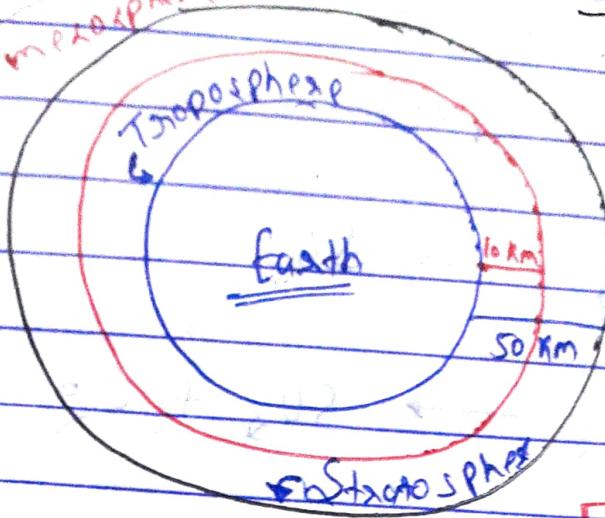


Thermosphere
mesosphere



Ozone Layer
px in
Stratosphere

U.V. Waves
Wavelength

200-315 nm

Atmospheric Pollution

1) Troposphere → Extends upto height of
10 Km from sea level.
(It is a turbulent)

2) Stratosphere → (10-50 Km)

Contain N_2 , O_2 , Ozone

Atm. Pollution

Tropospheric pollution

Gaseous Pollutant
oxide of Sulphur,
Nitrogen & carbon;
hydrogen sulphide,
hydrocarbons, ozone

Particulate
Pollutants
mud, dust,
fumes, smoke,

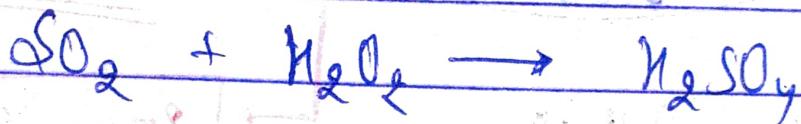
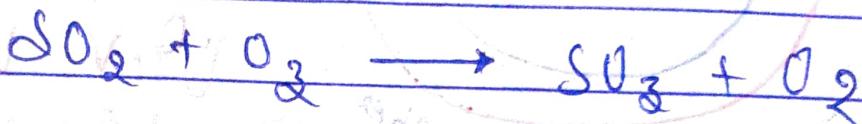
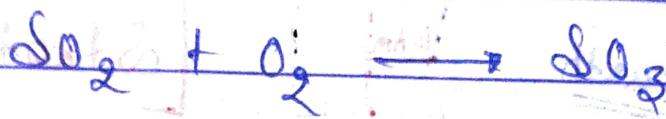
smog, etc.
Imp

Stratosphere

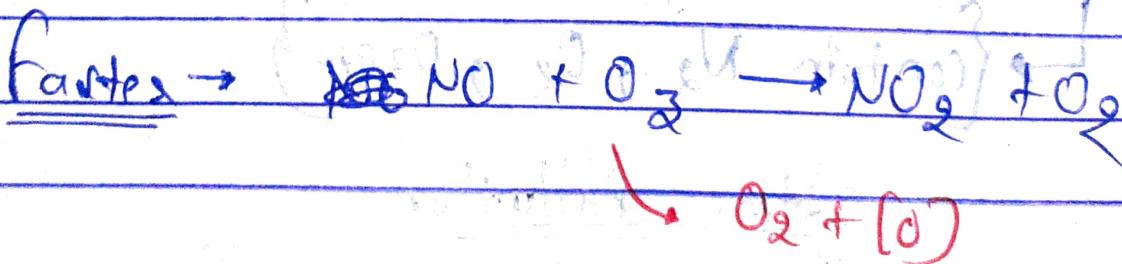
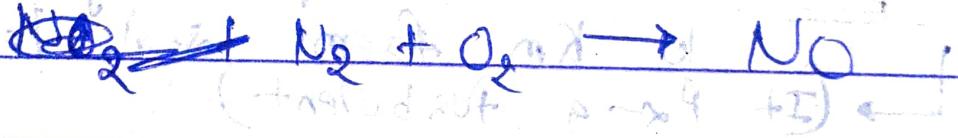
Ozone prevent 99.5%
of U.V. radiation

