CHEMISTRY

BOOKS - S DINESH & CO CHEMISTRY (HINGLISH)

REDOX REACTIONS

Example

1. Identify the species undergoing oxidation and reduction.

a. $H_2S(g) + Cl_2(g) \rightarrow 2HCl(g) + S(s)$

b. $3Fe_3O_4(s) + 8Al(s) \rightarrow 9Fe(s) + 4Al_2O_3(s)$

c. $2Na(s) + H_2(g) \rightarrow 2NaH(s)$

Watch Video Solution

2. Write the half equations for each of the following redox reactions:

$(i) 2Fe^3 + (aq) + 2I(aq) \rightarrow I_2(s) + 2Fe^2 + (aq)$

$(ii) 2Na(s) + CI_2(g) \rightarrow 2NaCI(s)$

$(iii) Mg(s) + CI_g \rightarrow MgCI_2(s)$

$(iv) Zn(s) + 2H^+(aq) \rightarrow Zn^2 + (aq) + H_2(g)$

$(V) 2k(s) + CI_2(g) \rightarrow 2kCI(s)$

Watch Video Solution

3. For the followin gredox reaction:

$2AI(s) + 3CuSO_4 \rightarrow faI_2(sO_4)(aq) + 3Cu(s)$

(i) Write the oxidation and reduction half reactions,

(ii) Which sp[ecieds acts as reducing angent and which as an oxidising agent?

(iii) What is the role of SO_4^2 ions in the reaction?

Watch Video Solution

4. On the basis of electronic concept, justify that the following reaction is a redox reaction

$2Na(g) + H_2(g) \rightarrow 2NaH(s)$

Watch Video Solution

5. Calculate the oxidation number of $(i)C$ in $CH_4, (ii)Mn$ in$KMnO_4, (iii)Cr$ in $K_2Cr_2O_7, (iv)P$ in H_3

Watch Video Solution

6. Calculate the oxidation number of sulfur in the following molecules and ions:

$(i)H_2SO_4, (ii)Na_2SO_4, (iii)SO_4^{2-}, (iv)S_2O_4^{2-}$

Watch Video Solution

7. What is the oxidation number of the metal atom in the following ions?

$(i)\left[Fe(CN)_6\right]^3, (ii)MnO_4, (iii)\left[Cr(H_2O)_6\right]^{3+}$

Watch Video Solution

8. Write the formula of the following compunds:

(i)Tin (IV) oxide ,(ii) Copper (I) iodide

,(iii) chromium (III) oxide ,(IV) Thallium (I) suplhate

,(V) Bismuth (III) niitrate Mercury (II) chloride

Watch Video Solution

9. Using stock natation, represent the following compunds:

(i) $HAuCI_4$ (ii) TI_(2)O(iii)FeO$(iv)Fe_2O_3(v)Bi(NO_3)_3(vi)HgCI_2$

Watch Video Solution

10. Point out the oxidising and reudcing agents in the following reactions:

(i) $SO_2 + 2HNO_3 \rightarrow H_2sO_4 + 2NO_2$

(ii) $SO_2 + 2H_2S \rightarrow 2H_2O + 3S$

(iii)$SO_2 + CI_2 2H_2O \rightarrow 2HCI \rightarrow 2HcI + H_2SO_4$

Watch Video Solution

11. In the following chemical reactions, indicate the substances undergoing oxidation and reduction and also mention the oxidising and reducingh agents.

$(i) 2HBr + CI_2 \rightarrow 2HCI + Br_2$

$(ii) 3CuO + 2NH_3 \rightarrow 3Cu + N_2 + 3H_2O$

Watch Video Solution

12. Is the reaction $BaO_2 + H_2SO_4 \rightarrow BaSO_4 + H_2O_2$ a redox reaction?

Watch Video Solution

Watch Video Solution

13. Justify that the reaction :

$2Cu_2 + Cu_2S \rightarrow 6Cu + SO_2$

is a redox reaction. Identify the species oxidised// reduced , acts as oxidant and as reductant.

Watch Video Solution

14. How do the following ions undergo disproportionation $(i)ClO^-, (ii)ClO_2^-, (iii)ClO_3^-$?

Watch Video Solution

15. Does ClO_4 (perchlorate ion) undergo disproportionation in slolution?

Watch Video Solution

16. In the disproportionation reaction,

$3HClO_3 \rightarrow HClO_4 + ClI_2 + 2O_2 + H_2O$

What is the equivalent mass of the oxidising agnet ?

Watch Video Solution

17. Why following two reaction proceed differently?

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

and

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

Watch Video Solution

18. Balance the following chemical equations by the oxidation number method

$(i)CuO + NH_3 \rightarrow Cu + N_{23} + H_2O$

$(ii)C_6H_6 + O_2 \rightarrow CO_2 + H_2O$

$(iii)SnO_2 + C \rightarrow Sn + CO$

$(iv) Fe_2O_3 \rightarrow Fe + CO$

$(v) P + HNO_3 \rightarrow HPO_3 + NO + H_2O$

$(vi) FeS_2 + O_2 \rightarrow Fe_2O_3 + SO_2$

View Text Solution

19. Balance the following redox equation:

$(i) Cu + NO_3^- \rightarrow rNO_2 + Cu^{2+}$ (Acidic medium)

$(ii) \left[Cr(OH)_4\right]^- + H_2O_2 \rightarrow rCrO_4^{2-} + H_2O$(Basic medium)

$(iii) MnO_4^- + Fe^{2+} \rightarrow Mn^{2+} + Fe^{3+} + H_2O$(Acidic medium)

Watch Video Solution

20. Write the half reaction for the following redox reaction

$(a) 2Fe^{3+}(aq) + 2I^-(aq) \rightarrow 2Fe^{2+}(aq) + I_2(aq)$

$(b) Zn(s) + 2H^+(aq) \rightarrow Zn^{2+}(aq) + H_2(g)$

(iii) $Al(s) + 3Ag^+ \rightarrow Al^{+3}(aq) + 3Ag(s)$

Watch Video Solution

21. Balance the following equation stepwise:

$$Cr_2O_7^{2-} + Fe^{2+} + + H^{\oplus} \rightarrow Cr^{3+} + Fe^{3+} + H_2O$$

Watch Video Solution

22. Balance the equation in acidic medium :

(a) "When chloride ion" CI^- is oxidised to CI_2 by $MnO4$

(b) "Chlorate ion" $CIO\overset{3}{\text{oxidies}}Mn^{2+} \rightarrow MnO_2(s)$

View Text Solution

23. The reaction involves the oxidation of $Sn^{2+} \rightarrow Sn^{4+}$ ion the skeleton equation for the reaction is :

$$Cr_2O_7^{2-} + Sn^{2+} + H^+ \rightarrow Cr^{3+} + Snb^{4+} + H_2O$$

Balance the equation by ion electron method.

Watch Video Solution

24. A cell is set up between copper and silver electrodes as follows:

$Cu(s)ICu^{2+}(aq)IIAg^{+}(aq)Iag(S)$

If the two half cells work under standard conditions, calculate the EMF of the cell

$\left(GivenE^{\circ}\_\left(Cu^{2+}/Cu\right)=+0.34V, E^{\circ}\_\left(Ag^{+}/Ag\right)\right.\quad\left.=+0.80V\right)$

Watch Video Solution

25. Calculate the standard reduction electrode potential of Cd^{2+}/Cd electrode for the cell:

$Zn(s)IZn^{2+}(IM)IICd^{2+}(IM)ICd(s)$

(Given that " " $\left.E_{cell}^{\circ}=0.36V \text{ and } E_{Zn^{2+}}^{\circ}/Zn\right)=-0.76V)$

Watch Video Solution

26. Can a nickel spoon be used to stir a solution of copper sulphate ? Support your answer with reason.

(Given : $E_{Ni^{2+}/Ni}^{\circ}=-0.25 \text{ V}, E_{Cu^{2+}/Cu}^{\circ}=0.34 \text{ V}$)

Watch Video Solution

27. Write each half cell reaction as well as redox reaction for the following electrochemical cell

$AL(s)\left|AL^{3+}(1M)\right|\left|Zn^{2+}(1M)\right|Zn(s)$

Watch Video Solution

28. Write the cell reaction that occurs when the folowing half cells are combined.

$I_2 + 2e^- \rightarrow 2I^-(1M), E^\circ = +0.54V$

$Br_2 + 2e^- \rightarrow Br^-(1M), e^\circ = +1.08V$

Watch Video Solution

29. A cell is prepared by dipping a copper rod in $1MCuSO_4$ solution and a nickel rod in $1MNiSO_4$. The standard reduction potentials of copper and nickel electrodes are $+0.34V$ and $-0.25V$ respectively.

(i) Which electrode will work as anode and which as cathode?

(ii) What will be the cell reaction?

(iii) How is the cell represented ?

(iv) Calculate the EMF of the cell.

