

## VALUE BASED QUESTIONS

Q.1. Chlorofluorocarbon (CFCs) are used as coolants in refrigerators and air conditioners because they are highly volatile and can be easily liquefied. Large quantities of CFCs find application in the manufacture of disposable foam products such as cups and plates and as solvent. However these are culprit in creating holes in the ozone layer as a result of which our planet earth gets exposed to the harmful effect of these radiations.

- (1) Give the chemical formulae of Freon 12 and Freon 13.
- (2) How do CFCs deplete ozone layer?
- (3) Suggest some substitute for freons.

Ans.1 Chemical formulae of Freon-12 and Freon-13 are  $\text{CF}_2\text{Cl}_2$  and  $\text{C}_2\text{F}_3\text{Cl}_3$ .

Ans.2 CFCs convert ozone ( $\text{O}_3$ ) and thus, deplete ozone layer.



Ans.3 A substitute of Freon is the recently synthesized compound HCFC-12 ( $\text{CF}_3\text{CHCl}_2$ ). The presence of hydrogen in the compound makes it more susceptible to oxidation in the lower atmosphere so that it may not reach stratosphere where blanket of ozone is present. This means that ozone layer is likely to remain intact.

Q.2 Chloroform is a very useful solvent for oils, fats and waxes and organic compounds. It can also be used for preserving biological specimens. Chloroform was used as a general anaesthetic in surgery for a long time. But because of its toxic nature, it is no longer used these days.

- (1). Chloroform is used for the preparation of an insecticide called chloropicrin. Write chemical equation for the same.
- (2). Why is storage of chloroform a problem?
- (3). Why is chloroform not used as an anaesthetic these days?
- (4). Suggest a substitute for chloroform.

Ans.1  $\text{CHCl}_3 + \text{HNO}_3 \text{ _____ } \text{CNO}_2\text{Cl}_3 + \text{H}_2\text{O}$   
Chloropicrin

Ans.2 Chloroform gets oxidized to a highly poisonous in the presence of oxygen.



Ans.3 Chloroform being toxic in nature, damages the central nervous system particularly liver.

Ans.4 Chloroform has been replaced by halothane ( $\text{CF}_3\text{CHClCHBr}$ ), which is non-toxic nature.

Q.3. Carbon tetrachloride is produced in large quantities for the manufacture of refrigerants and propellants for aerosols. It is also a very useful solvent.

(1) What is meant by pyrene?

(2) Why are “pyrene” fire extinguisher banned?

(3) In spite of its high utility, why should we stop use of  $\text{CCl}_4$  as a solvent and dry cleaning agent? What is the value associated with this?

Ans.1 Fire extinguisher employing  $\text{CCl}_4$  are known as pyrene extinguisher because of its non-inflammable nature.

Ans.2 In the presence of water,  $\text{CCl}_4$  is hydrolysed to phosgene which is extremely poisonous.



Therefore, the use of pyrene fire extinguisher is banned.

Ans.3 Carbon tetrachloride is of toxic nature. Prolong exposure to its vapors may cause liver cancer and permanent damage of the nervous system. Keeping this in view, the use of  $\text{CCl}_4$  in dry cleaning and as a solvent should be banned.