CHEMISTRY

BOOKS - MTG CHEMISTRY (HINGLISH)

REDOX REACTIONS

Redox Reactions In Terms Of Electron Transfer Reactions

1. Which of the following statements is not true?

A. In a chemical reaction, oxidation is always accompanied by reduction.

B. When a negative ion changes to neutral species, the process is oxidation.

C. Oxidizing agent has a tendency to lose electrons.

D. Conversion of MnO_4^{2-} to MnO_4^- is oxidation.

Answer: C

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2. Which of the following is not a redox reaction ?

A. $CuO + H_2 \rightarrow Cu + H_2O$

B. $Na + H_2O \rightarrow NaOH + \frac{1}{2}H_2$

C. $CaCO_3 \rightarrow CaO + CO_2$

D. $2K + F_2 \rightarrow 2KF$

Answer: C

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3. Which substance is serving as a reducing agent in the following reaction?

$14H^+ + Cr_2O_7^{2-} + 3Ni \rightarrow 2Cr^{3+} + 7H_2O + 3Ni^{2+}$

A. $Cr_2O_7^{2-}$

B. Ni

C. H^+

D. H_2O

Answer: B

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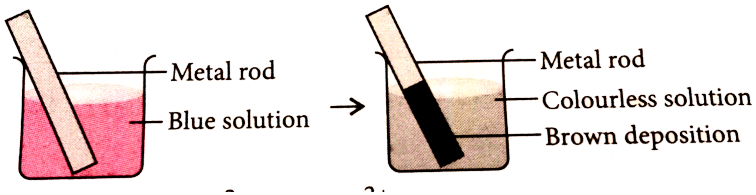
4. A redox reaction is shown in the diagrams. Identify the reaction.



A. $Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$

B. $Cu_{(s)} + 2Ag_{(aq)} \rightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)}$

C. $2Ag_{(s)} + Cu^{2+}_{(aq)} \rightarrow 2Ag^{+}_{(aq)} + Cu_{(s)}$

D. $2Cu_{(s)} + Zn^{2+}_{(aq)} \rightarrow Cu^{2+}_{(aq)} + Zn_{(s)}$

Answer: A

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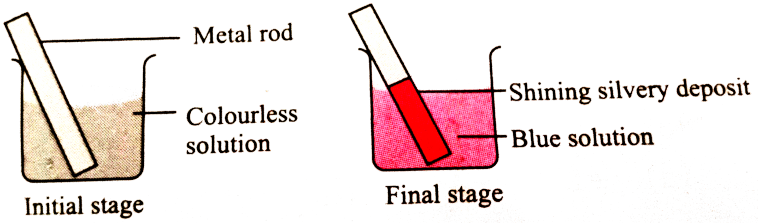
5. Identify the redox reaction taking palce in a beaker.



A. $Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow An^{2+}_{(aq)} + Cu_{(s)}$

B. $Cu_{(s)} + 2Ag_{(aq)} \rightarrow Cu^{2+}_{(aq)} + 2Ag_{(s)}$

C. $Cu_{(s)} + Zn^{2+}_{(aq)} \rightarrow Zn_{(s)} + Cu^{2+}_{(aq)}$

D. $2Ag_{(s)} + Cu^{2+}_{(aq)} \rightarrow 2Ag^{+}_{(aq)} + Cu_{(s)}$

Answer: B

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Oxidation Number

1. Which of the following is not a rule for calculating oxidation number ?

A. For ions, oxidation number is equal to the charge on the ion.

B. The oxidation number of oxygen is -2 in all of its compounds.

C. The oxidation number of fluorine is -1 in all of its compounds.

D. Oxidation number of hydrogen is +1 except in binary hydrides of alkali metals and alkaline earth metals where it is -1.

Answer: B

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2. The oxidation number of carbon in CH_2Cl_2 is

A. 0

B. $+1$

C. $+2$

D. $+4$

Answer: A

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3. Oxidation state of iron in $Fe(CO)_4$ is

A. $+1$

B. -1

C. $+2$

D. 0

Answer: D

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4. The oxidation states of sulphur in the anions SO_3^{2-}, $S_2O_4^{2-}$, and $S_2O_6^{2-}$ follow the order

A. $S_2O_4^{2-} > S_2O_6^{2-} > SO_4^{2-} > SO_3^{2-}$

B. $S_2O_6^{2-} > SO_3^{2-} > S_2O_4^{2-} > SO_4^{2-}$

C. $SO_4^{2-} > S_2O_6^{2-} > SO_3^{2-} > S_2O_4^{2-}$

D. $SO_3^{2-} > SO_4^{2-} > S_2O_4^{2-} > S_2O_6^{2-}$

Answer: C

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5. Oxidation numbers of Mn in its compounds $MnCl_2$, $Mn(OH)_3$, MnO_2 and $KMnO_4$ respectively are:-

A. $+2,\ +4,\ +7,\ +3$

B. $+2,\ +3,\ +4,\ +7$

C. $+7,\ +3,\ +2,\ +4$

D. $+7,\ +4,\ +3,\ +2$

Answer: B

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6. Arrange the oxides of nitrogen in increasing order of oxidation state of N from +1 to +5.

A. $N_2O < N_2O_3 < NO_2 < N_2O_5 < NO$

B. $N_2O < NO < N_2O_3 < NO_2 < N_2O_5$

C. $N_2O_5 < NO_2 < N_2O_3 < NO < N_2O$

D. $NO < N_2O < NO_2 < N_2O_3 < N_2O_5$

Answer: B

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7. The oxidation state of S in $H_2S_2O_8$ is

A. $+6$

B. $+7$

C. $+8$

D. 0

Answer: A

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8. Match the compounds given in column I with oxidation states of carbon given in column II and mark the appropriate choice.

	Column I		Column II
(A)	$C_6H_{12}O_6$	(i)	$+3$
(B)	$CHCl_3$	(ii)	-3
(C)	CH_3CH_3	(iii)	$+2$
(D)	$(COOH)_2$	(iv)	0

A. (A) $\rightarrow$ (iv), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (ii), (D) $\rightarrow$ (i)

B. (A) $\rightarrow$ (i), (B) $\rightarrow$ (ii), (C) $\rightarrow$ (iii), (D) $\rightarrow$ (iv)

C. (A) $\rightarrow$ (ii), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (iv), (D) $\rightarrow$ (i)

D. (A) $\rightarrow$ (iii), (B) $\rightarrow$ (ii), (C) $\rightarrow$ (i), (D) $\rightarrow$ (iv)

Answer: A

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9. Among the following identify the species with an atom in $+6$ oxidation state.