Watch Video Solution

Board Examination N C E R T

1. Assign oxidation number to the underlined elements in each of the following species:

a. NaH_2PO_4

b. $NaH\underline{S}O_4$

c. $H_4\underline{P_2}O_7$

d. $K_2\underline{Mn}O_4$

e. $\underline{Ca}O_2$

f. $Na\underline{B}H_4$

g. $H_2\underline{S_2}O_7$

h. $KAl(\underline{S}O_4)_2.12H_2O$

Watch Video Solution

2. What are the oxidation number of the underlined elements in each of the following and how do you rationalise your results?

a. $K\underline{I}_3$ b. $H_2\underline{S}_4O_6$ c. $\underline{Fe}_3O_4$

d. $\underline{C}H_3\underline{C}H_2OH$

e. $\underline{C}H_3\underline{C}OOH$

Watch Video Solution

3. Justify that the following reaction are redox reactions:

a. $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(g)$

b. $Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$

c. $4BCl_3(g) + 3LiAlH_4(s) \rightarrow 2B_2H_6(g) + 3LiCl(s) + 3AlCl_3(s)$

d. $2K(s) + F_2(g) \rightarrow 2K^{\oplus}F^{\Theta}(s)$

e. $4NH_3(g) + 5O_2(g) \rightarrow 4NO(g) + 6H_2O(g)$

Watch Video Solution

4. Fluorine reacts with ice and results in the change:

$H_2O(s) + F_2(g) \rightarrow HF(g) + HOF(g)$

Justify that this reaction is a redox reaction.

Watch Video Solution

5. Calculate the O.N of sulphur, chromium and nitrogen in H_2SO_5, CrO_5 and NO^-3 ion Suggest structure of these compounds.Account for the fallacy if any.

Watch Video Solution

6. Write formulas for the following compounds:

a. Mercury (II) chloride b. Nickel (II) sulphate

c. Tin (IV) oxide d. Thallium (I) sulphate

e. Iron (III) sulphate f. Chromium (III) oxide

Watch Video Solution

7. Suggest a list of the substances where carbon can exhibit oxidation states from -4 to $+4$ and nitrogen from -3 to $+5$.

Watch Video Solution

8. While sulphate dioxide and hydrogen peroxide can act as oxidising as well as reducing agents in their reactions, ozone and nitric acid act only as oxidants. Why?

Watch Video Solution

9. Consider the reaction:

a. $6CO_2(g) + 6H_2O(l) \rightarrow C_6H_{12}O_6(aq) + 6O_2(g)$

b. $O_3(g) + H_2O_2(l) \rightarrow H_2O(l) + 2O_2(g)$

Why it is more appropriate to write these reaction as: a.

$6CO_2(g) + 12H_2O(l) \rightarrow C_6H_{12}O_6(aq) + 6H_2O(l) + 6O_2(g)$

$O_3(g) + H_2O_2(l) \rightarrow H_2O(l) + O_2(g) + O_2(g)$

also suggest a technique to investigate the path of the above (a) and (b) redox reactions.

Watch Video Solution

10. The compound AgF_2 is an unstable compound. However, if formed, the compound acts as a strong oxidising agent. Why?

Watch Video Solution

11. Whenever a reaction between an oxidising agent and a reducing agent is carried out, a compound of lower oxidation state is formed if the reducing agent is in excess and a compound of higher oxidation state is formed if the oxidising agent is in excess. Justify this statement giving three illustrations.

Watch Video Solution

12. How do you count for the following observations ?

(a) Though alkaline potassium permanganate and acidic potassium permanganate both are used as oxidants, yet in the manufacture of benzoic acid from toluene we use alcoholic potassium permanganate as an oxidant. Why ? Write a balanced redox equation for the reaction.

(b) When concentrated sulphuric acid is added to an inorganic mixture containing chloride, we get colourless pungent smelling gas HCl, but if the mixture contains bromide then we get red vapour of bromine. Why ?

Watch Video Solution

13. Identify the substance oxidised substance reduced, oxidising agent, and reducing agent for each of the following reactions:

a. $2AgBr(s) + C_6H_6O_2(aq) \rightarrow 2Ag(s) + 2HBr(aq) + C_6H_4O_2(aq)$

b.

$HCHO(l) + 2\left[Ag(NH_3)_3\right]^{\oplus} + 3\overset{\Theta}{O}H(aq) \rightarrow 2Ag(s) + HCOO^{\Theta}(aq) + 4N$

c.

$HCHO(l) + 2Cu^{2+}(aq) + 5\overset{\Theta}{O}H(aq) \rightarrow Cu_2O(s) + HCOO^{\Theta}(aq) + 3H_2O$

d. $N_2H_4(l) + 2H_2O_2(l) \rightarrow N_2(g) + 4H_2O(l)$

d. $Pb(s) + PbO_2(s) + 2H_2SO_4(aq) \rightarrow 2PbSO_4(s) + 2H_2O(l)$

Watch Video Solution

14. Consider the reaction:

$2S_2O_3^{2-}(aq) + I_2(s) \rightarrow S_4O_6^{2-}(aq) + 2I^{\Theta}(aq)$

$2S_2O_3^{2-}(aq) + 2Br_2(l) + 5H_2O(l) \rightarrow 2SO_4^{2-}(aq) + 4Br^{\Theta}(aq) + 10H^{\oplus}(a$

Why does the same reductant, thiosulphate, react differently with iodine and bromine?

Watch Video Solution

15. Justify giving reaction that among halogens, fluorine is the best oxidant and among hydrohalic compounds, hydroiodic acid is the best reductant.

Watch Video Solution

16. Why does the following reaction occur?

$XeO_6^{4-}(aq) + 2F^{\Theta}(aq) + 6H^{\oplus}(aq) \rightarrow XeO_3(g) + F_2(g) + 3H_2O(l)$

What conclusion about the compound Na_4XeO_6 (of which XeO_6^{4-} is a part) can be drawn from the reaction?

Watch Video Solution

17. Consider the reactions:

a.

$H_3PO_2(aq) + 4AgNO_3(aq) + 2H_2O(l) \rightarrow H_3PO_4(aq) + 4Ag(s) + 4HNO$

b.

$H_3PO_2(aq) + 2CuSO_4(aq) + 2H_2O(l) \rightarrow H_3PO_4(aq) + 2Cu(s) + H_2SO$

c.

$C_6H_5CHO(l) + 2\left[Ag(NH_3)_2\right]^{\oplus}(aq) + 3\overset{\Theta}{O}H(aq) \rightarrow C_6H_5COO^{\Theta}(aq) + 2$

d. $C_6H_5CHO(l) + 2Cu^{2+}(aq) + 5\overset{\Theta}{O}H(aq) \rightarrow$ No change observed

What inference do you draw about the behaviour of $Ag^{\oplus}$ and Cu^{2+} from these reaction?

Watch Video Solution

18. Balance the following redox reactions by ion electron method:

a. $MnO_4^{\Theta}(aq) + I^{\Theta}(aq) \rightarrow MnO_2(s) + I_2(s)$ (in basic medium)

b. $MnO_4^{\Theta}(aq) + SO_2(g) \rightarrow Mn^{2+}(aq) + HSO_4^{\Theta}(aq)$ (in acidic solution)

c. $H_2O_2(aq) + Fe^{2+}(aq) \rightarrow Fe^{3+}(aq) + H_2O(l)$ (in acidic solution)

d. $Cr_2O_7^{2-} + SO_2(g) \rightarrow Cr^{3+}(aq) + SO_4^{2-}(aq)$ (in acidic solution)

Watch Video Solution

19. Balance the following equations in basic medium by ion-electron method and oxidation number methods and identify the oxidising agent and the reducing agent.

(a) $P_4(s) + OH^-(aq) \rightarrow PH_3(g) + HPO_2^-(aq)$

(b) $N_2H_4(1) + ClO_3^-(aq) \rightarrow NO(g) + Cl^-(g)$

(c) $Cl_2O_7(g) + H_2O_2(aq) \rightarrow ClO_2^-(aq) + O_2(g) + H^+$

Watch Video Solution

20. What sort of informations can you draw from the following reaction?

$$(CN)_2(g) + 2\overset{\Theta}{O}H(aq) \rightarrow CN^{\Theta}(aq) + CNO^{\Theta}(aq) + H_2O(l)$$

Watch Video Solution

21. 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.

Watch Video Solution

22. Consider the elements:

Cs, Ne, I and F

a. Identify the element that exhibits only negative oxidation state.

b. Identify the element that exhibits only positive oxidation state.

c. Identify the element that exhibits both positive and negative oxidation states.

d. Identify the element which exhibits neither the negative nor does the positive oxidation state.

Watch Video Solution

23. Chlorine is used to purify drinking water. Excess of chlorine is harmful. The excess of chlorine is removed by treating with sulphur dioxide. Present a balanced equation for this redox change taking place in water.

Watch Video Solution

24. From the periodic table select three non metals and three metals which can show dispropportionation rections.

Watch Video Solution

25. In Ostwald's process for the manufacture of nitric acid, the first step involves the oxidation of ammonia gas by oxygen gas to give nitric oxide

gas and steam. What is the maximum weight of nitric oxide that can obtained starting only with $10.00g$ of ammonia and $20.00g$ of oxygen?

Watch Video Solution

26. Using the standard electrode potentials given in the table predict if the reaction between the following feasible.

$(a) Fe^{3+}(aq)$ and $I^{-}(aq)$

$(b) Ag^{+}(aq)$ and $Cu(s)$

$(c) Fe^{3} + (aq)$ and $Cu(s)$

$Ag(s)$ and $Fe^{3+}(aq)$

$(Br_2)(aq)$ and $Fe^{2+}(aq)$

$(d) Ag(s)$ and $Fe^{3+}(aq)$

$(e) Br_2(aq)$ and $fe^{2+}(aq)$

View Text Solution

27. Predict the products of electrolysis in eaCHM of the following :

$a.$ An aqueous solution of $AgNO_3$ with silver electrodes.

b. An aqeous solution of $AgNO_3$ with platinum electrodes,

c. A dilute solution of H_2SSO_4 with platinum electrodes.

d. An aqueous solution of $CuCl_2$ with platinum electrodes.