1) Gaseous Air Pollutants

a) Oxides of Sulphur \rightarrow



b) Oxides of Nitrogen \rightarrow



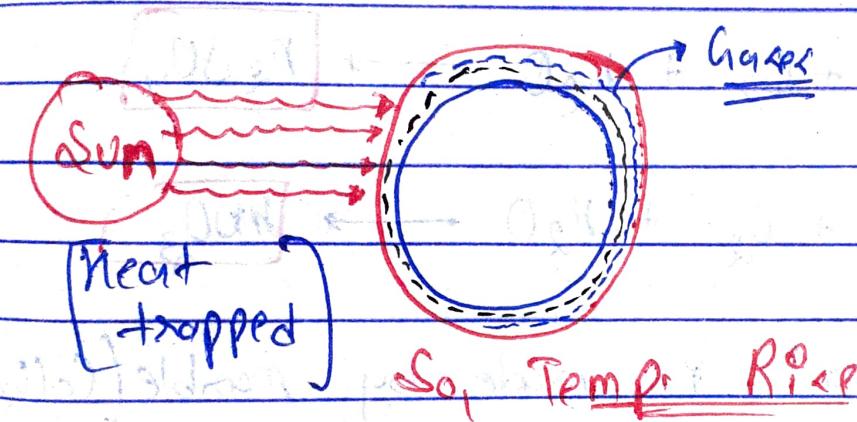
c) Hydrocarbons \rightarrow produced by incomplete combustion of fuel

Carcinogenic \rightarrow Cause of Cancer

d) Oxides of Carbon

- ⑨ $\text{CO} \rightarrow$ Colourless, odourless, Tasteless, poisonous gas [form carboxyhaemoglobin in blood]
- ⑩ $\text{CO}_2 \rightarrow$ Used in photosynthesis

Global Warming



Green House Gases

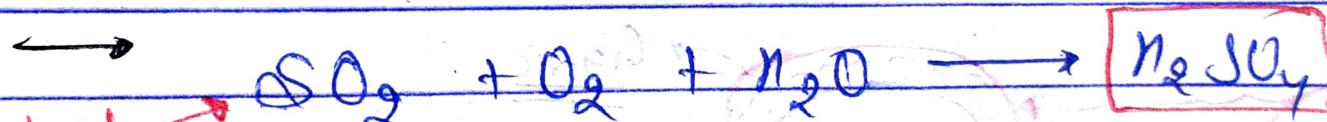
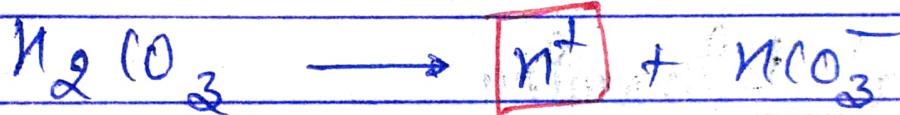
- CO_2
- CH_4
- CFC (Chlorofluoro carbon) [Freone]
↳ Reason for ozone depletion
- O_3
- N_2O
- H_2O Vapour

Troposphere me O_3
gandu baat but
stratosphere me O_3
achhi baat.

Acid Rain [Badly effect, Taj Mahal]

pH of rain water increases about ~~5.6~~

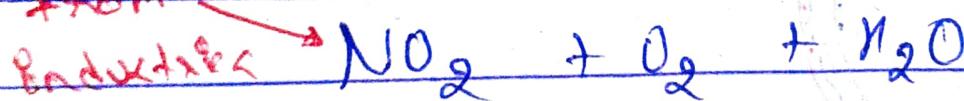
→ ~~5.6~~ ~~acid rain~~ ~~is~~ ~~more~~ ~~acidic~~ ~~than~~ ~~normal~~ ~~rain~~