A. MnO_4^-

B. $Cr(CN)_6^{3-}$

C. NiF_6^{2-}

D. CrO_2Cl_2

Answer: D

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10. The pair of the compounds in which both the metals are in the highest possible oxidation state is,

A. $McO_2, FeCl_3$

B. McO_4^-, CrO_2Cl_2

C. $MnCl_2, CrCl_3$

D. $[NiCl_4]^{2-}, [CoCl_4]^-$

Answer: B

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11. An element that never has a positive oxidation state in any of its compounds is

A. O

B. N

C. Cl

D. F

Answer: D

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12. Oxidation number if iodine in IO_3^-, IO_4^-, KI and I_2 respectively are

A. $-2, \ -5, \ -1, 0$

B. $+5, \ +7, \ -1, 0$

C. $+2, \ +5, \ +1, 0$

D. $-1, \ +1, 0, \ +1$

Answer: B

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13. Various oxidation states of few elements are mentioned. Which of the options is not correctly matched ?

A. Phosphorus: +3 to +5

B. Nitrogen : +1 to +5

C. Iodine : -1 to +7

D. Chromium : -3 to +6

Answer: D

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14. Carbon is in the lowest oxidation state in

A. CH_4

B. CCl_4

C. CF_4

D. CO_2

Answer: A

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15. Which of the following is a decreasing order of oxidation states of the central atoms?

A. $PCl_5, HIO_4, Cl_2O_7^{2-}, Cl_2O$

B. $Cr_2O_7^{2-}, Cl_2O, HIO_4, PCl_5$

C. $HIO_4, Cr_2O_7^{2-}, PCl_5, Cl_2O$

D. $Cr_2O_7^{2-}, HIO_4, Cl_2O, PCl_5$

Answer: C

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16. Which compound amongst the following gas the highest oxidation number of Mn?

$KMnO_4, K_2MnO_2, MnO_2$ and Mn_2O_3

A. $KMnO_4$

B. K_2MnO_4

C. MnO_2

D. Mn_2O_3

Answer: A

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17. In which of the following compounds oxidation state of chlorine has two different values?

A. $CaCl_2$

B. $NaCl$

C. $CaOCl_2$

D. CCl_4

Answer: C

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18. The oxidation number of nitrogen in $(N_2H_5)^+$ is

A. -2

B. $+2$

C. $+3$

D. -3

Answer: A

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19. Mark the correct statement from the following :

A. Copper metal can be oxidised by Zn^{2+} ions.

B. Oxidation number of phosphorus in P_4 is 4

C. An element in the highest oxidation state acts only as a reducing agent.

D. The element which shows highest oxidation number of +8 is Os in OsO_4

Answer: D

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20. Which compound among the following has lowest oxidation number of chlorine ?

A. Copper metal can be oxidised by Zn^{2+} ions.

B. $HClO_3$

C. HCl

D. HOCl

Answer: C

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21. Which of the following oxidation numbers is not correctly matched ?

A. $HClO_4$

B. N in $\left[Ni(CN)_6\right]^{4-} = +2$

C. P in $Mg_2P_2O_7 = +6$

D. Cr in $(NH_4)_2Cr_2O_7 = +6$

Answer: C

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22. Examples of few compounds in a particular oxidation state are given.

Mark the example which is not correct.

A. P in $NaH_2PO_4 = +5$

B. Chlorine in +7 oxidation state $-HClO$

C. Chromium in +6 oxidation state $-CrO_2Cl_2$

D. Carbon in 0 oxidation state $-C_{12}H_{22}O_{11}$

Answer: B

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23. The oxidation numbers of the sulphur atoms in pcroxy-monosulphuric acid (H_2SO_5) and peroxydisulphuric acid $(H_2S_2O_8)$ are respectively.

A. $+4$

B. $+2$

C. $+6$

D. -2

Answer: C

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24. Which is not true about the oxidation state of the following elements ?

A. Sulphur +6 to -2

B. Carbon +4 to -4

C. Chlorine +7 to -1

D. Nitrogen +3 to -1

Answer: D

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25. O.N of Fe in $K_4[Fe(CN)_6]$ is

A. $+2$

B. $+3$

C. $+4$

D. $+6$

Answer: A

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26. Arrange the following in increasing order of oxidation state of Ni.

$K_2\left[Ni(CN)_4\right], K_2[NiF_6], Ni(CO)_4$

A. $Ni(CO)_4, K_2\left[Ni(CN)_4\right], K_2[NiF_6]$

B. $K_2\left[Ni(CN)_4\right], Ni(CO)_4, K_2[NiF_6]$

C. $Ni(CO)_4, K_2[NiF_6], K_2\left[Ni(CN)_4\right]$

D. $K_2[NiF_6], K_2\left[Ni(CN)_4\right], Ni(CO)_4$

Answer: A

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27. The correct sequence of the oxidation state of underlined elements is

$Na_2\left[\underline{Fe}(CN)_5NO\right], K_2\underline{Ta}F_7, Mg_2\underline{P}_2O_7, Na_2\underline{S}_4O_6, \underline{N}_3H$

A. $+3, +5, +5, +2.5, -\frac{1}{3}$

B. $+5, +3, +5, +3, +\frac{1}{3}$

C. $+3, +3, +5, +5, -\frac{1}{3}$

D. $+5, +5, +3, +2.5, +\frac{1}{3}$

Answer: A

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28. What are the oxidation states of phosphorus in the following compounds ?

$H_3PO_2, H_3PO_4, Mg_2P_2O_7, PH_3, HPO_3$

A. $+1, +3, +3, +3, +5$

B. $+3, +3, +5, +5, +5$

C. $+1, +2, +3, +5, +5$

D. $+1, +5, +5, -3, +5$

Answer: D

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29. In which of the following compounds carbon is in highest oxidation state ?

A. CH_3Cl

B. CCl_4

C. $CHCl_3$

D. CH_2Cl_2

Answer: B

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30. The oxidising state of molybdenum in its oxo complex species $\left[Mo_2O_4(C_2H_4)_2(H_2O)\right]^{2-}$ is

A. $+2$

B. $+3$

C. $+4$

D. $+5$

Answer: B

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31. Oxidation number of P in $Ba(H_2PO_2)_2$ is

A. $+3$

B. $+2$

C. $+1$

D. -1

Answer: C

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32. Which of the following can act as oxidising as well as reducing agent?

A. H_2O_2

B. SO_3

C. H_2SO_4

D. HNO_3

Answer: A

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33. When a piece of sodium metal is dropped in water, hydrogen gas evolved because

A. sodium is reduced and acts as an oxidising agent

B. water is oxidised and act as a reducing agent

C. sodium loses electrons and is oxidised while water is reduced

D. water loses electrons and is oxidised to hydrogen.

Answer: C

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34. In the reaction,

$I_2 + 2S_2O_3^{2-} \rightarrow 2I^- + S_4O_6^{2-}$.

