

- When a piece of wire of copper is dipped in  $\text{AgNO}_3$  solution, the colour of the solution turns blue due to  
[MP PMT 1992; JIPMER 2002]  
(a) Formation of soluble complex  
(b) Oxidation of copper  
(c) Oxidation of silver  
(d) Reduction of copper
- $\text{HBr}$  and  $\text{HI}$  can reduce  $\text{H}_2\text{SO}_4$ ,  $\text{HCl}$  can reduce  $\text{KMnO}_4$  and  $\text{HF}$  can reduce  
[IIT 1981]  
(a)  $\text{H}_2\text{SO}_4$  (b)  $\text{KMnO}_4$   
(c)  $\text{K}_2\text{Cr}_2\text{O}_7$  (d) None of the above
- Consider the following statements :  
In the chemical reaction  
 $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + 2\text{H}_2\text{O} + \text{Cl}_2$   
(1) Manganese ion is oxidised  
(2) Manganese ion is reduced  
(3) Chloride ion is oxidised  
(4) Chloride ion is reduced  
Which of these statements are correct [NDA 1999]  
(a) 1 and 3 (b) 1 and 4  
(c) 2 and 3 (d) 2 and 4
- The oxide which cannot act as a reducing agent is  
[CBSE PMT 1995; AIIMS 2000; JIPMER 2002; Kurukshetra CEE 2002]  
(a)  $\text{SO}_2$  (b)  $\text{NO}_2$   
(c)  $\text{CO}_2$  (d)  $\text{ClO}_2$
- In the reaction between ozone and hydrogen peroxide,  $\text{H}_2\text{O}_2$  acts as  
[RPET 2000]  
(a) Oxidising agent  
(b) Reducing agent  
(c) Bleaching agent  
(d) Both oxidising and bleaching agent
- The oxidation state of each oxygen atom in  $\text{Na}_2\text{O}_2$  is  
[NCERT 1971]  
(a) - 2 each (b) - 2 and zero  
(c) - 1 each (d) None of the above
- The oxidation state of sulphur in  $\text{SO}_4^{2-}$  is  
[Bihar MEE 1996]  
(a) 4 (b) 2  
(c) 6 (d) - 6
- The charge on cobalt in  $[\text{Co}(\text{CN})_6]^{3-}$  is [CPMT 1985, 93]  
(a) - 6 (b) - 3  
(c) + 3 (d) + 6
- Oxidation number of S in  $\text{Na}_2\text{SO}_4$  is [CPMT 1989]  
(a) - 2 (b) + 2  
(c) - 6 (d) + 6
- A metal ion  $\text{M}^{3+}$  after loss of three electrons in a reaction will have an oxidation number equal to  
[CPMT 1980, 83, 84, 94, 99]  
(a) Zero (b) + 2  
(c) + 3 (d) + 6
- Oxidation number of oxygen in ozone ( $\text{O}_3$ ) is  
[MP PET 2000; MP PMT 2001]  
(a) + 3 (b) - 3  
(c) - 2 (d) 0
- The oxidation states of sulphur in the anions  $\text{SO}_3^{2-}$ ,  $\text{S}_2\text{O}_4^{2-}$  and  $\text{S}_2\text{O}_6^{2-}$  follow the order [CBSE PMT 2003]  
(a)  $\text{S}_2\text{O}_6^{2-} < \text{S}_2\text{O}_4^{2-} < \text{SO}_3^{2-}$  (b)  $\text{S}_2\text{O}_4^{2-} < \text{SO}_3^{2-} < \text{S}_2\text{O}_6^{2-}$   
(c)  $\text{SO}_3^{2-} < \text{S}_2\text{O}_4^{2-} < \text{S}_2\text{O}_6^{2-}$  (d)  $\text{S}_2\text{O}_4^{2-} < \text{S}_2\text{O}_6^{2-} < \text{SO}_3^{2-}$
- The oxidation number of hydrogen in  $\text{LiH}$  is  
(a) + 1 (b) - 1  
(c) 2 (d) 0
- Which of the following is not a redox reaction  
[RPMT 1999]  
(a)  $2\text{Rb} + 2\text{H}_2\text{O} \rightarrow 2\text{RbOH} + \text{H}_2$   
(b)  $2\text{CuI}_2 \rightarrow 2\text{CuI} + \text{I}_2$   
(c)  $2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$   
(d)  $4\text{KCN} + \text{Fe}(\text{CN})_2 \rightarrow \text{K}_4\text{Fe}(\text{CN})_6$
- Which of the following equations is a balanced one  
[EAMCET 1980]  
(a)  $5\text{BiO}_3^- + 22\text{H}^+ + \text{Mn}^{2+} \rightarrow 5\text{Bi}^{3+} + 7\text{H}_2\text{O} + \text{MnO}_4^-$   
(b)  $5\text{BiO}_3^- + 14\text{H}^+ + 2\text{Mn}^{2+} \rightarrow 5\text{Bi}^{3+} + 7\text{H}_2\text{O} + 2\text{MnO}_4^-$   
(c)  $2\text{BiO}_3^- + 4\text{H}^+ + \text{Mn}^{2+} \rightarrow 2\text{Bi}^{3+} + 2\text{H}_2\text{O} + \text{MnO}_4^-$   
(d)  $6\text{BiO}_3^- + 12\text{H}^+ + 3\text{Mn}^{2+} \rightarrow 6\text{Bi}^{3+} + 6\text{H}_2\text{O} + 3\text{MnO}_4^-$
- In the equation  
 $4\text{M} + 8\text{CN}^- + 2\text{H}_2\text{O} + \text{O}_2 \rightarrow 4[\text{M}(\text{CN})_2]^- + 4\text{OH}^-$   
Identify the metal M [AFMC 1998]  
(a) Copper (b) Iron  
(c) Gold (d) Zinc
- In alkaline condition  $\text{KMnO}_4$  reacts as  
 $2\text{KMnO}_4 + 2\text{KOH} \rightarrow 2\text{K}_2\text{MnO}_4 + \text{H}_2\text{O} + \text{O}_2$ . The equivalent weight of  $\text{KMnO}_4$  would be (Atomic mass of K = 39, Mn = 55, O = 16) [MP PMT 2002]  
(a) 158.0 (b) 79.0  
(c) 52.7 (d) 31.6