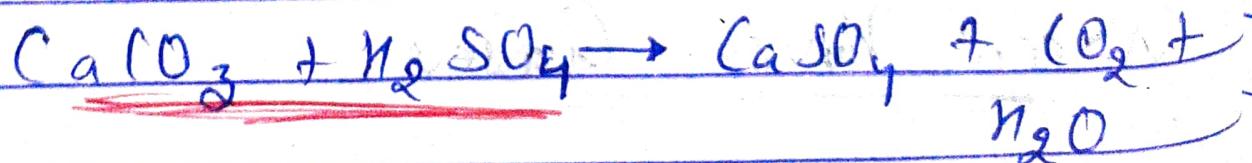
Produced

from

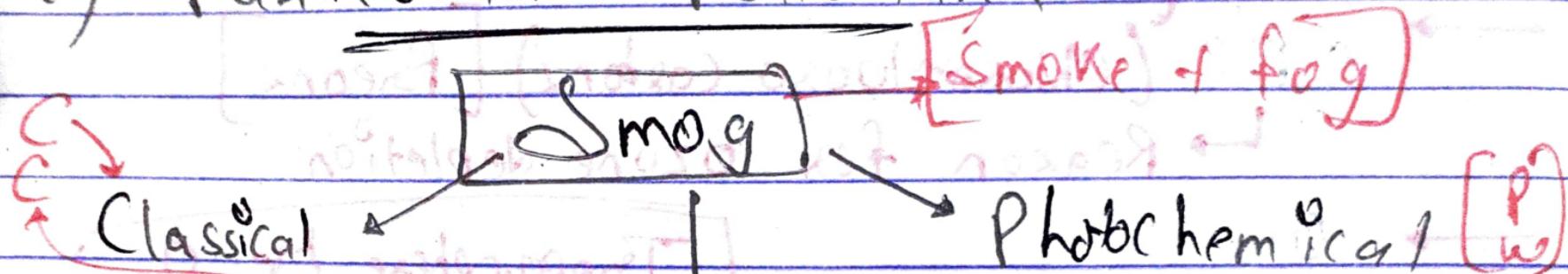
Industries



Taj Mahal is made by marble (CaCO_3)

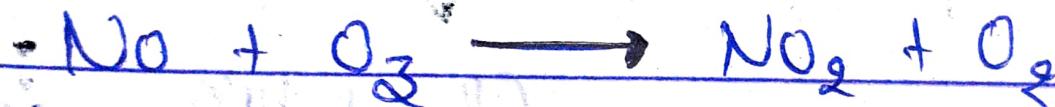


2.) Particulate Pollutants

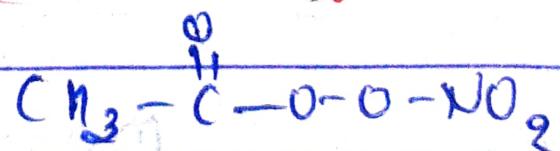
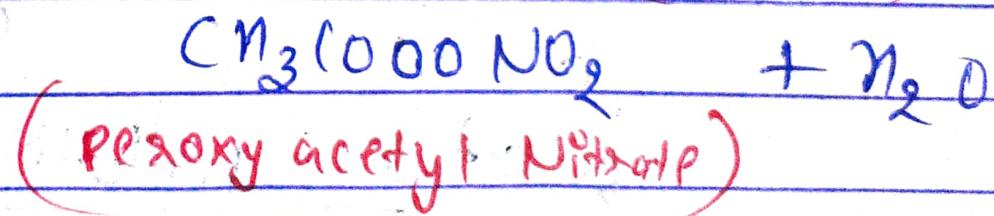
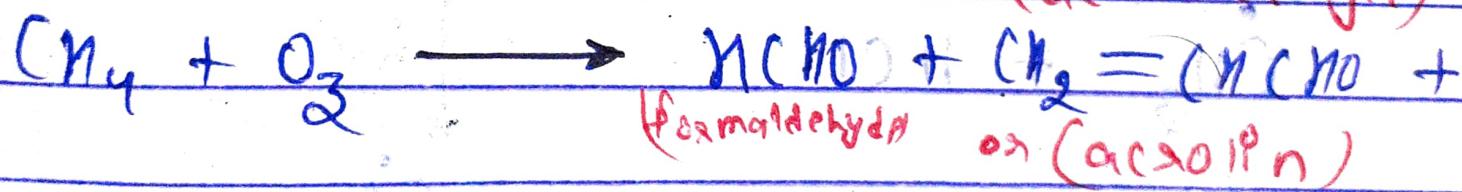