Equivalent wieght of iodine will be equal to

A. I_2 is reducing agent.

B. I_2 is oxidising agent and $S_2O_3^{2-}$ is reducing agent

C. $S_2O_3^{2-}$ is oxidising agent.

D. I_2 is reducing agent and $S_2O_3^{2-}$ is oxidising agent.

Answer: B

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35. In the reaction : $Cl_2 + OH^- \rightarrow Cl^- + ClO_4^- + H_2O$:-

A. Chlorine is oxidised

B. Chlorine is reduced.

C. Chlorine is oxidised as well as reduced.

D. Chlorine is neither oxidised nor reduced.

Answer: C

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36. Consider the following reaction :

$HCHO + 2\left[Ag(NH_3)_2\right]^+ + 3OH^- \rightarrow 2Ag + HCOO^- + 4NH_3 + 2H_2O$

Which of the following statements regarding oxidation and reduction is correct?

A. HCHO is oxidised to $HCOO^-$ and $\left[Ag(NH_3)_2\right]^+$ is reduced to Ag.

B. HCHO is reduced to $ddHCOO^-$ and $\left[Ag(NH_3)_2\right]^+$ is oxidised to Ag.

C. $\left[Ag(NH_3)_2\right]^+$ is reduced to Ag while OH^- is oxidised to $HCOO^-$

D. $\left[Ag(NH_3)_2\right]^+$ is oxidised to NH_3 while HCHO is reduced to H_2O.

Answer: A

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37. Identify the compounds which are reduced and oxidised in the following reaction:

$3N_2H_4 + 2BrO_3^- \rightarrow 3N_2 + 2Br^- + 6H_2O$

A. N_2H_4 is oxidised and BrO_3^- is reduced.

B. BrO_3^- is oxidised and N_2H_3 is reduced.

C. BrO_3^- is both reduced and oxidised.

D. This is not a redox reaction.

Answer: A

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38. Identify the oxidant and reductant in the following redox reaction:

$2K_2MnO_4 + CI_2 \rightarrow 2KCI + 2KMnO_4$

A. Oxidation of potassium manganate is taking place.

B. Reduction of potassium manganate is taking place.

C. Oxidation of Cl_2 is taking place.

D. Cl_2 acts as reducing agent in the reaction.

Answer: A

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39. Indicate whether the following conversions represent an oxidation, a reduction or none (neither oxidation nor reduction).

(i) $HClO_3$ to $HClO_4$ (ii) NH_4^+ to NH_3

(iii) NO_2 to N_2O_4 (iv) HSO_3^- to SO_4^{2-}

(v) H_2O_2 to H_2O

A.

(i)	(ii)	(iii)	(iv)	(v)
Oxidation	Reduction	None	None	Oxidation

B.

(i)	(ii)	(iii)	(iv)	(v)
Oxidation	None	None	Oxidation	Reduction

C.

(i)	(ii)	(iii)	(iv)	(v)
Reduction	Oxidation	Reduction	None	Reduction

D.

(i)	(ii)	(iii)	(iv)	(v)
Oxidation	Reduction	None	Reduction	Reduction

Answer: B

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40. In which of the following reactions, the underlined substance has been reduced ?

A. $\underline{Cu} + CuO \rightarrow CO_2 + Cu$

B. $\underline{CuO} + 2HCl \rightarrow CuCl_2 + H_2O$

C. $\underline{4H_2O} + 3F \rightarrow 4H_2 + Fe_3O_4$

D. $\underline{C} + 4HNO_3 \rightarrow CO_2 + 2H_2O + 4NO_2$

Answer: C

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41. A compound contains atoms A, B and C. the oxidation number of A is $+2$, of B is $+5$ and of C is -2. The possible formula of the compound is

A. XYZ_2

B. $Y_2(XZ_3)_2$

C. $X_3(YZ_4)_2$

D. $X_3(Y_4Z)_2$

Answer: C

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42. Consider the following reactions,

(I) $2Mn_2O_7 \rightarrow 4MnO_2 + 3O_2$

(II) $SnCl_2 + 2FeCl_3 \rightarrow SnCl_4 + 2FeCl_2$

A. $SnCl_2$ is oxidised and $FeCl_3$ acts as oxidising agent.

B. $FeCl_3$ is oxidised and acts as oxidising agent.

C. $SnCl_2$ is reduced and acts as oxidising agent.

D. $FeCl_3$ is oxidised and $SnCl_2$ acts as a oxidising agent.

Answer: A

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43. Which of the following statements is correct regarding redox reactions ?

A. An increase in oxidation number of an element is called reduction

B. A decrease in oxidation number of an element is called oxidation.

C. A reagent which lowers the oxidation number of an element in a given substance is reductant.

D. A reagent which increases the oxidation number of an element in a given substance is reductant .

Answer: C

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44. In the reacion ,

$3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow 5Br^- + BrO_3^- + 6HCO_3^-$

A. Bromine is reduced and carbonate ion is oxidised.

B. Bromine undergoes disproportionation.

C. Bromine is reduced and water is oxidised.

D. Only water is oxidised to carbonic acid.

Answer: B

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45. Given below is a redox reaction. Which of the following types the reaction belongs to ?

$$CuSO_{4(aq)} + Zn_{(s)} \rightarrow Cu_{(s)} + ZnSO_{4(aq)}$$

A. Combination reaction

B. Decomposition reaction

C. Metal displacement reaction

D. Non-metal displacement reaction

Answer: C

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46. Identify the oxidant the reductant in the following reaction.

$Cl_2(g) + 2Br^-(aq) \rightarrow 2Cl^-(aq) + Br_2(aq)$

A. Decomposition reaction

B. Metal displacement reaction

C. Non-metal displacement reaction

D. Disproportionation reaction

Answer: C

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47. Which of the following is a disproportionation reaction?

A. $Cl_{2(g)} + 2OH^-_{(aq)} \rightarrow ClO^-_{(aq)} + Cl^-_{(aq)} + H_2O_{(l)}$

B. $Cl_{2(g)} + 2I^-_{(aq)} \rightarrow 2Cl^-_{(aq)} + I_{2(s)}$

C. $2Fe_{(s)} + 3H_2O_{(l)} \xrightarrow{\Delta} Fe_2O_{3(s)} + 3H_{2(g)}$

D. $2H_2O_{(l)} + 2F_{2(g)} \rightarrow 4HF_{(aq)} + O_{2(g)}$

Answer: A

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48. Match the column I with column II with the type of reaction and mark the appropriate choice.