Watch Video Solution

28. 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.

Watch Video Solution

29. Given standard electrode potentials

$K^{\oplus} \mid K = -2.93V, Ag^{\oplus} \mid Ag = 0.80V,$

$Hg^{2+} \mid Hg = 0.79V$

$Mg^{2+} \mid Mg = -2.37V, Cr^3 \mid Cr = -0.74V$

Arrange these metals in their increasing order of reducing power.

Watch Video Solution

30. Depict the galvanic in whiCHM the reaction :

$Zn(s) + 2Ag^{\oplus}(aq) \rightarrow Zn^{2+}(aq) + 2Ag(s)$ takes place.

Further show :

$a.$ WhiCHM of the electrode is negatively CHMarged ?

$b.$ The carriers of the current in the cell.

$c.$ Individual reaction at eaCHM electrode.

Watch Video Solution

Problems For Practice

1. What is the O.N in $(a)H_2S(b)SO_2(c)SO_3$?

Watch Video Solution

2. Calculate the O.N of Mn in $(a)Mn_4^- (b)K_2MnO_4(c)MnO_2$

Watch Video Solution

3. What is the oxidation number of the underlined atoms in the following ?

$(a)\underline{C}O_2, (b)\underline{S}OO_2, (c)\underline{Cr}_2O_7^{2-}, (d)\underline{Cr}O_4^{2-}, (e)H_4\underline{P}_2O_7, (f)NaH_2\underline{P}O, (h)\underline{I}$

View Text Solution

4. Are the O.N of oxygen in OF_2 and Na_2O_2 same or different?

Watch Video Solution

5. Calculate the oxidation number of (i) Cr in CrO_4^{2-} (ii) C in HCO_3^- (iii) Cl in ClO_4^- (iv)Cr in $Cr_2O_7^{2-}$

View Text Solution

6. Write the oxdation number of the underlined atoms in each of the following:

$(i) KMnO_4 (ii) H_4^+ (iii) S_2O_3^{2-} (iv) Na_3PO_4$

View Text Solution

7. Classify the following compounds on the basis of the oxidation number of xenon.

$XeF_4, XeOF_2, XeO_2F_2, XeF_6$

View Text Solution

8. What is the oxidation number of nitrogen in (i) nitric acid (HNO_3) (ii) nitrous acid (HNO_2) (iii) nitric oxide (NO) (iv) nitrous oxide (N_2O) (v) nitrogen (N_2)?

Watch Video Solution

9. In which o fthe following compounds O.N of carbon in Zero:

$(i) CH_4, (ii) HCHO, (iii) C_6H_{12}O_{16}, (iv) \mathbb{C}I_2F_2$

View Text Solution

10. Answer the following :

(i) What is the O.N Of iondine in HIO_4?

(ii) What is the O.N of Mg in Mg_3N_2

(iii) What is the sum of the O.N of various elements in an anion ?

(iv) What is the O.N of oxygen in Na_2O_2

Watch Video Solution

11. Balance the following equation by oxidation number method .

$(i) Zn + HNO \rightarrow Zn(NO_3)_2 + NO + H_2O$

$(ii) MnO_4^- + Fe^{2+} \rightarrow Mn^{2+} + Fe^{3+}$

$(iii) MnO_2 + HCI \rightarrow MnCI_2 + CI_2 + CI_2 + H_2O$

$(iv) I_2 + HNO_3 \rightarrow HIO_3 + NO_2 + H_2O$

View Text Solution

12. Balance the following equation by ion electron method

$(i) FeCI_3 + H_2S \rightarrow FeCI_2 + HCI + S$

$(ii) Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO + H_2O$

$(iii) KI + CI_2 \rightarrow KCI + I_2$

$(iv) MnO_2 + HCI \rightarrow MnCI_2 + H_2O + CI$

$(iv) H_2S + HNO_3 \rightarrow H_2SO_4 + NO_2 + N_2O$

View Text Solution

13. Write correctly the balanced half reactions and the overall equations for the following skeletal equations

$(i) NO_3^- + Bi^{3+} + NO_2$

$(ii) Fe(OH)_2 + H_2O_2 \rightarrow Fe(OH)_3 + H_2O$

$Cr_2O_7^{2-} + C_2H_4O \rightarrow C_2H_4O_2 + Cr^{3+}$

$(iv) MnO_4^- + H_2C_2O_4 \rightarrow Mn^{2+} + CO_2$

$(v) AI + NO_3^- \rightarrow AI(OH)_4^- + NH_3$

$(vi) CrO_7^{2-} + Fe(2+) \rightarrow rFe^{3+} + Cr^{3+}$

View Text Solution

14. Which reaction occurs at cathode in a galvanic cell ?

Watch Video Solution

15. Can a half cell work independently ?

Watch Video Solution

16. What is the direction of flow of electrons in the following cell ?

$Zn|Zn^{2+}||Ag^{+}|Ag$

Watch Video Solution

17. Can 1M $FeSO_4$ solution be stored in nickel vessel ?

Watch Video Solution

18. Predict whether the following redox reaction is feasible under the standard conditions or not.

$Sn^{2+}(aq) + Cu(s) \rightarrow Sn(s) + Cu^{2+}(aq)$

Given : $E^{\circ}_{Sn^{2+}/Sn} = -0.136\ \text{V}$ and $E_{Cu^{2+}/Cu} = +0.34\ \text{V}$

Watch Video Solution

19. Can 1 M $ZnSO_4$ be stored in a vessel made up of copper ?

Given : $E^{\circ}_{Zn^{2+}/Zn} = -0.76$ and $E^{\circ}_{Cu^{2+}/Cu} = +0.34\ \text{V}$?

Watch Video Solution

20. What is the cell potential of the following cell ?

$Zn(s)\left|Zn^{2+}(1.0M)\right|\left|Pb^{2+}(1.0M)\right|Pb(s)$

Given :$E^{\circ}_{Pb^{2+}/Pb} = -0.12\ \text{V}$ and $E^{\circ}_{Zn^{2+}/Zn} = -0.76\ \text{V}$

Watch Video Solution

Short Answer Type Questions

1. The reaction $Cl_2(g) + 20H^-(aq) \rightarrow ClO^-(aq) + Cl^-(aq) + H_2O(l)$ represents the process of bleaching. Identify and name the species that bleaches the substances due to its oxidising action.

Watch Video Solution

2. MnO_4^{2-} undergoes disproportionation reaction in acidic medium but MnO_4^- does not. Given reason.

Watch Video Solution

3. PbO and PbO_2 react with HCl according to following chemical equations

$2PbO + 4HCl \rightarrow 2PbCl_2 + 2H_2O$

$PbO_2 + 4HCl \rightarrow PbCl_2 + Cl_2 + 2H_2O$

Why do these compounds differ n their reactivity?

Watch Video Solution

4. Nitric acid is an oxidising agent and reacts with PbO but it does not react with PbO_2. Explain why?

Watch Video Solution

5. write balanced chemical equation for the following reaction

(i) Permanganate ion $\left(MnO_4^-\right)$ reacts with suphur dioxide gas in acidic medium to produce $Mn^2(+)$ and hydrogen suphate ion.

(Balance by oxidation number method)

(ii) Reaction of liquid hydrazine (N_2H_4) with chlorate ion CIO_3^- in basic medium produces nitric oxide gas and chloride ion in gaseous state.

(Balance by oxidation number method)

(iii) Dichlorine heptaoxide(CI_2O_7) in gaseous state combines with an aquious sloution of hydrogen peroxide in acidic medium to give chlorite ion $\left(CIO_2^-\right)$ and oxygen gas.

(Balance by ion electron method)

View Text Solution

6. Calculate the oxidation number of phosphorus in the following species.

(a) HPO_3^{2-} (b) PO_4^{3-}

Watch Video Solution

7. Identify the redox reaction out of the following reacitons and identify the oxidising and reducing agents in them.

(a) $3HCl(aq) + HNO_3(aq) \rightarrow Cl_2(g) + NOCl(g) + 2H_2O(l)$

(b) $HgCl_2(aq) + 2KI(aq) \rightarrow HgI_2(s) + 2KCl(aq)$

(c) $Fe_2O_3(s) + 3CO(g) \xrightarrow{\Delta} 2Fe(s) + 3CO_2(g)$

(d) $PCl_2(l) + 3H_2O(l) \rightarrow 3HCl(aq) + H_2PO_3(aq)$

(e) $4NH_3(aq) + 3O_2(g) \rightarrow 2N_2(g) + 6H_2O(g)$

Watch Video Solution

8. Balance the following ionic equations

$(a) Cr_2O_7^{2-} + H^+ + I^- \rightarrow Cr^{3+} + H_2O$

$(b) Cr_2O_7^{2-} + Fe^{2+} + H^+ \rightarrow Cr^{3+} + Fe^{3+} + h_2O$

$(c) MnO_4^- + SO_3^{2-} + H^+ \rightarrow Mn^{2+} + SO_4^{2-} + H_2O$

$(d) MnO_4^- + H^+ + B^- \rightarrow Mn^{2+} + Br_2 + H_2O$

View Text Solution

Long Answer Type Questions

1. Explain redox reaction on the basis of electron transfer, Given suitable examples.

Watch Video Solution

2. On the basis of standard electrode potential values, suggest which of the following reactions would take place? (Consult the book for $E^{\ominus}$ value)