- a) Occurs in cool, humid climate
- a) occurs in warm, dry & sunny climate
- b) Smoke + fog + SO_2
- b) Smoke + fog + N_2O_5 + Nitrogen (hydrocarbon) oxide
- c) Reducing smog
- d) Oxidizing Smog

Photochemical Smog

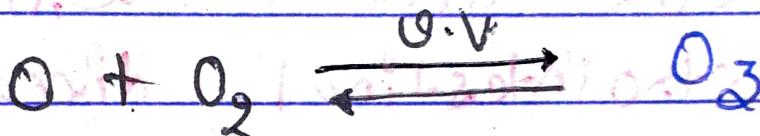


(acetaldehyde)

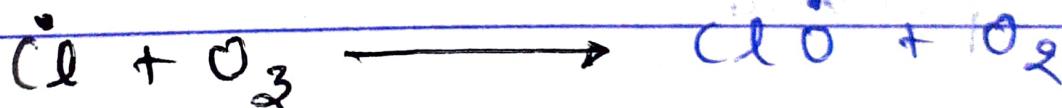
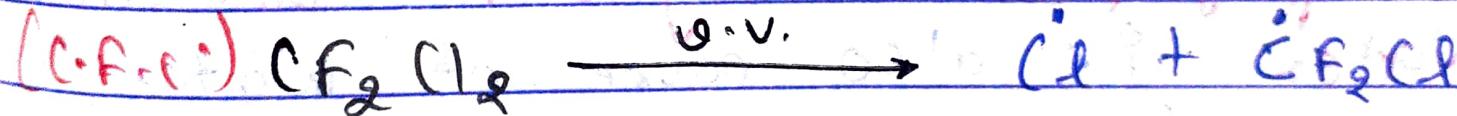