Column I		Column II	
(A)	$3Mg_{(s)} + N_{2(g)} \xrightarrow{\Delta} Mg_3N_{2(s)}$	(i)	Displacement
(B)	$NaH_{(s)} + H_2O_{(l)} \rightarrow NaOH_{(aq)} + H_{2(g)}$	(ii)	Decomposition
(C)	$3ClO^-_{(aq)} \rightarrow 2Cl^-_{(aq)} + ClO^-_{3(aq)}$	(iii)	Combination
(D)	$2KClO_{3(s)} \rightarrow 2KCl_{(s)} + 3O_{2(g)}$	(iv)	Disproportionation

A. (A) $\rightarrow$ (i), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (ii), (D) $\rightarrow$ (iv)

B. (A) $\rightarrow$ (iv), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (ii), (D) $\rightarrow$ (i)

C. (A) $\rightarrow$ (ii), (B) $\rightarrow$ (i), (C) $\rightarrow$ (iii), (D) $\rightarrow$ (iv)

D. (A) $\rightarrow$ (iii), (B) $\rightarrow$ (i), (C) $\rightarrow$ (iv), (D) $\rightarrow$ (ii)

Answer: D

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49. Which of the following is not an example of disproportionation reaction ?

A. $4ClO_3^- \rightarrow Cl^- + 3ClO_4^-$

B. $2H_2O_2 \rightarrow 2H_2O + O_2$

C. $2NO_2 + 2OH^- \rightarrow NO_3^- + H_2O$

D. $TiCl_4 + 2Mg \rightarrow Ti + 2MgCl_2$

Answer: D

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50. White phosphorus reacts with caustic soda to form PH_3 and NaH_2PO_2. This reaction is an example of

A. oxidation

B. reduction

C. disproportionation

D. displacement

Answer: C

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51. What is the oxidation number of carbon in C_3O_2 (carbon suboxide) ?

A. $+4/3$

B. $+10/4$

C. $+2$

D. $+2/3$

Answer: A

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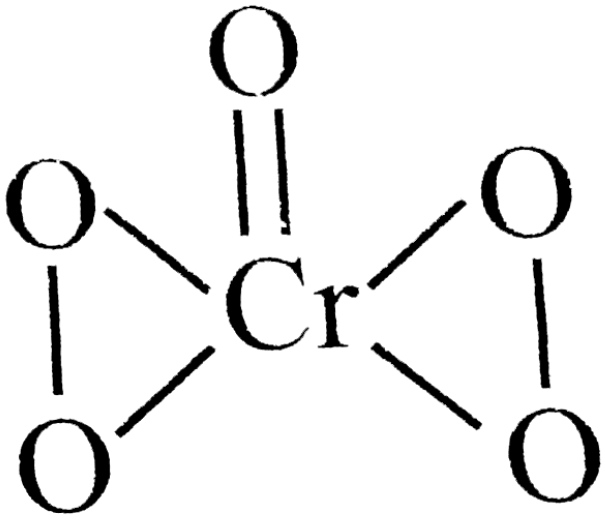
52. The oxidation number of Cr in $CrO(5)$ which has the following structure is



A. $+4$

B. $+5$

C. $+6$

D. $+3$

Answer: C

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53. In the conversion of Br_2 to BrO_3^- , the oxidation state of Br changes from.

A. $+1$ to $+5$

B. 0 to -3

C. $+2$ to $+5$

D. 0 to $+5$

Answer: D

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54. Permanganate (VII) ion, MnO_4^- oxidises I^- ion to I_2 and gives manganese (IV) oxide MnO_2 in basic medium. The skeletal ionic equation is given as

$$pMnO_{4(aq)}^- + qI_{(aq)}^- + xH_2O_{(l)} \rightarrow rMnO_{2(s)} + sI_{2(s)} + yOH_{(aq)}^-$$

The values of p, q, r and s are

A.

p	q	r	s
1	2	8	4

B.

p	q	r	s
2	6	2	3

C.

p	q	r	s
2	4	2	8

D.

p	q	r	s
1	4	8	2

Answer: B

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55. Choose correct statements (s) regarding the following reactions.

$$Cr_2O_7^{2-}(aq) + 3SO_3^{2-}(aq) + 8H^+ \rightarrow 2Cr^{3+}(aq) + 3SO_4^{2-}(aq) + 4H_2O$$

A.

$$Cr_2O_{7(aq)}^{2-} + 3SO_{2(g)} + 2H_{(aq)}^{+} \rightarrow 2Cr_{(aq)}^{3+} \rightarrow 2Cr_{(aq)}^{3+} + 3SO_{4(aq)}^{2-}$$

B.

$$2Cr_2O_{7(aq)}^{2-} + 3SO_{2(g)} + 4H_{(aq)}^{+} \rightarrow 4Cr_{(aq)}^{3+} + 3SO_{4(aq)}^{2-} + 2H_2O_{(l}$$

C.

$$Cr_2O_{7(aq)}^{2-} + 3SO_{2(g)} + 14H_{(aq)}^{+} \rightarrow 2Cr_{(aq)}^{3+} + 3SO_{4(aq)}^{2-} + 7H_2O_{(l}$$

D.

$$Cr_2O_{7(aq)}^{2-} + 6SO_{2(g)} + 7H_{(aq)}^{+} \rightarrow 2Cr_{(aq)}^{3+} + 6SO_{4(aq)}^{2-} + 7H_2O_{(l)}$$

Answer: A

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56. The Mn^{3+} ion is unstable in solution and undergoes disproportionation reaction to give Mn^{+2}, MnO_2, and $H^{\oplus}$ ion. Write a balanced ionic equation for the reaction.

A. $3Mn^{3+} + 4H_2O \rightarrow MnO_2 + Mn^{2+} + 8H^{+}$

B. $Mn^{2+} + 4H_2O \rightarrow MnO_2 + 4H^+$

C. $Mn + 2H_2O \rightarrow MnO_2 + 4H^+$

D. $2Mn^{3+} + 2H_2O \rightarrow MnO_2 + Mn^{2+} + 4H^+$

Answer: D

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57. The number of moles of $KMnO_4$ reduced by $1\text{mol of}KI$ in alkaline medium is

A. $1/5$

B. 2

C. $3/2$

D. 4

Answer: B

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58. Balance the following equation by oxidation number method:

$K_2Cr_2O_7 + FeSO_4 + H_2SO_4 \rightarrow Cr_2(SO_4)_3 + Fe_2(SO_4) + K_2SO_4 + H_2$

A. $Cr_2O_7^{2-} + 14H^+ + 6Fe^{2+} \rightarrow 6Fe^{3+} + 2Cr^{3+} + 7H_2O$

B.

$2K^+ + Cr_2O_7^{2-} + 7SO_4^{2-} + 6Fe^{2+} \rightarrow 3Fe^{3+} + SO_4^{2-} + Cr^{3+} +$

C. $Cr_2O_7^{2-} + 2K^+ + 7H^+ + 6Fe^{2+} \rightarrow 6Fe^{3+} + 6Cr^{3+} + K^+$

D. $Cr_2O_7^{2-} + 7H^+ + 6Fe^{2+} \rightarrow 3Fe^{2+} + 2Cr^{3+} + 2K^+ + 7H_2O$

Answer: A

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59. Which will be the value of x, y and z in the following equaton.