(a) $Cu + Zn^{2+} \rightarrow Cu^{2+} + Zn$

(b) $Mg + Fe^{2+} \rightarrow Mg^{2+} + Fe$

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

(d) $Fe + Cd^2 \rightarrow Cd + Fe^{2+}$

Watch Video Solution

3. Why does flluorine not shown disproportionation reaction?

Watch Video Solution

4. Write redox couples involved in the reactions (i) to (iv) given in question 31 .

View Text Solution

5. Find out the oxidation number of chlorine in the following compounds

$NaClO_4, NaClO_3, NaClO, KClO_2, Cl_2O, NaCl, Cl_2$

Watch Video Solution

6. Which method can be used to find out strength of reductant/oxidant in a solution? Explain with an example.

Watch Video Solution

Additional Important Question

1. The blue colour of copper sulphate solution is discharged when a rod of zinc is deppid in it.Explain.

Watch Video Solution

2. Why connot oxidation occur without reduction?

Watch Video Solution

3. Articles of iorn are generally coated with zinc.Explain.

Watch Video Solution

4. Why is anode negatively charged in an electrochemical cell?

Watch Video Solution

5. Why is standard hydrogen electrode called reversible electrode?

Watch Video Solution

6. Check the feasibility of the following redox reaction with the help of electrochemical series

$Ni(s) + 2Ag^{+}(aq) \rightarrow Ni^{2+}(aq) + 2Ag(s)$

Watch Video Solution

7. What will happen when chloride is passed through an aqueous solution of potassium bromide ?

Watch Video Solution

8. What is the souce of electrical energy in a galvanic cell ?

Watch Video Solution

9. Knowing that :

$Cu^{2+}(aq) + 2e^{-} \rightarrow Cu(s), \qquad E^{\circ} = +0.34 \text{ V}$

$2Ag^{+}(aq) + 2^{-} \rightarrow 2Ag(s), \qquad E^{\circ} = +0.80 \text{ V}$

reason out whether, 1M silver nitrate solution can be stored in copper vessel or 1M copper sulphate solution in silver vessel.

Watch Video Solution

10. Determine the oxidation number of the element in the bold in the following species

$(i)SiH_4$, $(ii)BH_3$, $(iii)Bf_3$, $(iv)S_2O_3(2-)$, $(v)BrO_4^-$, $(vi)HPO_4^{2-}$

View Text Solution

11. Identify the oxidants and redutants in the folowing reactions

$(a)CH_4(g) + 4CI(g) \rightarrow \mathbb{C}I_4(g) + 4HCI(g)$

$(b)2H^+(aq) + MnO_2(S) + C_2H_2O_4(aq) \rightarrow Mn^{2+}(aq) + 2CO_2(g) + 2H_2$

$(c)I_2(aq) + 2S_2O_3^{2-}(aq) \rightarrow 2I^-(aq) + S_4O_6^{2-}(aq)$

$(d)CI_2(g) + 2Br^-(aq) \rightarrow 2CI^-(aq) + Br_2(aq)$

Watch Video Solution

12. write the O.N of all the atoms in the folowing well known oxidants:

$(i)KMnO_4$, $(ii)K_2Cr_2O_7$, $(iii)KCIO_4$

Watch Video Solution

13. The difference in the oxidation numbers of two types of sulphul atoms in $Na_2S_4O_6$ is.....

Watch Video Solution

14. Define reducing agent.

Watch Video Solution

15. Arrange the following in order of increasing O.N of iodine:

Watch Video Solution

16. What is the oxidation number of hgydrogen in $LiAIH_4$? Name a compound in which hydrogen has the same oxidation state.

Watch Video Solution

17. H_2O_2 changes to O_2 What is the change in oxidation number of oxygen per atom?

Watch Video Solution

18. What is O.N of carbon in $(CN)^- ion$?

Watch Video Solution

19. Which is the anhydrode of $HNO_3 \text{out of} N_2O, NO \text{and} N_2O_5$?

Watch Video Solution

20. Out of $(HSO_4)^-$ which is a stronger base?

Watch Video Solution

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

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

Watch Video Solution

22. Given one expample of disprop[ortionation reaction

$2H_3\overset{+1}{P}O_2 \xrightarrow{heat} \overset{-3}{P}H_3 + H_3\overset{+5}{P}O_4$

Watch Video Solution

23. What is the oxidation state of sodium in sodium amalgam (Na/Hg)?

Watch Video Solution

24. What is the oxidation number of chlorine in bleaching powder?

Watch Video Solution

25. Is the following reaction a redox reaction is nature? Justify your answer.

$Cr_2O_7^{2-} + H_2O \rightarrow 2CrO_4^{2-} + 2h^+$

Watch Video Solution

26. Is it safe to stir 1M $AgNO_3$) solution with copper spoon? Given: $E^\circ Ag^+/ag = 0.80V, E^\circ Cu^{2+}/Cu^{2+}/Cu = 0.34V$

Watch Video Solution

27. Balance the following redox reaction :

$Cu + NO_3^- \rightarrow NO_2 + Cu^{2+}$ (Acidic medium).

Watch Video Solution

28. (a) Define oxidation.

(b) Which is the O.N of sup[lhur in H_2S and of carbon in $C_6H_{12}O_6$?

Watch Video Solution

29. Define reducing agent.

Watch Video Solution

30. What is O.N of Na in Na_2O_2?

Watch Video Solution

31. A number of phenomenon both physical, chemical and biologicl are concerned with redox reactions.These rections find extensive use in pharmarceutical industrial and agriculture fields. Answer the following quiesion on the basis of above paragraph.

(a) What is a redox reaction?

(b)Give applications of redox rection in photosynthesis.

Watch Video Solution

H O T S Conceptual Question

1. Which of the following are examples of disproportionation reactions?

a. $Ag(NH_3)_2^{\oplus} + 2H^{\oplus} \rightarrow Ag^{\oplus} + 2\overset{\oplus}{N}H_4$

b. $Cl_2 + 2\overset{\ominus}{O}H \rightarrow ClO^{\ominus} + Cl^{\ominus} + H_2O$

c. $CaCO_3 \rightarrow CaO + CO_2$

d. $2HgO \rightarrow 2Hg + O_2$

e. $Cu_2O + 2H^{\oplus} \rightarrow Cu + Cu^{2+} + H_2O$

f. $CuS + O_2 \rightarrow Cu + SO_2$

g. $2HCuCl_2 + \text{dilute with} H_2O \rightarrow Cu + Cu^{2+} + 4Cl^{\ominus} + 2H^{\oplus}$

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

Watch Video Solution

2. Calculate the formal charge and the oxiation state of Cr in chromate $(CrO_4^{2-})ion.$

Watch Video Solution

3. Phosphorus acid can act both as oxidising agent as well as reducing agent while phosphoric acid is only an oxidising agent. Explain.

" " Or

Phosphorus acid undergoes disproportionation reaction but phosphoric acid does not. Explain.

Watch Video Solution

4. H_2S acts only as reducing agent while SO_2 can act both as a reducing agent and as an oxidising agent. How will you account for it ?

Watch Video Solution

5. The number of mole of oxalate ions oxidised by one mole of MnO_4^- ion is:

Watch Video Solution

Value Based Question

1. A student working in the laboratory kept and aqueous solution of ferrous suphate in a vessel made up of zinc.

After a few days, he found that the vessel had developed holes and cracks

(i) why did the vessel develop holes in it ?

(ii) What is the chemical reaction that takes place gt?

(iii) what is the value assouciateed with this?

Watch Video Solution

2. An electrochemical cell is a device in which the oxidation and reduction half rections are taking place separtely and the electrical energy is

evloved as a result of the rection.In fact all redox reactions are of spontaneous nature and the free energy change($\triangle G$) is negative. This is vonverted in to the electrical energy.

(i)Which electrode acts as negative pole?

(ii) which electrode acts as positive pole?

(iii) ho does curent flow in the elctrochemical cell?

(iv) what is the value associated with the working of electrochemicals cells?

Watch Video Solution

Oxidation Reduction Very Short Answer Questions Assingnment

1. Define oxidation according to electronic concept.

Watch Video Solution

2. Which reactant is reducing agent in the following reaction ?

$Cu^2(aq) + H_2(g) \rightarrow Cu(S) + 2H^+(aq)$

Watch Video Solution

3. What is the elctrode potential of a standard hydrogen elctrode?

Watch Video Solution

4. Can we store copper sulphate solution in zinc vessel ?

Watch Video Solution

5. what will happen if $CuSO_4$ solution is stirred by a nickel spatula?

Watch Video Solution

6. What changes take plce when a zinc plate is immersed in copper sulphate solution ? Explain in the light of electronic concept of oxidation and reduction.

Watch Video Solution

7. In the reaction $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$, identify which one is reduced and which one is oxidized ?

