over.

18. Explain greenhouse effect and depletion of ozone layer with reference to global warming. [All India 2009C]

Ans. Greenhouse effect is the phenomenon responsible for heating of the earth due to the presence of certain gases in the atmosphere. Greenhouse gases ($C0_2$ CH_4 N_20 and CFCs) allow the solar radiations to enter, but prevent the escape of heat radiations of longer wavelength. When these greenhouse gases increases4n concentration in the atmosphere, global warming occurs .

Depletion of ozone layer occur due to increased level of CFCs. CFCs react with UV-rays in stratosphere to release chlorine atoms. Cl degrades ozone and releases molecular oxygen. CFCs have permanent and continuous effect as Cl atoms are not consumed. This leads to thinning of ozone layer. As a result, harmful radiations enter the earth's atmosphere, which causes rise in temperature and thus, global warming results.

19. How is ozone formed in the stratosphere? Why is it called good ozone? Explain CFCs contribute to ozone hole formation. [All India 2009c]

Ans. Formation of ozone in stratosphere

(i) Nascent oxygen combines with molecular oxygen (0_2) to form ozone by the action of UV-rays.

$$O_2 \xrightarrow{\text{UV-rays}} [O] + [O]$$

Molecular oxygen — Nascent oxygen

$$O_2 + [O] \xrightarrow{\text{UV-rays}} O_3$$

Ozone **(1)**

It is called good ozone as it absorbs harmful UV radiations from the sun.

CFCs react with UV in stratosphere to release Cl atoms. Cl atoms act as catalyst to degrade ozone and release molecular oxygen. CFCs have permanent and continuous effect as Cl atoms are not consumed. This leads to thinning of ozone layer. It has resulted in the formation of ozone hole as observed over the Antarctica region.

20. It has been recorded that the temperature of the earth's atmosphere has increased by 0.6°C.

(i) What has caused this increase? (ii) Explain its consequences. [Delhi 2008]

Ans. Increase in the level of greenhouse gases ($C0_2$ CFCs, etc.) in the atmosphere allow the heat waves to reach earth but prevent their escape and thus, the earth becomes warm.

(ii) Effects of increased temperature

- It leads to deleterious changes in environment resulting into odd climatic changes called El Nino effect.
- It results into increased melting of polar ice caps which will cause the rise in sea level and many coastal areas also be submerged.
- It leads to increased weed growth, eruption of diseases and pests. Thus, the crop productivity also decreases.

5 Marks Questions

21. Why is the ozone layer required in the stratosphere? How does it get degraded? Explain.

(ii) Why is the ozone depletion a threat to mankind? [Delhi 2013c]

Ans. Ozone found in stratosphere is required because it acts as a shield absorbing harmful ultraviolet radiations coming from the sun. (l)' Ozone layer gets depleted by the ozone depleting compounds mainly Chlorofluorocarbons (CFCs), which travel to the stratosphere after being released from the refrigerants and industrial emissions. UV rays from the sun acts on CFCs releasing atoms which degrade ozone releasing molecular oxygen.

(ii) Ozone depletion is proved to be a threat to mankind in following ways

- Causes damage to human skin cells.
- Causes mutation and induce breaks in chemical bonds of DNA molecules.

22. (i) Expand CFG.

(ii) CFGs are a part of greenhouse gases. Name the other gases.

(iii) Explain the major harms caused by these gases.

(iv) Mention the consequences of the degradation of O_3 . [All India 2009C]

Ans. (i) Chlorofluorocarbon.

(ii) $C0_2$, CH_4, $N_2O$are other greenhouse gases.

(iii) These gases absorb radiations, that comes to earth's surface and heat it. This cycle is repeated many times, heating the earth.

(iv) Ozone depletion is proved to be a threat to mankind in following ways

- Causes damage to human skin cells.
- Causes mutation and induce breaks in chemical bonds of DNA molecules.