$xI_2 + yOH^- \rightarrow IO_3^- + zI + 3H_2O$

A.

x	y	z
6	3	5

B. $\begin{matrix} x & y & z \\ 3 & 2 & 3 \end{matrix}$

C. $\begin{matrix} x & y & z \\ 3 & 6 & 5 \end{matrix}$

D. $\begin{matrix} x & y & z \\ 3 & 3 & 3 \end{matrix}$

Answer: C

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60. The number of electrons involved in the conversion of MnO_4^- to MnO_2 is

A. 3

B. 4

C. 1

D. 2

Answer: A

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61. The values of coefficients to balance the following reaction are

$$Cr(OH)_3 + ClO^- + OH^- \rightarrow CrO_4^{2-} + Cl^- + H_2O$$

	$Cr(OH)_3$	ClO^-	CrO_4^{2-}	Cl^-
A.	2	3	3	3
B.	2	4	3	2
C.	2	4	4	2
D.	2	3	2	3

Answer: D

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62. The stoichiometric constants for the reaction $pCu + qHNO_3 \rightarrow rCu(NO_3)_2 + sNO + tH_2O$ p, q, r, s and t respectively are

A. 3, 3, 3, 2, 3

B. 3, 2, 3, 2, 4

C. 3, 8, 3, 2, 4

D. 2, 3, 3, 3, 2

Answer: C

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63. What is the correct representation of reaction occurring when HCl is heated with MnO_2 ?

A. $MnO_4^- + 5Cl^- + 8H^+ \rightarrow Mn^{2+} + 5Cl^- + 5H_2O$

B. $MnO_2 + 2Cl^- + 4H^+ \rightarrow Mn^{2+} + Cl_2 + 2H_2O$

C. $2MnO_2 + 4Cl^- + 8H^+ \rightarrow 2Mn^{2+} + 2Cl_2 + 4H_2O$

D. $MnO_2 + 4HCl \rightarrow MnCl_4 + Cl_2 + H_2O$

Answer: B

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64. When $KMnO_4$ is reduced with oxalic acid in acidic solution, the oxidation number of Mn changes from

A. $+2$ to $+7$

B. $+4$ to $+7$

C. $+7$ to $+2$

D. $+6$ to $+2$

Answer: C

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65. When a mananous salt is fused with a mixture of KNO_3 and and solid NaOH, the oxidation number of Mn change from +2 to:

A. $+4$

B. $+3$

C. $+6$

D. $+7$

Answer: C

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66. For decolourisation of $1\text{mol of}KMnO_4$, the moles of H_2O_2 required is

A. $1/2$

B. $3/2$

C. $5/2$

D. $7/2$

Answer: C

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67. The number of moles of $K_2Cr_2O_7$ reduced by $1mol$ of Sn^{2+} ions is

A. $1/3$

B. $1/6$

C. $2/3$

D. $3/4$

Answer: A

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68. Which of the following colour changes shown during redox titrations is not correct ?

A. $Cr_2O_7^{2-}$ oxidises the indicator diphenylamine to produce blue colour showing end point.

B. Iodine formed by oxidation of I^- ions gives blue colour with starch showing end point.

C. $KMnO_4$ in the form of MnO_4^- ions gives pink colour showing end point.

D. Thiosulphate ions $\left(S_2O_3^{2-}\right)$ give blue colour showing end point.

Answer: D

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69. Which of the following acts as a self-indicator ?

A. $K_2Cr_2O_7$

B. $KMnO_4$

C. Oxalic acid

D. Iodine

Answer: B

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70. Which of the following are the common oxidising agents used in redox titrations ?

A. $K_2Cr_2O_7$, $KMnO_4$, Iodine

B. $FeSO_4$, $KMnO_4$, Sodium thiosulphate

C. Oxalic acid, $KMnO_4$, $CuSO_4$

D. Mohr's salt, KI, Sodium sulphate

Answer: A

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Mcqs Oxidation Number

1. Match the column I with column II and mark the appropriate choice.

Column I (Compound)		Column II (Oxidation state of Fe)	
(A)	$K_3[Fe(OH)_6]$	(i)	+8/3
(B)	$K_2[FeO_4]$	(ii)	+2
(C)	$FeSO_4 \cdot (NH_4)_2 SO_4 \cdot 6H_2O$	(iii)	+3
(D)	Fe_3O_4	(iv)	+6

A. (A) $\rightarrow$ (iii), (B) $\rightarrow$ (i), (C) $\rightarrow$ (ii), (D) $\rightarrow$ (iv)

B. (A) $\rightarrow$ (iii), (B) $\rightarrow$ (iv), (C) $\rightarrow$ (ii), (D) $\rightarrow$ (i)

C. (A) $\rightarrow$ (i), (B) $\rightarrow$ (iii), (C) $\rightarrow$ (ii), (D) $\rightarrow$ (iv)

D. (A) $\rightarrow$ (iv), (B) $\rightarrow$ (ii), (C) $\rightarrow$ (i), (D) $\rightarrow$ (iii)

Answer: B

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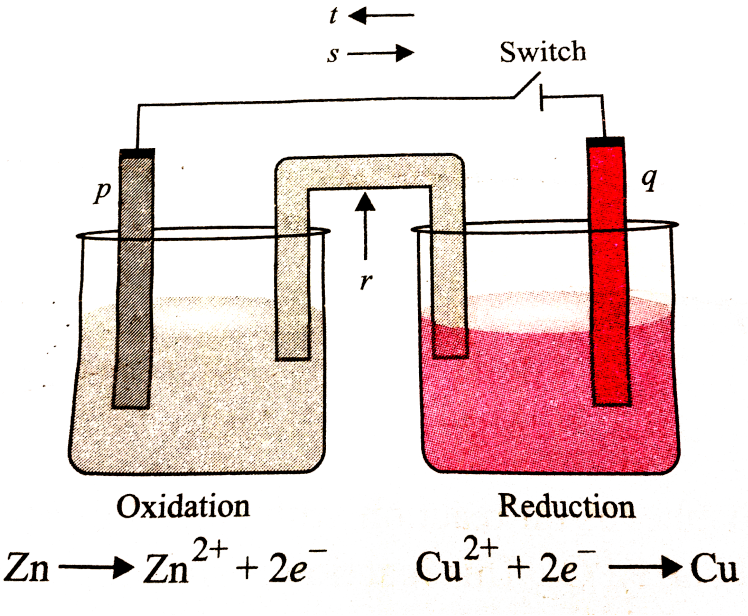
Mcqs Redox Reactions And Electrode Processes

1. Given below is the set up for Daniell cell. Label p, q, r, s, t in the given figure.



	p	q	r	s	t
A.	Anode	Cathode	Salt bridge	Electron flow	Current flow
	p	q	r	s	t
B.	Cathode	Anode	Salt bridge	Current flow	Electron flow
	p	q	r	s	t
C.	Anode	Cathode	Salt bridge	Current flow	Electron flow
	p	q	r	s	t
D.	Cathode	Anode	Salt bridge	Ions flow	Electron flow

Answer: A

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Redox Reactions And Electrode Processes

1. Given below are few statements regarding electrode potentials. Mark the correct statements.

A. (i) and (ii)

B. (i) and (iii)

C. (ii) and (iii)

D. (i), (ii) and (iii)

Answer: D

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2. What wil be the products of electrolysis of an aqueous solution of $AgNO_3$ with silver electrodes ?