Watch Video Solution

8. Oxidation and reduction always proceed side by side Explain.

Watch Video Solution

9. Write the following redox reactions using half cell rections

$(i) Zn(s) + FeCI_2(aq) \rightarrow ZnCI_2(aq) + Fe(s)$

$(ii) Mg(s) + CI_2(g) \rightarrow MgCI_2(s)$

$(iii) Mg(s) + 2H^+(aq) \rightarrow Mg^{2+}(aq) + H_2(g)$

Watch Video Solution

10. Which of the following redox reaction is oxidation and which is reduction.

$(i) Zn \rightarrow Zn^{2+} + 2e^-$

$(ii) CI_2 + 2e^- \rightarrow 2CI^-$

$(iii) Fe \rightarrow Fe^{2+} + 2e^-$

$(iv) Sn^{4+} + 2e^- \rightarrow Sn^{2+}$

Watch Video Solution

11. Explain oxidation and reduction according to electronic conccept .Give two expamples.

Watch Video Solution

12. Oxidation cannot occur whithout reduction.Justify.

Watch Video Solution

Oxidation Number Balancing Of Redox Equations Very Short Answer Questions Assingnment

1. Indicate which of the substance/ion in the following reactions is an oxidising agent and which is a reducing agent?

(i) $2FeCl + SnCl_2 \rightarrow 2FeCl_2 + SnCl_4$

(ii) $2Mg + SO_2 \rightarrow 2MgO + S$

(iii) $2SO_2 + O_2 \rightarrow 2SO_3$

(iv) $Ca + Cl_2 \rightarrow CaCl_2$

(v) $Sn^{2+} + 2Hg^{2+} \rightarrow Hg_2^{2+} + Sn^{4+}$

(vi) $2Cu^{2+} + 4I^- \rightarrow 2CuI + I_2$

(vii) $2I^- + H_2O_2 \rightarrow 2OH^- + I_2$

(viii) $SO_2 + 2H_2S \rightarrow 3S + 2H_2O$

(ix) $SO_2 + 2HNO_3 \rightarrow H_2SO_4 + 2NO_2$

(x) $SO_2 + Cl_2 + 2H_2O \rightarrow 2HCl + H_2SO_4$

Watch Video Solution

2. What is O.N of H in NaH?

Watch Video Solution

3. What happens to oxidation number of a substance in oxidation ?

Watch Video Solution

4. What is the O.N of C in $C_6H_{12}O_6$?

Watch Video Solution

5. A species undergoes decrease in O.N What is its nature?

Watch Video Solution

6. What is the O.N of oxygen in peroxide linkage?

Watch Video Solution

7. What is the O.N of Fe in iron (III) suplhate?

Watch Video Solution

8. The oxidation state of Cr in $Cr_2O_7^{2-}$ is

Watch Video Solution

Oxidation Number Balancing Of Redox Equations Short Answer Questions Assingnment

1. Define oxidation and reduction according to the oxidation number.

Watch Video Solution

2. What is the O.N of all the atoms in the following:

$(i)BrF_3$, $(ii)Sb_2O_5$, $(iii)Pb_3O_4$, $(iv)(NH_4)_2SO_4$

Watch Video Solution

3. What is the O.N of

(i)N in NO_3^- (ii) P in H_3PO_4 (iii) Mn in K_2MnO_4?

Watch Video Solution

4. Determine the change in OgtN of S in H_2s and SO_2 in the following reaction

$2H_2S + SO_2 \rightarrow 3S + \ + H_2O$

Watch Video Solution

5. Calculate the O.N of

$(i) Cr \text{in} K_2CrO_4$

$(ii) S \text{in} H_2SO_4$

$(iii) S \text{in} NaHSO_4$

$N \text{in} HNO_3$

$(iv) P \text{in} H_3PO_4$

Watch Video Solution

6. Balance the following redox reaction :

$Cu + NO_3^- \rightarrow NO_2 + Cu^{2+}$ (Acidic medium).

Watch Video Solution

Electrochemical Cells Galvanic Cells

1. Why it not possible to determine the absoulte reduction potential of an elctrode?

Watch Video Solution

2. DIFFERENCE BETWEEN POTENTIAL DIFFERENCE AND EMF

Watch Video Solution

3. An electrochemical cell stops working after sometime. Explain.

Watch Video Solution

4. (a) What do you mean by Electrolytic cell?

(b) An electrochemical cell is made of nickel and copper electrodes with their standard reduction potentials -0.25 V and +0.34 V respectively. Select the anode and cathode. Represent the cell and find e.m.f. of the cell.

Watch Video Solution

5. For a standard cell

$Zn(s)\left|Zn^{2+}(1M)\right|\left|Cu^{2+}(1M)\right|Cu(s)$

Write the electrode reaction and cell reaction. Also find the e.m.f. of cell if

?

$E^{\circ}_{Zn^{2+}|Zn} = -0.76 \text{ V},$

$E^{\circ}_{Cu^{2+}|Cu} = +0.34 \text{ V}.$

Watch Video Solution

6. (a) Standard reduction potentials of zinc and copper electrodes are -0.76 V and 0.34 V respectively.Which electrode will undergo oxidation and which lelctrode reduction?

`(b) Can we store copper suphate in zinc vessel? Give expalnation support of your answer.

Watch Video Solution

7. Is it safe to stir 1M $AgNO_3$ solution with copper spoon?

Watch Video Solution

Iv Assertion Reason Type Question

1. Assertion [A]: Among halogens fluorine is the best oxidant.

Reason (R): Fluorine is the most electronegative atom.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A.

C. A is true but R is flase

D. Both A and R are false

Answer:

Watch Video Solution

2. Assertion (A) In the reaction between potassium permanganate and potassium iodide, permanganate ions acts as oxidising agent.

Reason (R) Oxidation state of manganese changes from +2 and +7 during the reaction.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A.

C. A is true but R is flase

D. Both A and R are false

Answer:

Watch Video Solution

3. Assertion (A) The decomposition of hydrogen peroxide to form water and oxygen is an example of disproportionation reaction

Reason (R) The oxygen of peroxide is in -1 oxidation state and it is converted to zero oxidation state in O_2 and -2 oxidation state in H_{2O}.

A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A.

C. A is true but R is flase

D. Both A and R are false

Answer:

Watch Video Solution

Multiple Choice Question Type I

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. $2K + Fe_2 \rightarrow 2KF$

D. $BaCI_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCI$

Answer:

Watch Video Solution

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

Watch Video Solution

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:

Watch Video Solution

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:

Watch Video Solution

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

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

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

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. Thiousuphate undergoes oxidation by bromine and reductuon vby iodine in these rections

D. Bromine undergoes oxidaion and iodine undergoes reduction these reactions

Answer:

Watch Video Solution

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 zero

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

D. In all its compouinds the oxidatiuon number of fluorine is -1

Answer:

Watch Video Solution

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:

Watch Video Solution

8. Which of the following arrangements represent increasing aoxidation number of the central atom?

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

B. $ClO_3^-, ClO_4^{2-}, MnO_4^-, CrO_2^-$

C. $CrO_2^-, ClO_3^-, MnO_4^-, ClO_3^-$

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

Answer:

View Text Solution

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:

Watch Video Solution

10. Indentify disproportionation rection

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

B. $CH_4 + 4CI_2 \rightarrow CCI_4 + 4HCI$

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

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

Answer: D

Watch Video Solution

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

A. Cl

B. Br

C. Fe

D. I

Answer:

View Text Solution

Multiple Choice Question Type Ii

1. Which of the following staement (s) is/are not true about the following decomposition reaction

$2KClO_3 \rightarrow 2KCl + 3O_2$

A. Potassium is undergoing oxidation

B. Cholorine is undergoing oxidation

C. Oxygen is reduced

D. None of the species are undergoing oxidtion or reduciton

Answer:

Watch Video Solution

2. Identify the correct statement(s) in relation to the following reaction.

$Zn + 2HCl \rightarrow ZnCl_2 + H_2$

A. Zinic is acting as an oxidant

B. Chlorine is acting as a reductant

C. Hydrogen ion is acting as an oxidant

D. Zinc is acting as a reductant

Answer:

Watch Video Solution

3. The exhibition of various oxidation states by an element is also related to the outer orbital electornic configuration of its atom. Atom(s) having which of the following outermost electronic confjigurations will exhibit more than one oxidation state in its compounds

A. $3s^1$

B. $3d^14s^2$

C. $3d^24s^2$

D. $3s^3p^3$

Answer:

Watch Video Solution

4. Identify the correct statement (s) in relation to the following reaction :

$Zn + 2HCI \rightarrow ZnCI^2 + H_2$

A. Phosphorus is undergoing reduction only

B. Phosphorus is undergoing oxidation only

C. Phosphourus is undergoing oxidation as well as reduction

D. Hydrogen is undergoing neither oxidation nor reduction

Answer:

View Text Solution

5. Which of the following electrodes will act as anodes, which connected to Standard Hydrogen Electrode?

A. $AI/AI^{3+}E^{\text{minus}} = -1.66$

B. $Fe/Fe^{2+}E^{\text{minus}} = -0.44$

C. $Cu/Cu^{2+}E^{\text{minus}} = +0.34$

D. $F_2(g)/2F^-(aq)E^{\text{minus}} = +2.87$

Answer:

Watch Video Solution

Multiple Choice Question Mcqs

1. Oxidation is defined as:

A. loss of electrons

B. gain of electrons

C. gain of protons

D. loss of protons

Answer: A

Watch Video Solution

2. A reducing agent is a substance Which can:

A. accept electrons

B. donate electrons

C. accept protons

D. donate protons

Answer: B

Watch Video Solution

3. A redox reaction is:

A. proton transfer reaction

B. ion combination reaction

C. a reaction in solution

D. electron transfer reaction

Answer: D

Watch Video Solution

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

A. Burning of candle

B. Rusting of iron

C. dessolving a salt in water

D. dissolving Zn in dil H_2SO_4

Answer: C

Watch Video Solution

5. The reaction of $H_2S + H_2O_2 \rightarrow S + 2H_2O$ manifests

A. alkaline of H_2O_2

B. reducing nature of H_2O_2

C. oxidising nature ofH_2O_2

D. reducing nature of H_2O_2

Answer: C

Watch Video Solution

6. The oxidation number of iron in the compound $K_4\left[Fe(CN)_6\right]$ is

A. $+6$

B. $+4$

C. $+3$

D. $+2$

Answer: D

Watch Video Solution

7. Pick the group which does not on an a neutral oxide:

A. NO_2, P_4O_{10}, AI_2O_3, NO

B. MgO, N_2O_5, SO_3N_2O

C. CO_2, SO_3, CaO, XeO_3

D. $CO, SiO_2, SnO_2, Na_2O_3$

Answer: C

Watch Video Solution

8. Magnesium reacts with acids producing hydrogen and correspondmg magnesium salts. In such reactions Mg undergoes

A. reduction

B. oxidation

C. neither oxidation nor reduction

D. simple dissolution

Answer: B

Watch Video Solution

9. When P reacts with caustic soda the products are PH_3 and NaH_2PO_2 .the reaction is an example of:

A. Oxidation

B. reduction

C. both oxidation and reduction

D. neutralisation

Answer: C

Watch Video Solution

10. In a reaction the oxidtion number of an element becomes zero from -1 It is a case of:

A. oxidation

B. reduction

C. neither oxidation nor reduction

D. both oxidaion and reduction

Answer: A

Watch Video Solution

11. $Cl_2 + H_2S \rightarrow 2HCl + S$,

In that above reaction oxidation state of chlorine changes from

A. zero to -1

B. 1to zero

C. zero to 1

D. remains unchanged.

Answer: A

Watch Video Solution

12. During elctrolysis, the rection at anode is :

A. oxidation

B. reduction

C. decomposition

D. None of these

Answer: A

Watch Video Solution

13. In a reaction

$$H_2O(\text{steam}) + C(\text{glowing}) \rightarrow CO + H_2$$

A. H_2O is the reducing agent

B. H_2O is the oxidisting agent

C. carbon is the oxidising agent

D. oxidation reduction does not occur

Answer: B

Watch Video Solution

14. The oxidation number of C in $CH_4, CH_3CI, CH_2CI_2, CHCI_3 \text{and} \mathbb{C}I_4$ are respectively:

A. $+4, \ +2, 0, \ -2, \ -4$

B. $+2, \ +4, , 0, \ -4, \ -2$

C. $-4, \ -2, 0, \ +4, \ +4$

D. $-2, \ -4, 0, \ +4, \ +2$

Answer: C

Watch Video Solution

15. Reduction never involves:

A. gain of electrons

B. decrease in oxidation number

C. loss of electrons

D. decrease in vlaency of elctropositive component

Answer: C

Watch Video Solution

Very Short Answer Questions Assingnment

1. The oxidation number of $CI \text{in} HCIO_5$ is:

A. $+3$

B. $+5$

C. -1

D. $+7$

Answer: D

Watch Video Solution

Multiple Choice Question Bank Mcqb

1. The oxidation number of Cr in $Cr(CO_6)$ is :

A. 0

B. 2

C. -2

D. $+6$

Answer:

Watch Video Solution

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

A. $CaCO_3 \rightarrow CaO + CO_2$

B. $O_2 + 2H_2 \rightarrow 2H_2O$

C. $Na + H_2O \rightarrow NaOH + 1/2H_2$

D. $MnCI_3 \rightarrow ?MnCI_2 + 1/2CI_2$

Answer:

Watch Video Solution

3. In the reaction

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

A. Bromine is oxidised and carbonate is reduiced

B. Bromine is reduced and water is oxidaised

C. Bromine is neither reduced nor oxidised

D. Bromine is both reduced and oxidised

Answer:

Watch Video Solution

4. In which of the folowing rection nitrogen is not reduced ?

A. $NO_2 \rightarrow NO^{2+}$

B. $BNO_3^- \rightarrow NO$

C. $NO_3^- \rightarrow NH_4^+$

D. $NH_4^+ \rightarrow N_2$

Answer:

Watch Video Solution

5. The most powerful oxidising agent among the following is:

A. H_2SO_4

B. H_3BO_3

C. HPO_3

D. H_3PO_4

Answer:

View Text Solution

6. The oxidation state of iodine in $H_4IO_6^-$ is:

A. $+7$

B. -1

C. $+5$

D. $+1$

Answer:

Watch Video Solution

7. The standard electrode potentials of elements A,B and C are+0.68, -2.50 and -0.50 V respectively.The correct order of their reducing powers is:

A. $A > B > C$

B. $A > B > C > B$

C. $C > B > A$

D. $NB > C > A$

Answer:

Watch Video Solution

8. In the rection:

$2Ag + 2H_2SO_4 \rightarrow Ag_2SO_4 + 2H_2O + SO_2$

Sulphuric acid acts as:

A. Oxidising agent

B. Reducing agent

C. Catalyst

D. Acid as well as oxidant

Answer:

Watch Video Solution

9. Which of the following is a redox reaction?

A. H_2SO_4 with NaOH

B. In atmosphere $O_3 \text{form} O_2$ by lightining

C. Nitrogen oxide formed from nitrogen and oxygen by lightining

D. Evaporation of water.

Answer:

Watch Video Solution

10. Without losing its concentration, $ZnCl_2$ solution can't be kept in contact with

A. Al

B. Au

C. Pb

D. Ag

Answer: A

Watch Video Solution

11. The oxidation number of Cr in $K_2Cr_2O_7$ is

A. -6

B. $+6$

C. $+2$

D. -2

Answer:

Watch Video Solution

12. The oxidation state of nitrogen in N_3H is

A. $+1/2$

B. $+3$

C. -1

D. $-1/3$

Answer: D

Watch Video Solution

13. A metal ion M^{3+} loses three electrons , its oxidation number will be

A. $+3$

B. $+6$

C. 0

D. -3

Answer:

Watch Video Solution

14. Oxidation state of Fe in FeO_4 is:

A. $3/2$

B. $4/5$

C. $5/4$

D. $8/3$

Answer:

Watch Video Solution

15. In an acidic medium dichromate ion oxidises ferrous ion to ferric ion. If the gram molecular mass of potassium dichromate is 294 g, its gram equivalent mass is..... Grams.

A. 294

B. 127

C. 49

D. 24.5

Answer:

Watch Video Solution

16. Which of the following statement is true for the electrochemical Daniell cell ?

A. Current flows from zinc electrode to copper electrode

B. Electrons flow from copper electrode to zinc electrode

C. Cations move towards copper electrode

D. Cations move twoards zinc electrode

Answer:

Watch Video Solution

17. Number of moles of MnO_4^- required to oxidise one mole of ferrous oxalate completely in acidic medium will be

A. 2.5 mol

B. 0.2 mol

C. 0.6 mol

D. 0.4 mol

Answer:

Watch Video Solution

18. Oxidation number of P in PO_4^{3-}, of S in SO_4^{2-} and that of $Cr_2O_7^{2-}$ are respectively

A. $+3,\ +6$ and $+5$

B. $+5,\ +3$ and $+6$

C. $+3,\ +6$ and $+6$

D. $+5,\ +6$ and $+6$

Answer:

Watch Video Solution

19. Oxidation states of P in $H_4P_2O_5$, $H_4P_2O_6$, $H_4P_2O_7$ are:

A. $+3,\ +5,\ +4$

B. $+5,\ +3,\ +4$

C. $+5,\ +4,\ +3$

D. $+3,\ +4,\ +5$

Answer:

View Text Solution

20. When CI_2 gas reacts wioth hot and concentrated solution of sodium hydroxide the oxidation number of chloirine changes from:

A. $Zero \rightarrow +1$ and $zsero \rightarrow -5$

B. $Zero \rightarrow -1$ and $zsero \rightarrow +5$

C. $Zero \rightarrow -1$ and $zsero \rightarrow +3$

D. $Zero \rightarrow +1$ and $zsero \rightarrow -3$

Answer:

View Text Solution

21. Standard reduction p[otentials of the half rections are given bvelow:

$F_2(g) + 2e^- \rightarrow 2F_{aq}^- : \quad E^\circ = +2.85V$

$CI_2(g) + 2e^- \rightarrow 2CI(aq)^- : \quad E^\circ = +1.36V$

$Br(2)(g) + 2e^- \rightarrow 2Br(aq)^- : \quad E^\circ = +1.06V$

$I_2(s) + 2e^- \rightarrow 2I_{aq}^- : \quad E^\circ = +0.53V$

The stronges oxidising and reducing agents respectively are

A. F_2 and I^-

B. Br_2 and CI^-

C. CI_2 and Br^-

D. CI_2 and I_2

Answer:

View Text Solution

22. The pair of compounds that can exist together is

A. $FeCI_3, SnCI_2$

B. $H_gCI_2, SnCI_2$

C. $FeCI_2, SnCI_2$

D. $FeCI_3, KI$

Answer:

View Text Solution

23. In acidic medium , H_3O_2 changes $Cr_2O_7^{-2}$ to CrO_5 Which has two (-O-O-) bonds. Oxidation state of Cr in CrO_5 is

A. $+5$

B. $+3$

C. $+6$

D. -10

Answer:

View Text Solution

24. Which of the following does not involve oxidation of iorn?

A. Formation of $Fe(CO)_5$ form Fe

B. Liberation Of H_2 from stem by iron at high temperature

C. Rustiing of iron sheets

D. Decomposition of blue copper sulphate solution by iron

Answer:

View Text Solution

Jee Main Other Engineering Entrance Examination

1. Out of Cu,Ag,Fe and Zn, the metal which can displace all others atoms from therir salt solutions is:

A. Ag

B. Cu

C. Zn

D. Fe

Answer: C

View Text Solution

2. Consider the following reaction:

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

with reference to the above which one of the following is the correct statement ?

