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For Deg I Chemistry Hons Paper-I

(A)

☐ Molecular formula of Hydrogen Peroxide

Thenard found that 17 Part by weight of H_2O_2 gives on decomposition 8 Part of Oxygen and 9 Part of Water.

∴ 9 Parts of Water contains 1 Part by weight of hydrogen and 8 Parts by weight of Oxygen

∴ 17 Parts by weight of Hydrogen Peroxide contains 1 Part of H_2 and 16 Parts of Oxygen

∴ Atomic ratio of Hydrogen to Oxygen in H_2O_2 is $\frac{1}{1} : \frac{16}{16} = 1:1$

Hence the empirical formula is $(HO)_n$

Vapour density of $H_2O_2 = 17$

(By the help of experiment)

∴ Molecular wt = $17 \times 2 = 34$

∴ $(HO)_n = 34 \quad \therefore n = 2$

∴ Molecular formula = $(HO)_2$
= H_2O_2

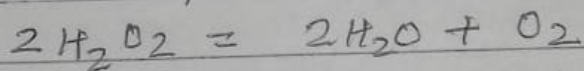
Ans

(B)

Strength of H_2O_2 Solution :-

The strength of H_2O_2 solution is expressed in terms of volume of oxygen evolved on heating H_2O_2 solution.

This is usually expressed in "Volume Strength" which means the volume of oxygen at N.T.P that can be obtained from 1 volume of a sample of a solution of H_2O_2 .



68 gram

22.4 litre at N.T.P

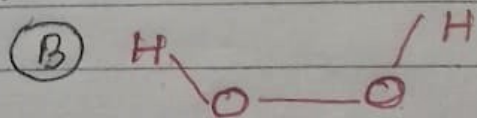
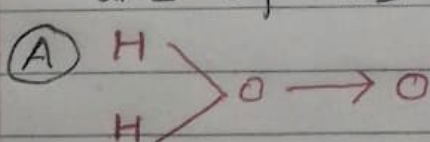
\therefore 1 gram H_2O_2 gives 329.4 cc of O_2 at N.T.P
or 100 cc of 1% solution gives 329.4 cc of O_2
at N.T.P

\therefore 1 cc of 1% " " " " 3.294 cc of O_2

1% solution of H_2O_2 therefore is of 3.294

10 Volume H_2O_2 is of 3.294% strength

Structure :- Two possible structures of H_2O_2 are -



Evidence for Structure (A) :-

This structure explain only oxidising property of H_2O_2 as one oxygen atom in its molecule is more labile. L.K. Mishra

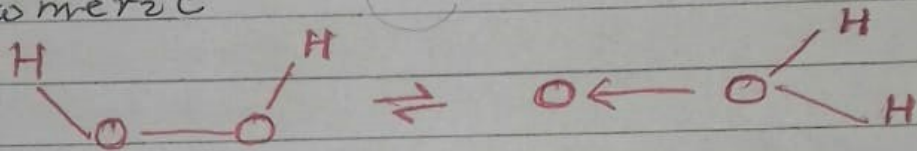
(C)

Evidence for structure (B) :-

- (1) H_2O_2 is a weak dibasic acid. It forms two series of salts e.g. $NaO-OH$ and $NaO-ONa$.

Hence the molecule must consist of two $-OH$ group.

So, it may be probable that the two types of hydrogen Peroxide are tautomeric



Uses :-

- (1) It is used as disinfectant for ear and wounds
- (2) As a Bleaching agent for wool and silk.
- (3) Used as fuel in Rocket, submarine and Torpedos.

insp

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