A. Ag from Ag anode dissolves while Ag^+ from solution gets deposited on cathode.

B. Ag is liberated at cathode and O_2 is liberated at anode.

C. Ag at cathode and nitric acid at anode is liberated.

D. No reaction takes place.

Answer: A

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3. What will be the products of electrolysis of $AgNO_3$ solution in water with platinum electrodes ?

A. Ag is liberated at cathode and Ag is deposited in anode.

B. Ag is liberated at cathode and O_2 is liberated at anode.

C. Ag is liberated at anode and water is liberated at cathode.

D. Ag is liberated at cathode and silver oxide is liberated at anode.

Answer: B

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4. In an oxidation process for a cell,

$M_1 \rightarrow M_1^{n+} + ne^-$,

the other metal (M_2) being univalent showing reduction takes up ..... electrons to complete redox reaction.

A. $(n-1)$

B. 1

C. n

D. 2

Answer: C

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5. Which of the following reactions takes place at anode ?

A. Reduction

B. Oxidation

C. Decomposition

D. Dissolution

Answer: B

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6. Which of the following will act as cathode when connected to standard hydrogen electrode which has E° value given as zero ?

(i) $Zn^{2+}/Zn, E^\circ = -0.76V$

(ii) $Cu^{2+}/Cu, E^\circ = +0.34V$

(iii) $Al^{3+}/Al, E^\circ = -1.66V$

(iv) $Hg^{2+}/Hg, E^\circ = +0.885V$

A. (i) and (ii)

B. (ii) and (iv)

C. (i) and (iii)

D. (i), (ii), (iii) and (iv)

Answer: B

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7. Which of the following reaction does not take place ?

A. $Ag^{+} \rightarrow Ag - e^{-}$

B. $Fe^{2+} \rightarrow Fe^{3+} + e^{-}$

C. $Cu^{2+} + 2e^{-} \rightarrow Cu$

D. $Al^{3+} \rightarrow Al - 3e^{-}$

Answer: B

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8. निम्नलिखित संभव अभिक्रियाओं की सहायता से Mg, Zn, Cu और Ag को उनके धत्ते हुए इलेक्ट्रोड विभव के क्रम में लिखिए।

$Cu + 2Ag^{+} \rightarrow Cu^{2+} + 2Ah$

$Mg + Zn^{2+} \rightarrow Mg^{2+} + Zn$

$Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$

A. $Mg > Zn > Cu > Ag$

B. $Mg < Zn < Cu < Ag$

C. $Zn > Cu > Ag > Mg$

D. $Mg > Cu > Zn > Ag$

Answer: B

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9. Which of the following is not a correct statement about electrochemical series of reduction potentials ?

A. The standard electrode potential of hydrogen is 0.00 volts.

B. Active non-metals have positive reduction potentials.

C. Active metals have negative reduction potentials.

D. Metals which have positive reduction potentials are good reducing agent.

Answer: D

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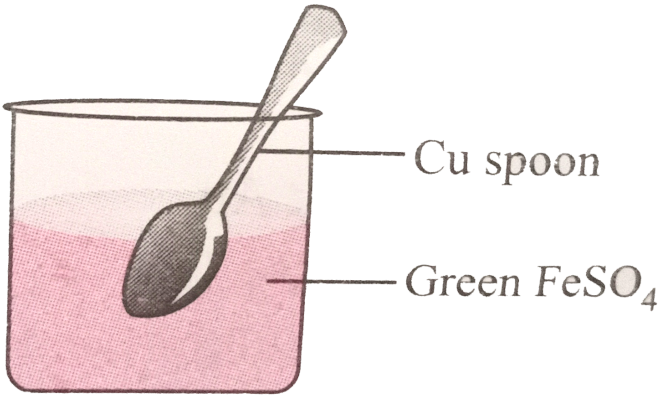
10. If a spoon of copper metal is placed in a solution of $FeSO_4$, what will be the correct observation ?



A. Copper is dissolved in $FeSO_4$ to give brown deposit.

B. No reaction takes place.

C. Iron is deposited on copper spoon.

D. Both copper and iron are precipitated.

Answer: B

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11. The solution in a beaker turns blue if

A. Cu electrode is placed in $ZnSO_4$ solution

B. Cu electrode is placed in $AgNO_3$ solution

C. Cu electrode is placed in $Al_2(SO_4)_3$ solution

D. Cu electrode is placed in $FeSO_4$ solution

Answer: B

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12. The standard electrode potential a Ag^+/Ag is +0.80 V and of Cu^{2+}/Cu is +0.34 V. These electrodes are connected through a salt bridge and if :

A. Ag can oxidise Zn and Cu.

B. Ag can reduce Zn^{2+} and Cu^{2+}

C. Zn can reduce Ag^+ and Cu^{2+}

D. Cu can reduce Zn^{2+} and Ag^+.

Answer: C

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13. The E° values of redox complex of halogens are given. Based on these values mark the correct statement.

$E^\circ_{I_2/CI^-} = +0.54V, E^\circ_{Br_2/Br^-} = +1.08V,$

$E^\circ_{Cl_2/Cl^-} = +1.36V,$

A. Chlorine can displace bromine and iodine from their salt solutions.

B. Chlorine can only displace iodine from its salt solution.

C. Bromine can displace chlorine from its salt solution.

D. Iodine can displace chlorine and bromine from their salt solutions.

Answer: A

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14. Arrange the following metals in the order in whiCHM they displace eaCHM other from the solution of their salts. $Al, Cu, Fe, Mg,$ and $Zn.$

A. Cu, Fe, Zn, Al, Mg

B. Fe, Zn, Cu, Al, Mg

C. Mg, Cu, Fe, Zn, Al

D. Mg, Al, Zn, Fe, Cu

Answer: D

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15. Arrange the following metals in increasing order of their reducing power.

