JEE Main Archive	**DTS-1**

1.(D) **(A)** $NO + O_3 \longrightarrow NO_2 + O_2$

$O_3 + h\nu \longrightarrow O_2 + O$

$NO_2 + O \longrightarrow NO + O_2$

Net reaction $2O_3 + h\nu \longrightarrow 3O_2$

Thus, ozone layer is depleted by oxides of nitrogen.

(B) Ozone layer is a protective layer and absorbs harmful UV rays coming from the Sun.

(C) $Cl + O_3 \longrightarrow ClO + O_2$; $O_3 + h\nu \longrightarrow O + O_2$; $ClO + O \longrightarrow Cl + O_2$

Net reaction $2O_3 + h\nu \longrightarrow 3O_2$

Thus, ozone layer is also depleted by reaction with freons.

(D) This is an incorrect statement as ozone does not absorb infrared radiations.

2.(B) $O_2 \xrightarrow[\text{rays}]{h\nu} O + O$; $O_2 + O \longrightarrow O_3$

3.(D) Chlorofluorocarbons provide $Cl^{\bullet}$ free radical, which reacts with ozone and convert it into O_2 as

$CF_2Cl_2 \longrightarrow Cl^{\bullet} + \dot{C}F_2Cl$; $Cl^{\bullet} O_3 \longrightarrow ClO^{\bullet} + O_2$; $ClO^{\bullet} + O \longrightarrow Cl^{\bullet} + O_2$

The reaction, once start, continues for a long time. Thus, chlorofluorocarbons (CF_2Cl_2) are responsible for the depletion of ozone layer.

4.(D) Green house effect is caused by CO_2.

5.(C) Ozone layer permits the infrared radiations to pass through but doesn't permit the higher range of ultraviolet radiation to pass through.

6.(A) Ozone layer is found in the stratosphere region of atmosphere. It prevents harmful UV radiation from coming to earth.

7.(D) Freons or chlorofluoro carbons are responsible for depletion of the ozone layer in the upper strata of the atmosphere. They are used as propellants, aerosol spray caps, refrigerants, fire fighting reagents etc. They are stable and chemically inert compounds. They absorb UV – radiation and break down liberating free atomic chlorine which cause decomposition of ozone through free radical reaction. This result in the depletion of the ozone layer.

Freons are mainly Freon – 1($CFCl_3$) and Freon – 2(CF_2Cl_2). They form free radical of chlorine in the presence of UV-radiation. Such free radical decomposes O_3 as follows.

$\dot{Cl} + O_3 \longrightarrow \dot{ClO} + O_2$; $ClO + O_3 \longrightarrow \underset{\text{chlorine free radical}}{\dot{Cl}} + 2O_2$

8.(D) Bhopal gas tragedy of 1984 was caused by methyl isocyanate (MIC). This gas was released from a pesticide manufacturing plant union carbide.

9.(A) In stratosphere the following reactions takes place which are responsible for the depletion of ozone layer

$NO + O_3 \longrightarrow NO_2 + O_2$; $CF_2Cl_2 \xrightarrow{hv} \dot{C}F_2Cl + \dot{C}l$; $CFCl_3 \xrightarrow{hv} \dot{C}FCl_2 + \dot{C}l$

$\dot{C}l + O_3 \longrightarrow Cl\dot{O} + O_2$; $Cl\dot{O} + O \longrightarrow \dot{C}l + O_2$

Hence, methane (CH_4) is not responsible for ozone layer depletion.

10.(C) Pollutants which are formed by reaction of primary pollution (persists in the environment in the form they are passed into it) are called as secondary pollutants e.g. peroxyacyl nitrates (PAN) are formed through reaction between nitrogen oxides and hydrocarbons in the presence of sunlight.