A. Zn is reduced to Zn^{2+} ions

B. Zn is reduced to $Zn^{2+} ions$

C. Zn^{2+} ions are oxidised to Zn

D. Cu^{2+} ions are oxidised to Cu

Answer: B

View Text Solution

3. A half cell rectio $A^- - E^- \rightarrow$ a has a large negative reduction potential.If follows that

A. A is easily reduced

B. A is easily oxidised

C. A^- is readily reduced

D. A^- is readely oxidised

Answer: D

View Text Solution

4. Four metals A,B,CD have standard electrode potentials of -3.05,-1.66,-0.40 and +0.8V respectively.The metal which is most easily reduced is :

A. A

B. B

C. C

D. D

Answer: D

View Text Solution

5. The oxidation number of Fe in $Fe(CO)_5$ is

A. 4

B. 2

C. 10

D. None of these

Answer: D

View Text Solution

6. When $KMnO_4$ reacts with acidified $FeSO_4$

A. only $FeSO_4$ is oxidised

B. only $KMnO_4$ is oxidised

C. $FeSO_4$ is oxidised and $KMnO_4$ is reduced

D. None of these

Answer: C

View Text Solution

7. The O.N of N in $(NH_4\_(2)SO_4)$ is :

A. $+3$

B. $+2$

C. $+5$

D. -3

Answer: D

View Text Solution

8. The oxidation potential of A and B are + 2.37 and+ 1.66 V respectively.In a chemical reaction

A. A will be replaced by B

B. A will repalce B

C. A will not replace B

D. A and B will not replace each other

Answer: B

View Text Solution

9. Equivalent mass of oxidising agent in the reaction

$SO_2 + 2H_2S \rightarrow 3S + 2H_2O$ is

A. 321

B. 64

C. 16

D. 8

Answer: C

View Text Solution

10. The reaction in which hydrogen poeroxide is a reducing agent is:

A. $Pbs + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$

B. $2KI + H_2O_2 \rightarrow 2KOH + I_2$

C. $H_2SO_3 + H_2O_2 \rightarrow H_2sO_4 + H_2O$

D. $Ag_2O + H_2O_2 \rightarrow 2Ag + H_2O + O_2$

Answer: D

View Text Solution

11. In a balanced equation

$$H_2SO_4 \rightarrow xHI \rightarrow H_2S + yI_2 + zH_2O$$

The values of x,y,z are

A. x=3,y=5z=2

B. x=4,y=8,z=5

C. x=8,y=4,z=4

D. x=5,y=3,z=4

Answer: C

Watch Video Solution

12. The oxidation state of chromium in the final product formed by the reaction between KI and acidified potassium dichromate solution is :

A. $+4$

B. $+6$

C. $+2$

D. $+3$

Answer: D

Watch Video Solution

13. What is the oxidation number of Xe in $XeOF_2$?

A. zero

B. $+2$

C. $+4$

D. $+3$

Answer: C

Watch Video Solution

14. In the balanced chemical reaction

$$IO_3^{\ominus} + al^{\ominus} + bH^{\ominus} \rightarrow cH_2O + dI_2$$

a, b, c, and d, respectively, correspond to

A. 5,6,3,3

B. 5,3,6,3

C. 3,5,3,6

D. 5,6,5,5

Answer: A

Watch Video Solution

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

A. $CrO_2^-, ClO_3^-, CrO_4^-, MnO_4^-$

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

C. $CrO_4^-, ClO_3^-, MnO_4^-, CrO_4^{2-}$

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

Answer: A

Watch Video Solution

16. Consider the following reaction :

$$xMnO_4^- + yC_2O_4^{2-} + zH^+ \rightarrow xMn^{2+} + 2yCO_2 + \frac{z}{2}H_2O$$

The value of x, y and z in the reaction are, respectively.

A. 2,5 and 16

B. 5,2 and 16

C. 2,5 and 8

D. 2,5 and 8

Answer: A

Watch Video Solution

17. In which of the following reactions H_2O_2 acts as a reducing agent?

A. I and II

B. III and IV

C. I and III

D. II and IV

Answer: D

View Text Solution

18. In Br_3O_8 compound, oxidation number of bromine is:

A. $\frac{16}{13}$

B. $\frac{26}{3}$

C. $\frac{24}{3}$

D. $\frac{16}{3}$

Answer: D

Watch Video Solution

19. How many grams of potassium dichromate are required to oxidise 20.0 g of Fe^{2+} in $FeSO_4$ to Fe^{3+} if the reaction is carried out in acidic medium? Molar masses of $K_2Cr_2O_7$ and $FeSO_7$ are 294 and 152 respectively

A. 6.45 g

B. 7.45 g

C. 8.45 g

D. 9.45 g

Answer: A

View Text Solution

Jee Joint Entrance Examination Comprehension 1

1. Oxidation number is the charge assigned to an atom of a molecule or ion according to some arbitry rules .In neutral molecules , the sum of the oxidation numbers of all the atoms present is zero while in a simple or complex ion it is equal to the net charge on ion. In some cases the oxidation number may be even fractional. Athough sometimes a particular elemenet may have same valency and oxidation state but these are based upon different concepts.The number of oxidation states available for a particular elements are normally more than the valencies

A brown complex has the formula:

$\left[Fe(H_2)(O)_5NO\right]SO_4$ the oxidation number of iron is:

A. $+1$

B. $+2$

C. $+3$

D. 0

Answer: A

Watch Video Solution

2. oxidation states available for a particular elements are normally more than the valencies

A brown complex has the formula:

$\left[Fe(H_2)(O)_5NO\right]SO_4$ the oxidation number of iron is:

In which compound,Mn exhibits highest oxidation state?

A. MnO_2

B. Mn_3O_4

C. K_2MnO_4

D. $MnSO_4$

Answer: C

Watch Video Solution

3. oxidation states available for a particular elements are normally more than the valencies

A brown complex has the formula:

$[Fe(H_2)(O)_5NO]SO_4$ the oxidation number of iron is:

In which of the following pairs there is the maximum difference in the oxidaation state of the elements other than oxygen?

A. NO_2 and N_2O_4

B. P_2O_5 and P_4O_{10}

C. $K_2mNo_4N_2O$ and NO

D. SO_2 and SO_3

Answer: D

Watch Video Solution

4. oxidation states available for a particular elements are normally more than the valencies

A brown complex has the formula:

$[Fe(H_2O_5)NO]SO_4$ the oxidation number of iron is:

Phosphorus has the oxidation satate of +3 in

A. Phosphorus acid

B. Orthophosphoric acid

C. Hypophorus acid

D. Metaphosphoric acid

Answer: A

Watch Video Solution

5. A redox reaction consists of oxidation and reduction half reactions. There is a loss of electrons in oxidation and the species which loses elecrons is sreducing agnet.Its oxidation number increases during oxidation. Similarly there is a gain of electrons during reduciton and the species wlhih gains electrons is an odidsing agent. thhe species which gains electrons is an aoxidising agent its oxidstion number decreases

during reduction .The number of electrons released during oxidation is equal to number of electrons gained dunring reduciton

Out of the following only one is redox reaction.Identify it.

A. $Ca(OH)_2 + 2HCI \rightarrow CaCI_2 + 2H_2O$

B. $BaCI_2 + MgsO_4 \rightarrow BaSO_4 + MgCI_2$

C. $2S_2O_7^{2-} + 23H_2O \rightarrow 2SO_4^{2-} + 4H^+$

D. $Cu_2S + 2FeO \rightarrow 2Cu + 2Fe + SO_2$

Answer: D

Watch Video Solution

6. A redox reaction consists of oxidation and reduction half reactions. There is a loss of electrons in oxidation and the species which loses elecrons is sreducing agnet.Its oxidation number increases during oxidation. Similarly there is a gain of electrons during reduciton and the species wlhih gains electrons is an odidsing agent. thhe species which gains electrons is an aoxidising agent its oxidstion number decreases

during reduction .The number of electrons released during oxidation is equal to number of electrons gained dunring reduciton

The reation:

$2H_2O(L) \rightarrow 4H^+(aq) + O_2 + 4e^-$ is

A. an oxidation reaction

B. a reduction reaction

C. a redox reaction

D. a hydrolysis reaction

Answer: A

Watch Video Solution

7. A redox reaction consists of oxidation and reduction half reactions. There is a loss of electrons in oxidation and the species which loses elecrons is sreducing agnet.Its oxidation number increases during oxidation. Similarly there is a gain of electrons during reduciton and the species wlhih gains electrons is an odidsing agent. thhe species which

gains electrons is an aoxidising agent its oxidstion number decreases during reduction .The number of electrons released during oxidation is equal to number of electrons gained dunring reduciton

Which of the following involves transfer of five electrons?

