**Redox Reactions 571** 

UNIVERSAL SELF SCORE

## **Redox Reactions**

ET Self Evaluation Test -13

1.	When a piece of wire of copper is dipped in $\ensuremath{\mathit{AgNO}_3}$ solution, the	10.	A metal ion $M^{3+}$ after loss of three electrons in a reaction will have
	colour of the solution turns blue due to		an oxidation number equal to
	(a) Formation of soluble complex		(a) Zero (b) + 2
	(b) Oxidation of copper		(c) $+ 3$ (d) $+ 6$
	(c) Oxidation of silver	11.	Oxidation number of oxygen in ozone $(O_3)$ is
_	(d) Reduction of copper		[MP PET 2000; MP PMT 2001]
2.	<i>HBr</i> and <i>HI</i> can reduce $H_2SO_4$ , <i>HCl</i> can reduce <i>KMnO</i> <sub>4</sub>		(a) $+3$ (b) $-3$ (d) $-3$
	and <i>HF</i> can reduce [11T 1981]		(c) - 2 $(d) = 0$
	(a) $H_2SO_4$ (b) $KMnO_4$	12.	The oxidation states of sulphur in the amons $SO_3^-$ , $S_2O_4^-$ and
	(c) $K_2 C r_2 O_7$ (d) None of the above		$S_2 O_6^{2-}$ follow the order [CBSE PMT 2003]
3.	Consider the following statements :		(a) $S_2 O_6^{2-} < S_2 O_4^2 < S O_3^{2-}$ (b) $S_2 O_4^{2-} < S O_3^{2-} < S_2 O_6^{2-}$
	$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$		(c) $SO_3^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$ (d) $S_2O_4^2 < S_2O_6^{2-} < SO_3^{2-}$
	(1) Manganese ion is oxidised	13.	The oxidation number of hydrogen in $LiH$ is
	(2) Manganese ion is reduced		(a) $+1$ (b) $-1$
	(3) Chloride ion is oxidised		(c) 2 (d) 0
	(4) Chloride ion is reduced	14.	Which of the following is not a redox reaction
	Which of these statements are correct [NDA 1999]		[RPMT 1999]
	(a) $1 \text{ and } 3$ (b) $1 \text{ and } 4$ (c) $2 \text{ and } 3$ (d) $2 \text{ and } 4$		(a) $2Rb + 2H_2O \rightarrow 2RbOH + H_2$
4.	The oxide which cannot act as a reducing agent is		(b) $2CuI_2 \rightarrow 2CuI + I_2$
-	[CBSE PMT 1995; AIIMS 2000; JIPMER 2002;		(c) $2H_2O_2 \rightarrow 2H_2O + O_2$
	Kurukshetra CEE 2002]		(d) $4KCN + Fe(CN)_2 \rightarrow K_4Fe(CN)_{\epsilon}$
	(a) $SO_2$ (b) $NO_2$	15.	Which of the following equations is a balanced one
	(c) $CO_2$ (d) $ClO_2$		[EAMCET 1980]
5.	In the reaction between ozone and hydrogen peroxide, $H_2 O_2$ acts		(a) $5BiO_3^- + 22H^+ + Mn^{2+} \rightarrow 5Bi^{3+} + 7H_2O + MnO_4^-$
	as [RPET 2000]		(b) $5BiO^{-} + 14H^{+} + 2Mn^{2+} \rightarrow 5Bi^{3+} + 7HO + 2MnO^{-}$
	(a) Oxidising agent		$(0) \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$
	(b) Keducing agent		(c) $2BiO_3^- + 4H^+ + Mn^{2+} \rightarrow 2Bi^{3+} + 2H_2O + MnO_4^-$
	(d) Both oxidising and bleaching agent		(d) $6BiO_3^- + 12H^+ + 3Mn^{2+} \rightarrow 6Bi^{3+} + 6H_2O + 3MnO_4^-$
6.	The oxidation state of each oxygen atom in $Na_2O_2$ is	16.	In the equation
	[NCERT 1971]		$4M + 8CN^- + 2H_2O + O_2 \rightarrow 4[M(CN)_2]^- + 4OH^-$
	(a) - 2 each (b) - 2 and zero		Identify the metal $M$
	(c) - 1 each (d) None of the above		(a) Copper (b) Iron
7.	The oxidation state of sulphur in $SO_4^{2-}$ is		(c) Gold (d) Zinc
	[Bihar MEE 1996]	17.	In alkaline condition $KMnO_4$ reacts as
	(a) 4 (b) 2 (c)		$2KMnO_4 + 2KOH \rightarrow 2K_2MnO_4 + H_2O + O$ . The equivalent
_	(c) $0$ (d) $-0$		weight of $KMnO_4$ would be (Atomic mass of $K = 39$ , $Mn = 55$ , O
8.	The charge on cobalt in $[CO(CN)_6]^\circ$ is [CPMT 1985, 93]		= 16) [MP PMT 2002]
	(a) $-6$ (b) $-3$		(a) 158.0 (b) 79.0
	(c) + 3 $(d) + 6$		(c) 52.7 (d) 31.6
9.	Oxidation number of S in $Na_2SO_4$ is [CPMT 1989]	18.	In acidic medium, equivalent weight of $K_2 Cr_2 O_7$ (mol. wt. = M)
	(a) - 2 (b) + 2		is [AFMC 1988]
	(c) $-6$ (d) $+6$		(a) $M/3$ (b) $M/4$
			(c) $M/6$ (d) $M/2$

