INORGANIC CHEMISTRY

s-BLOCK MISCELLANEOUS

1. LIST-I contains compounds and LIST-II contains reaction **[JEE(Advanced) 2022]**

LIST-I	LIST-II
(I) H_2O_2	(P) $Mg(HCO_3)_2 + Ca(OH)_2 \rightarrow$
(II) $Mg(OH)_2$	(Q) $BaO_2 + H_2SO_4 \rightarrow$
(III) $BaCl_2$	(R) $Ca(OH)_2 + MgCl_2$
(IV) $CaCO_3$	(S) $BaO_2 + HCl \rightarrow$
	(T) $Ca(HCO_3)_2 + Ca(OH)_2 \rightarrow$

Match each compound in LIST – I with its formation reaction(s) in LIST-II, and choose the correct option

(A) I $\rightarrow$ Q; II $\rightarrow$ P; III $\rightarrow$ S; IV $\rightarrow$ R

(B) I $\rightarrow$ T; II $\rightarrow$ P; III $\rightarrow$ Q; IV $\rightarrow$ R

(C) I $\rightarrow$ T; II $\rightarrow$ R; III $\rightarrow$ Q; IV $\rightarrow$ P

(D) I $\rightarrow$ Q; II $\rightarrow$ R; III $\rightarrow$ S; IV $\rightarrow$ P

2. Fe^{3+} is reduced to Fe^{2+} by using - **[JEE(Advanced) 2015]**

(A) H_2O_2 in presence of NaOH

(B) Na_2O_2 in water

(C) H_2O_2 in presence of H_2SO_4

(D) Na_2O_2 in presence of H_2SO_4

3. The pair(s) of reagents that yield paramagnetic species is / are : **[JEE(Advanced) 2014]**

(A) Na and excess of NH_3

(B) K and excess of O_2

(C) Cu and dilute HNO_3

(D) O_2 and 2-ethylanthraquinol

SOLUTIONS

1. Ans. (D)

Sol. (P) $Mg(HCO_3)_2 + 2Ca(OH)_2 \rightarrow Mg(OH)_2 + 2CaCO_3 + 2H_2O$

(Q) $BaO_2 + H_2SO_4 \rightarrow H_2O_2 + BaSO_4$

(R) $Ca(OH)_2 + MgCl_2 \rightarrow Mg(OH)_2 + CaCl_2$

(S) $BaO_2 + 2HCl \rightarrow BaCl_2 + H_2O_2$

(T) $Ca(HCO_3)_2 + Ca(OH)_2 \rightarrow 2CaCO_3 + 2H_2O$

2. Ans. (A, B)

Sol. In acidic medium H_2O_2 oxidises Fe^{+2} to Fe^{+3}

In alkaline solution H_2O_2 reduces Fe^{+3} to Fe^{+2}

$Fe^{+2} \xrightarrow{H^+/H_2O_2} Fe^{+3}$

$Fe^{+2} \xrightarrow{H_2SO_4/H_2O_2} Fe^{+3}$

$Fe^{2+} \xrightarrow[\text{(Acidic medium)}]{Na_2O_2+H_2SO_4} Fe^{+3}$

$Fe^{+3} \xrightarrow{NaOH/H_2O_2} Fe^{2+}$

$Fe^{3+} \xrightarrow{Na_2O_2+\text{Water}} Fe^{2+}$

$\{Na_2O_2 + 2H_2O \longrightarrow 2NaOH + H_2O_2\}$

3. Ans. (A, B, C) / (B, C)

Sol. If ammonia considered as a gas then reaction will be :

(A) $Na + \underset{\text{(excess)}}{NH_3} \longrightarrow NaNH_2 + \frac{1}{2}H_2$

($NaNH_2 + \frac{1}{2}H_2$ are diamagnetic)

If ammonia considered as a liquid then reaction will be

$M + (x+y)NH_3 \rightarrow [M(NH_3)_x]^+ + [e(NH_3)y]^-$

ammoniated e^-

blue colour

paramagnetic

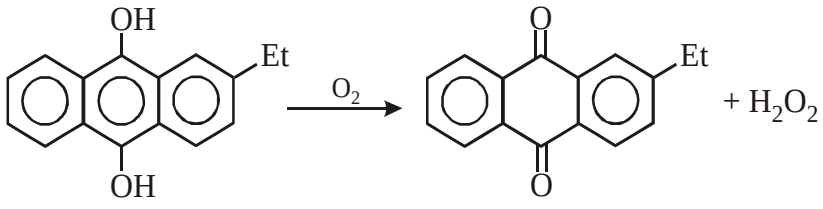
S.R.A.

(B) $K + \underset{\text{(excess)}}{O_2} \longrightarrow KO_2\,(K^+, O_2^-)$

Paramagnetic

(C) $3Cu + 8HNO_3 \longrightarrow 3Cu(NO_3)_2 + 2NO + 4H_2O$

Paramagnetic Paramagnetic

(D) 

$+ H_2O_2$