[Given : $E^{\circ}_{K^{+}/K} = -2.93V, E^{\circ}_{Ag^{+}/Ag} = +0.80V, E^{\circ}_{Al^{3}/Al} = -1.66V, E^{\circ}_{Au^{3+}/Au}$]

A. $Li < K < Al < Ag < Au$

B. $Au < Ag < Al < K < Li$

C. $K < Al < Au < Ag < Li$

D. $Al < Ag < Au < Li < K$

Answer: B

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16. A metal X displaces nickel from nickel sulphate solution but does not displace manganese from manganese sulphate solution. What is the correct order of their reducing powers ?

A. $Ni > Mn > X$

B. $X > Mn > Ni$

C. $Mn > X > Ni$

D. $Mn > Ni > X$

Answer: C

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17. Given

$E^{\circ}_{Ag^{+}/Ag} = +0.80V, E^{\circ}_{Cu^{2+}/Cu} = +0.34V, E^{\circ}_{Fe^{3+}/Fe^{2+}} = +0.76V, E^{\circ}_{Ce^{4}}$

Which of the following statements is not correct ?

A. Fe^{3+} does not oxidise Ce^{3+}.

B. Cu reduces Ag^+ to Ag.

C. Ag will reduce Cu^{2+} to Cu.

D. Fe^{3+} reduces Cu^{2+} to Cu.

Answer: C

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18. निम्नलिखित आयनो को इलेक्ट्रॉन ग्रहण करने की बढ़ती क्षमता के क्रम में लिखो । $H^+, Mg^{2+}, K^+, Ag^+, Zn^{2+}$ तथा Cu^{2+}

A. $Ag^+ > H^+ > Zn^{2+} > Mg^{2+} > K^+$

B. $H^+ > Zn^{2+} > Mg^{2+} > K^+ > Ag^+$

C. $K^+ > Mg^{2+} > Zn^{2+} > H^+ > Ag^+$

D. $Mg^{2+} > Zn^{2+} > K^+ > H^+$

Answer: A

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19. What will be the order of decreasing reducing nature for the given metals ?

A. $Zn > Na > Fe > Mg > Cu > Ag$

B. $Cu > Fe > Mg > Zn > Na > Ag$

C. $Ag > Cu > Fe > Zn > Mg > Na$

D. $Na > Mg > Zn > Fe > Cu > Ag$

Answer: D

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20. Which of the following is the strongest oxidizing agent ?

A. F_2

B. Cl_2

C. Br_2

D. I_2

Answer: A

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21. Fluorine is the best oxidising agent because it has

A. it is most electronegative .

B. it has highest reduction potential.

C. it has highest oxidation potential.

D. it has smallest size.

Answer: B

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22. Which of the following halides is most acidic ?

A. F^-

B. Br^-

C. I^-

D. Cl^-

Answer: C

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Higher Order Thinking Skills

1. The oxidation sates of metal in the compounds $Fe_{0.94}O$ and $\left[Cr(PPh_3)_3(CO)_3\right]$ respectively are

A. $\frac{200}{94}, 0$

B. $0, \frac{94}{200}$

C. $2, 1$

D. $1, \frac{200}{94}$

Answer: A

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2. Consider the following reaction,

$$\begin{array}{lll} CHO & & COO^- \\ | & +OH^- \rightarrow & | \\ CHO & & CH_2OH \end{array}$$

Select the incorrect statement.

A. It is not a disproportionation reaction.

B. It is intramolecular redox reaction.

C. OH^- is a reducing as well as oxidising agent.

D. $\begin{array}{l} CHO \\ | \\ CHO \end{array}$ is a reducing as well as oxidising agent.

Answer: C

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3. Which of the following is a redox reaction ?

A. Reaction of H_2SO_4 with NaOH

B. In atmosphere, formation of O_3 from O_2 by lightening

C. Formation of oxides of nitrogen from nitrogen and oxygen by lightening

D. Evaporation of H_2O

Answer: C

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4. Why following two reaction proceed differently?

$Pb_3O_4 + 8HCl \rightarrow 3PbCl_2 + Cl_2 + 4H_2O$

and

$Pb_3O_4 + 4HNO_3 \rightarrow 2Pb(NO_3)_2 + PbO_2 + 2H_2O$

A. three numbers of Pb^{2+} ions get oxidised to Pb^{4+} state

B. one number Pb^{4+} ion gets reduced to Pb^{2+} and two numbers of Pb^{2+} ions remain unchanged in their oxidation state

C. one number Pb^{2+} ion gets oxidised to Pb^{4+} and two numbers of Pb^{4+} ions remain unchanged in their oxidation states

D. three numbers of Pb^{4+} ions get reduced to Pb^{2+} state.

Answer: B

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5. which of the following statements is not correct about the reaction given below?

$$K_4\left[Fe(CN)_6\right] \xrightarrow{\text{Oxidation}} Fe^{3+} + CO_2 + NO_3^{\ominus}$$

A. Fe is oxidised from Fe^{2+} to Fe^{3+}.

B. Carbon is oxidised from C^{2+} to C^{4+}.

C. N is oxidised from N^{3-} to N^{5+}.

D. Carbon is not oxidised.

Answer: D

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6. One mole of N_2H_4 loses ten moles of electrons to form a new compound A. Assuming that all the nitrogen appears in the new compound, what is the oxidation state of nitrogen in A? (There is no change in the oxidation state of hydrogen.)

A. -1

B. -3

C. $+3$

D. $+5$

Answer: C

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7. Using the following Latimer diagram for bromine,

$pH = 0, BrO_4^- \xrightarrow{1.82V} BrO_3^- \xrightarrow{1.50V} HBrO \xrightarrow{1.595V} Br_2 \xrightarrow{1.06552V} Br^-$

the species undergoing disproportionation is

A. BrO_4^-

B. BrO_3^-

C. HBrO

D. Br_2

Answer: C

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8. For the reaction : $I^- + ClO_3^- + H_2SO_4 \rightarrow Cl^- + HSO_4^- + I_2$

The correct statement(s) in the balanced equation is/are:

A. stoichiometric coefficient of HSO_4^- is 6

B. iodide is oxidized

C. sulphur is reduced

D. H_2O is one of the products.

Answer: C

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9. MnO_4^- ions are reduced in acidic conditions to Mn^{2+} ions whereas they are reduced in neutral condition to MnO_2. The oxidation of 25 mL of a solution x containing Fe^{2+} ions required in acidic condition 20 mL of a solution y containing MnO_4 ions. What value of solution y would be required to oxidize 25 mL of solution x containing Fe^{2+} ions in neutral condition ?

A. 11.4 mL

B. 12.0 mL

C. 33.3 mL

D. 35.0 mL

Answer: C

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Ncert Exemplar

1. Which of the following is not an example of redox reaction?

A. $CuO + H_2 \rightarrow Cu + H_2O$

B. $Fe_2O_3 + 3CO \rightarrow 2Fe + 3CO_2$

C. $2K + F_2 \rightarrow 2KF$

D. $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

Answer: D

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2. The more positive the value of E^{θ}, the greater is the tendency of the species to get reduced. Using the standard electrode potential of redox couples given below find out which of the following is the strongest oxidizing agent.