Stratospheric Pollution

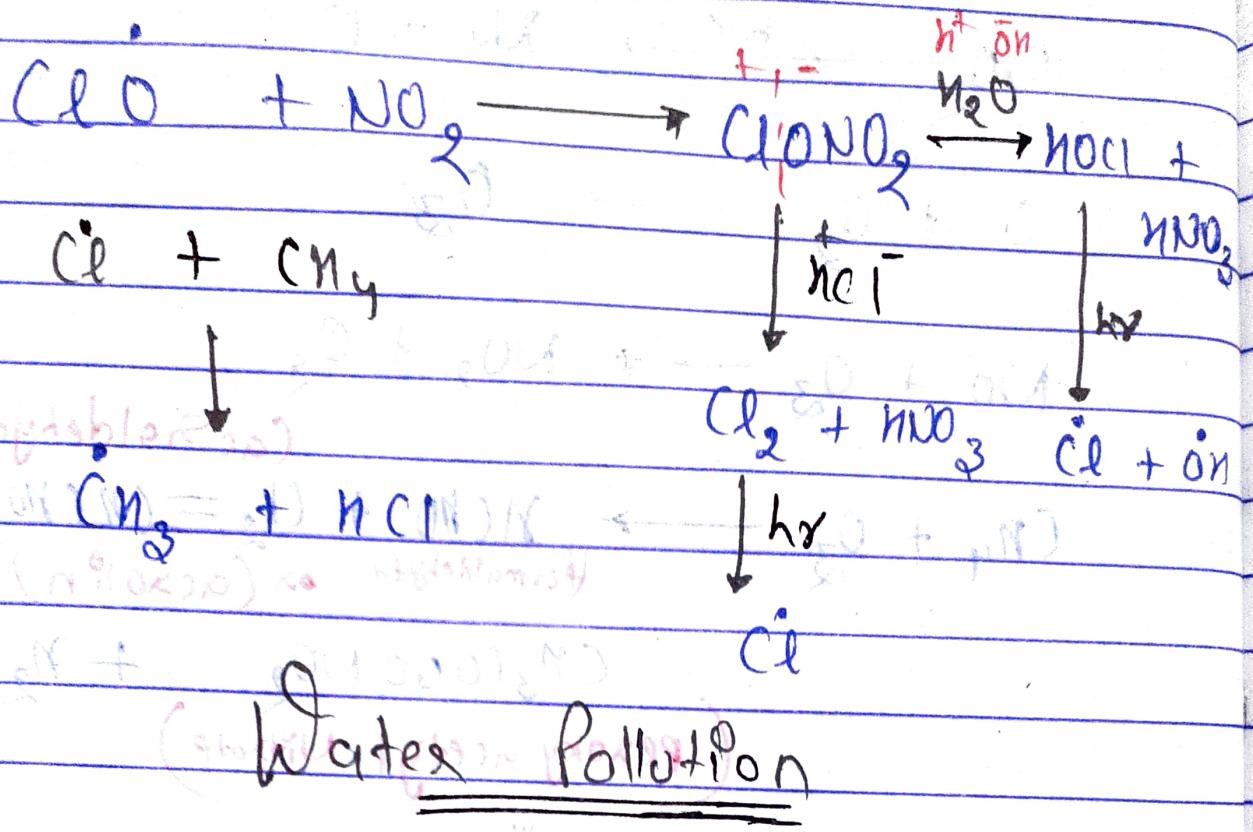
Formation & breakdown of Ozone



Free Radical [Chain Rxn.]



The Ozone Hole



(i) Pathogens \rightarrow most serious water pollutants are disease causing agents called pathogens.

Human excreta contain bacteria such as *Escherichia coli* & *Streptococcus faecalis* which cause gastrointestinal diseases.

(ii) Organic Wastes \rightarrow Excessive phytoplankton growth within water is also cause of water pollution.

for aquatic life. If the conc. of dissolved oxygen (D.O.) of water is below 6 ppm, the growth of fish gets inhibited.

D.O. \rightarrow In Cold Water \rightarrow [10 ppm]

\rightarrow In Air \rightarrow [200000 ppm]

Major H_2O -pollutants

Micron-organisms, Organic Wastes, Plant nutrients, Toxic heavy metals, sediment, Pesticides, Heat, Radioactive substances

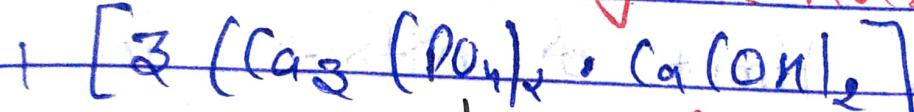
The amount of oxygen required by bacteria to break down the organic matter present in a certain volume of a sample of water, is called **Biochemical Oxygen Demand (BOD)**. The amount of BOD in water is a measure of amount of organic material in water, in terms of how much oxygen will be required to break it down biologically.

A clear water would have BOD value of less than 5 ppm, whereas highly polluted water could have a BOD value of 17 ppm or more.

B.O.D. Value \rightarrow Clean Water \rightarrow < 5 ppm

Highly polluted \rightarrow ≥ 17 ppm

The F^- ions make the enamel on teeth much harder by converting hydroxyapatite



F^- (less hard)

$3Ca_3(PO_4)_2 \cdot CaF_2$ (Much hard)

(Gradually added salt (fluorapatite))

However, F^- ion concn. above 2 ppm causes brown mottling of teeth.

At some time, excess fluoride (over 10 ppm)

caused harmful effect to bones & teeth.

Required \rightarrow

$$[F^-] = 1 \text{ ppm}$$

Lead \rightarrow The prescribed upper limit conc. of lead in drinking water is about 50 ppb

Required \rightarrow $\boxed{[Pb] \leq 50 \text{ ppb}}$

Sulphate \rightarrow Excessive sulphate ($> 500 \text{ ppm}$) in water causes laxative effect

Required \rightarrow $\boxed{[SO_4^{2-}] \leq 500 \text{ ppm}}$ (loose (soft) motion)

Nitrate \rightarrow max. limit of nitrate in
water \leq 500 ppm

Excess nitrate causes disease \rightarrow
methemoglobinemia (Blue baby syndrome)

$$[\text{NO}_3^-] \leq 500 \text{ ppm}$$

Conc. of some Metal ions drinking H₂O

At Metal

Max conc. (in ppm)

Fe

0.2

Mn

0.05 ppm

Al

0.2

Co

3.0

Zn

5.0

Cd

0.005

Trick

Cd (Addu Khan) \rightarrow 0.005

ppm

Mn main

0.05

Fe

0.2

Fe

0.2

Al

0.2

Al

0.2

Cu

3.0

Cu

3.0

Zn

5.0

Zn

5.0