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JEE Mains 2020 Jan Chapter wise Question Bank

Redox Reactions

Q1

Cl_2 on reaction with hot & conc. NaOH gives two chlorine having products X and Y. On treatment with $AgNO_3$, X gives precipitate. Determine average bond order of Cl and O bond in 'Y' ?

7th Jan Morning

Sol

01.67

$$3Cl_2 + 6NaOH \xrightarrow[\text{Hot \& conc.}]{} \underset{(X)}{5NaCl} + \underset{(Y)}{NaClO_3} + 3H_2O$$

$$NaCl + AgNO_3 \longrightarrow \underset{\text{ppt.}}{AgCl} + NaNO_3$$

Y is $NaClO_3$ $\quad ClO_3^-$ (bond order) $= \frac{5}{3}$

Q2

Amongs the following which is redox reaction ?

(1) $N_2 + O_2 \xrightarrow{2000K}$ (2) Formation of O_3 from O_2

(3) Reaction between NaOH and H_2SO_4 (4) Reaction between $AgNO_3$ and NaCl

7th Jan Evening

Sol

(1)

$N_2 + O_2 \rightarrow 2NO$

$3O_2 \rightarrow 2O_3$

$2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$

$AgNO_3 + NaCl \rightarrow NaNO_3 + AgCl$

Q3

0.3 g $[ML_6]Cl_3$ of molar mass 267.46 g/mol is reacted with 0.125 M $AgNO_3$(aq) solution, calculate volume of $AgNO_3$ required in ml.

8th Jan Morning

Sol

26.92

$[ML_6]Cl_3 + 3AgNO_3 \longrightarrow 3AgCl$

0.3 g v ml, 0.125 M

$$\frac{0.3}{267.46} \times 3 = 0.125 \times V \times 10^{-3}$$

$$\text{or, } V = \frac{0.3 \times 3 \times 1000}{267.46 \times 0.125} = 26.92 \text{ ml.}$$

Q4

5 g of Zn reacts with
(I) Excess of NaOH (II) Dilute HCl, then volume ratio of H_2 gas evolved in (I) and (II) is
(1) 2 : 1 (2) 1 : 2 (3) 1 : 1 (4) 3 : 1

9th Jan Evening

Sol

(3)

$Zn + 2NaOH \longrightarrow Na_2ZnO_2 + H_2$

$Zn + 2HCl \longrightarrow ZnCl_2 + H_2$

According to stoichiometry in both the reactions, equal number of moles of H_2 are evolved.

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