E^{θ} values: $Fe^{3+}/Fe^{2+} = +0.77$

$I_{2(s)}/I^{-} = +0.54,$

$Cu^{2+}/Cu = +0.34, Ag^{+}/A = 0.80V$

A. Fe^{3+}

B. $I_{2(s)}$

C. Cu^{2+}

D. Ag

Answer: D

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3. E^{θ} values of some redox couples are given below. On the basis of these values choose the correct option.

E^{θ} values: $Brt_2 / Br^- = +1.90$

$Ag^+ / Ag(s) = +0.80$

$Cu^{2+} / Cu(s) = +0.34, I_2(s) / I^- = +0.54$

A. Cu will reduce Br^-

B. Cu will reduce Ag

C. Cu will reduce I^-

D. Cu will reduce Br_2

Answer: D

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4. Using the standard electrode potential, find out the pair between which redox reaction is not feasible. E° values :

$Fe^{3+}/Fe^{2+} = +0.77, I_2/I^- = +0.54V$

$Cu^{2+}/Cu = +0.34V, Ag^+/Ag = +0.80V$

A. Fe^{3+} and I^-

B. Ag^+ and Cu

C. Fe^{3+} and Cu

D. Ag and Fe^{3+}

Answer: D

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5. Thiosulphate reacts differently with iodine and bromine in the reactions given below :

$S_2O_3^{2-} + I_2 \rightarrow S_4O_6^{2-} + 2I^-$

$S_2O_3^{2-} + 2Br_2 + 5H_2O \rightarrow 2SO_4^{2-} + 2Br^- + 10H^+$

Which of the following statements justifies the above dual behaviour of thiosulphate ?

A. Bromine is a stronger oxidant than iodine.

B. Bromine is a weaker oxidant than iodine.

C. Thiosulphate undergoes oxidation by bromine and reduction by iodine in these reactions.

D. Bromine undergoes oxidation and iodine undergoes reduction in these reactions.

Answer: A

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6. The oxidation number of an element in a compound is evaluated on the basis of certain rules. Which of the following rules is not correct in this respect ?

A. The oxidation number of hydrogen is always +1.

B. The algebraic sum of all the oxidation numbers in a compound is zero.

C. An element in the free or the uncombined state bears oxidation number zero.

D. In all its compounds, the oxidation number of fluorine is -1.

Answer: A

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7. In which of the following compounds, an elements exhibits two different oxidation states?

A. NH_2OH

B. NH_4NO_3

C. N_2H_4

D. N_3H

Answer: B

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8. Which of the following arrangements represent increaseing oxidation number of the central atom?

A. $CrO_2^-, ClO_3^-, CrO_4^{2-}, MnO_4^-$

B. $ClO_3^-, CrO_4^{2-}, MnO_4^-, CrO_2^-$

C. $CrO_2^-, ClO_3^-, MNO_4^-, CrO_4^{2-}$

D. $CrO_4^{2-}, MnO_4^-, CrO_2^-, ClO_3^-$

Answer: A

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9. The largest oxidation number exhibited by an element depends on its outer eletronic configuration. With which of the following outer electronic configurations the element will exhibit largest oxidation number ?

A. $3d^1 4s^2$

B. $3d^3 4s^2$

C. $3d^5 4s^1$

D. $3d^5 4s^2$

Answer: D

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10. Identify the disproportionation reaction.

A. $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$

B. $CH_4 + 4Cl_2 \rightarrow CCl_4 + 4HCl$

C. $2F_2 + 2OH^- \rightarrow 2F^- + OF_2 + H_2O$

D. $2NO_2 + 2OH^- \rightarrow NO_2^- + NO_3 + H_2O$

Answer: D

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11. Which of the following elements does not show disproportionation tendency?

A. Cl

B. Br

C. F

D. I

Answer: C

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Assertion And Reason

1. Assertion : Conversion of potassium ferrocyanide to potassium ferricyanide is an oxidation process.

Reason : Oxidation is the addition of oxygen/electronegative element to a

substance or removal of hydrogen/electropositive element from a substance.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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2. Justify that the reaction

$2Cu_2O_s + Cu_2S(s) \rightarrow 6Cu(s) + SO_2(g)$ a redox reaction. Identify the species oxidised / reduced. Which acts as an oxidanat and which acts as a reductant?

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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3. Assertion : HNO_2 can act both as a reducing agent and an oxidising agent.

Reason : In HNO_2, oxidation state of nitrogen is +3 which can change from -3 to +5.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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4. Assertion : Decomposition of potassium chlorate is an example of redox reaction .

Reason : There is no change in the oxidation number of potassium in decomposition of potassium chlorate.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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5. Assertion : Displacement reactions of chlorine, bromine and iodine using fluorine are not generally carried out in aqueous solution.

Reason : Fluorine being highly reactive attacks water and displaces the oxygen of water.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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6. Assertion : Decomposition of hydrogen peroxide is an example of disproportionation reaction.

Reason : In a disproportionation reaction, an element in one oxidation state is simultaneously oxidised and reduced .

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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7. Assertion : CO_4^- does not snow disproportionation reaction.

Reason : In ClO_4^- , chlorine is present in its highest oxidation state .

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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8. Assertion : All halogens undergo disproportionation reaction in alkaline medium.

Reason : All halogens exhibit variable oxidation states.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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9. Assertion : The only way to get F_2 form F^- is to oxidise electrolytically.

Reason : The recovery of halogens from their halides requires an oxidation process.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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10. Assertion: Oxygen atom in both O_2 and O_3 has oxidation number zero.

Reason: In F_2O, oxidation number of O is $+2$.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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11. Assertion : In the species, $S_4O_6^{2-}$ each of the two extreme sulphurs exhibits oxidation state of +5 and the two middle sulphurs as zero.

Reason : The average of four oxidation numbers of sulphurs of the $S_4O_6^{2-}$ is 2.5.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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12. Assertion : In titrations involving potassium permanganate no indicator is used.

Reason : MnO_4^- acts as the self-indicator.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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13. Assertion : The transfer of electrons from zinc to copper takes place through metal wire connecting the two rods.

Reason : Electricity from solution in one beaker to other flows by migration of ions through the salt bridge.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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14. Assertion : Insert electrolytes like KCl, KNO_3 are used in salt bridge.

Reason : Salt bridge provides an electric contact between the two solutions without allowing them to mix with each other.

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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15. Assertion : A metal having negative reduction potential when dipped in the solution of its own ions has a tendency to pass into solution .

Reason : Metals undergo reduction .

A. If both assertion and reason are true and reason is the correct explanation of assertion.

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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