Answers and Solutions

**1.** (b) 
$$2Ag^+ + Cu \rightarrow Cu^{++} + 2Ag^-; E^o_{Ag^+/Ag} > E^o_{Cu^{++}/Cu}$$
.

- **2.** (d)  $F^-$  can be oxidised to  $F_2$  only by electrolysis.
- $3. \qquad (c) \quad \mbox{Because the oxidation state of chlorine is } -4 \ to \ 0 \ \mbox{while} \\ Manganese ion is reduced because its oxidation state + 4 to + 2. }$
- **4.** (c)  $CO_2$  is a acidic oxide.
- 5. (b)  $H_2O_2$  acts as a reducing agent in the reaction between  $O_3$ and  $H_2O_2$ .
- **6.** (c) In  $Na_2O_2$  oxygen show 1 oxidation state.
- 7. (c)  $SO_4^{2-}$  $x - 2 \times 4 = -2$ 
  - x = 8 2 = +6.
- 8. (c)  $\ln [Co(CN)_6]^{3-}$  complex Co shows + 3 oxidation state.

**9.** (d) 
$$Na_2SO_4$$
  
 $2 + x - 2 \times 4 = 0$ 

$$x = +6$$
.

10. (d)  $M^{3+} \rightarrow M^{6+} + 3e^-$ . Thus the oxidation number of metal = + 6.

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**13.** (b) 
$$Li H^{+1}$$

- 14. (d) In the reaction  $4KCN + Fe(CN)_2 \rightarrow K_4Fe(CN)_6$ , change in oxidation state is not taking place.
- 15. (b)  $5BiO_3^- + 14H^+ + 2Mn^{2+} \rightarrow 5Bi^{3+} + 7H_2O + 2MnO_4^$ is the balanced reaction.

16. (c) 
$$4Au + 8CN^{-} + 2H_2O + O_2 \rightarrow 4[Au(CN)_2]^{-} + 4OH^{-}$$
.

17. (a) 
$$e^- + Mn^{7+} \to Mn^{6+}$$
  $\therefore E = \frac{M}{1}$ 

**18.** (c) 
$$Cr_2O_7^{2-} + 14H^+ + 6e \rightarrow 2Cr^{3+} + 7H_2O^{3-}$$

Equivalent weight of  $K_2 Cr_2 O_7$ 

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

**11.** (d) Molecule and free atoms show zero oxidation state  $O_3$  is a molecule shows zero oxidation state.

**12.** (b) 
$$S_2 O_4^{2-} < S O_3^{2-} < S_2 O_6^{2-}$$

Oxi. state of sulphur in  $S_2O_4^{2-} = +3$ 

Oxi. state of sulphur in  $SO_3^{2-} = +4$ 

Oxi state of sulphur in  $S_2 O_6^{2-} = +5$  .