18. In acidic medium, equivalent weight of  $K_2Cr_2O_7$  (mol. wt. =  $M$ ) is (c)  $M/6$  (d)  $M/2$   
 (a)  $M/3$  (b)  $M/4$  [AFMC 1988]

## AS Answers and Solutions

(SET-13)

- (b)  $2Ag^+ + Cu \rightarrow Cu^{++} + 2Ag^-$ ;  $E_{Ag^+/Ag}^0 > E_{Cu^{++}/Cu}^0$ .
- (d)  $F^-$  can be oxidised to  $F_2$  only by electrolysis.
- (c) Because the oxidation state of chlorine is -4 to 0 while Manganese ion is reduced because its oxidation state +4 to +2.
- (c)  $CO_2$  is an acidic oxide.
- (b)  $H_2O_2$  acts as a reducing agent in the reaction between  $O_3$  and  $H_2O_2$ .
- (c) In  $Na_2O_2$  oxygen shows -1 oxidation state.
- (c)  $SO_4^{2-}$   
 $x - 2 \times 4 = -2$   
 $x = 8 - 2 = +6$ .
- (c) In  $[Co(CN)_6]^{3-}$  complex Co shows +3 oxidation state.
- (d)  $Na_2SO_4$   
 $2 + x - 2 \times 4 = 0$   
 $x = +6$ .
- (d)  $M^{3+} \rightarrow M^{6+} + 3e^-$ . Thus the oxidation number of metal = +6.
- (d) Molecule and free atoms show zero oxidation state.  $O_3$  is a molecule shows zero oxidation state.
- (b)  $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-}$   
 Oxi. state of sulphur in  $S_2O_4^{2-} = +3$   
 Oxi. state of sulphur in  $SO_3^{2-} = +4$   
 Oxi state of sulphur in  $S_2O_6^{2-} = +5$ .
- (b)  $LiH$ .
- (d) In the reaction  $4KCN + Fe(CN)_2 \rightarrow K_4Fe(CN)_6$ , change in oxidation state is not taking place.
- (b)  $5BiO_3^- + 14H^+ + 2Mn^{2+} \rightarrow 5Bi^{3+} + 7H_2O + 2MnO_4^-$  is the balanced reaction.
- (c)  $4Au + 8CN^- + 2H_2O + O_2 \rightarrow 4[Au(CN)_2]^- + 4OH^-$ .
- (a)  $e^- + Mn^{7+} \rightarrow Mn^{6+} \therefore E = \frac{M}{1}$ .
- (c)  $Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$

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Equivalent weight of  $K_2Cr_2O_7$

$$= \frac{\text{Molecular Mass}}{6} = \frac{294.2}{6} = \frac{M}{6}$$