A. $(MnO_4)^- \rightarrow Mn^{2+}$

B. $(CrO_4)_4^{2-} \rightarrow (Cr)^{3+}$

C. $(MnO_4)^{2-} \rightarrow MnO_2$

D. $(Cr_2O_7)^{2-} \rightarrow 2Cr.$

Answer: A

Watch Video Solution

8. A redox reaction consists of oxidation and reduction half reactions. There is a loss of electrons in oxidation and the species which loses elecrons is sreducing agnet.Its oxidation number increases during oxidation. Similarly there is a gain of electrons during reduciton and the species wlhih gains electrons is an odidsing agent. thhe species which

gains electrons is an aoxidising agent its oxidstion number decreases during reduction .The number of electrons released during oxidation is equal to number of electrons gained dunring reduciton

When SO_2 is passed through KIO_3 the O.N of iodine changes from

A. $+5 \rightarrow 0$

B. $5 \rightarrow -1$

C. $-5 \rightarrow 0$

D. $-7 \rightarrow -1$

Answer: B

Watch Video Solution

9. Given below are a set of half-cell reactions (acidic medium) along with their $E_{\circ}$ with respect to normal hydrogen electrode values. Using the data obtain the correct explanation to question given below.

$I_2 + 2e^- \rightarrow 2I^-$ $E^\circ = 0.54$

$Cl_2 + 2e^- \rightarrow 2Cl^-$ $E^\circ = 1.36$

$Mn^{2+} + e^- \rightarrow Mn^{2+}$ $E^\circ = 1.50$

$Fe^{3+} + e^- \rightarrow Fe^{2+}$ $E^\circ = 0.77$

$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$ $E^\circ = 1.23$

Among the following, identify the correct statement:

A. Chloride ion is oxidised by O_2

B. Fe^{2+} ios oxidised by iodide

C. lodide ion is oxidised by chlorine

D. Mn^{2+} is odidised by chlorine

Answer: C

Watch Video Solution

Jee Joint Entrance Examination Comprehension 2

1. Given below are a set of half-cell reactions (acidic medium) along with their $E_\circ$ with respect to normal hydrogen electrode values. Using the data obtain the correct explanation to question given below.

$I_2 + 2e^- \rightarrow 2I^-$ $E^\circ = 0.54$

$Cl_2 + 2e^- \rightarrow 2Cl^-$ $E^\circ = 1.36$

$Mn^{2+} + e^- \rightarrow Mn^{2+}$ $E^\circ = 1.50$

$Fe^{3+} + e^- \rightarrow Fe^{2+}$ $E^\circ = 0.77$

$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$ $E^\circ = 1.23$

While Fe^{2+} is stable, Mn^{3+} is not stable in acid solution because:

A. O_2oxidises $\mathrm{lt}n^{2+}\mathrm{to}Mn^{3+}$

B. O_2oxidises $\mathrm{both}Mn^{2+}\mathrm{to}Mn^{3+}\mathrm{and}Fe^{2+} \rightarrow Fe^{3+}$

C. $Fe^{3+}\mathrm{oxidises}H_2O \rightarrow O_2$

D. $Mn^{3+}\mathrm{oxidises}H_2O\mathrm{to}O_2$

Answer: D

Watch Video Solution

Jee Joint Entrance Examination Comprehension 3

1. Redox reactions play a pivotal role in chemistry and biology.The values of standard reduction potential E° of two half cell reaction decide which way the reaction is expected to proceed. A simple exaple is Danie cell in

which zinc goes in to solution and copper gets deposited Given below are set of half cell reaction (acidic medium) along with their E° values.

$I_2 + 2e^- \rightarrow 2I^- \quad E^{\circ} = 0.54$

$CI_2 + 2e^- \rightarrow 2CI^- \quad E^{\circ} = 0.54$

$Mn^{3+} + e^- \rightarrow Mn^{2+} \quad E^{\circ} = 1.36$

$Fe^{3+} + e^- \rightarrow Mn^{2+} \quad E^{\circ} = 0.77$

$O_2 + 4H^+ e^- \rightarrow 2h_2O \quad E^{\circ} = 1.23$

Using these data , obtain the correct explanation for the following question.

Sodium fusion extact obvtined from aniline. On treatment with iron (II suphate and H_2SO_4) in presence of air givers a prussian blue precipitte.The blue colour is due to the formation of

A. $Fe_4\left[Fe(CN)_6\right]^-(3)$

B. $Fe_3\left[Fe(CN)_6\right]^-(2)$

C. $Fe_4\left[Fe(CN)_6\right]^-(2)$

D. $Fe_3\left[Fe(CN)_6\right]^-(3)$

Answer: A

View Text Solution

Straight Objective Type Mcqs Single Correct Option

1. The O.N of P in $Ba(H_2PO_2)_2$ is:

A. $+3$

B. $+2$

C. $+1$

D. -1

Answer: C

View Text Solution

2. For the redox reaction:

$$MnO_4^- + C_2O_4^{2-} + H^+ \rightarrow Mn^{2+} + CO_2 + H_2O$$

The correct coefficeents of the reactants for the balanced reaction are:

$MnO_4^- \; C_2O_4^{2-} \; H^+ \; +$

A. $2 \quad 5 \quad 16$

B. $16 \quad 5 \quad 2$

C. $5 \quad 16 \quad 2$

D. $2 \quad 16 \quad 5$

Answer: A

View Text Solution

3. A Standard hydrogen electrode has zero electrode potential beacause

A. hydrogen is easiest to oxidise

B. the electrode potential is assuemed to be zero

C. hydrogen atom has only one electron

D. hydrogen is the lightest element

Answer: B

View Text Solution

4. The standard reduction potential of three metallic cations x,y and z are +0.52,-3.03 and -1.18V respectively .The order of reducing power is:

A. $Y > Z > X$

B. $X > Y > X$

C. $Z > Y > X$

D. $Z > X > Y$

Answer: A

View Text Solution

5. The oxidation number of sulphur in S_8, S_2F_{32} and H_2S respectively are:

A. $0, +1$ and -2

B. $+2, +1$ and -2

C. $0, +1$ and $+2$

D. $-2, +1$ and -2

Answer: A

View Text Solution

6. A gas X at 1 atm pressure is bubbled through a solution containing a mixture of $1MY^-$ and $1MZ^-$ at $25^\circ C$.If the reduction potential of $Z > Y > X$, then

A. Y will oxidise X and not Z

B. Y will oxidise Z and not X

C. Y will Oxidise both Z and X

D. Y will reduce both X and Z

Answer: A

View Text Solution

7. Among the following , identify the species with an atom in +6 oxidaiton state of metal

A. MnO_4^-

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

C. NiF_6^{2-}

D. CrO_2CI_2

Answer: D

View Text Solution

8. In the standardisation of $Na_2S_2O_3$ using $K_2Cr_2O_7$ by iodometry the equivalent mass of $K_2Cr_2O_7$ is:

A. Molecular $mass/2$

B. Molecular $mass/6$

C. Molecular $mass/3$

D. Same as the molecular mass.

Answer: B

View Text Solution

9. In an electrolytic cell, the flow of electron mass.

A. cathode to anode in solution

B. cathode to anode through external supply

C. cathode to anode through internal supply

D. anode to cathode through internal supply

Answer: C

View Text Solution

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

A. $\left[Fe(CN)_6\right]^{3-}$ and $\left[Co(CN)_6\right]^{3-}$

B. CrO_2CI_2 and MnO_4

C. TiO_3 and MnO_2

D. $\left[CO(CN)_6\right]^{3-}$ and MnO_2

Answer: B

View Text Solution

11. Oxidation numbers of the metal in the minerals haematite and magneetite respectively are:

A. II,III in haematite and III in magnetite

B. II, III in haematite and II in magnetite

C. II in haematitie and II,III in magnetite

D. III in haematitie and II, III in magnetitie

Answer: D

View Text Solution

12. The reaction of white phosphorus iwht aqueous $NaOH$ gives phosphine along with another phosphorus containing compund. The oxidation states of phosphorus in phosphine and the other product are respectively

A. redox reaction,-3 and -5

B. redox reaction,+3 and +5

C. disproportionation reactions,-3 and +5

D. disproportionation reaction, -3 and+3

Answer:

View Text Solution

13. Which ordering of compounds is according to the decreasing order of oxidation state of nitrogen ?

A. HNO_3, NO, NH_4CI, N_2

B. HNO_3, NO, N_2, NH_4CI

C. HNO_3, NH_4CI, NO, N_2

D. NO, HNO_3, NH_4CI, N_2

Answer: B

View Text Solution

Multiple Correct Answer Type Mcqs

1. Which of the following involve oxidation and reduction?

A. $2Na + 2H_2O \rightarrow 2NaOH + H_2$

B. $2CuI_2 \rightarrow 2Cu + l_2$

C. $NH_4CI + NaOH \rightarrow NaCI + NH_3 + H_2O$

D. $4KCN + Fe(CN)_6 \rightarrow K_4\left[Fe(CN)_6\right]$

Answer: A::C

View Text Solution

2. Which of the following can act both as oxidising agents and reducing agents?

A. HNO_2

B. H_2O_2

C. H_2S

D. SO_2

Answer: A::B::D

View Text Solution

3. In the rection

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

A. $S_2O_3^{2-}$ gets oxidised to $S_4O_6^{2-}$

B. $S_2O_3^{2-}$ gets oxidised to $S_4O_6^{2-}$

C. I_2gets reduced tol^-

D. $l_2$gets oxidised tol^-

Answer:

View Text Solution

4. Which CI_2 is passed through hot $NaOH$ solution, oxidation number of CI changes from E238

A. $-1 \rightarrow 0$

B. $0 \rightarrow -1$

C. $0 \rightarrow +5$

D. $0 \rightarrow +7$

Answer: B::C

View Text Solution

5. 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 coeffiecient of HSO_4^- is 6

B. iodide is oxidised

C. suphur is reduced

D. H_2O is one of the products

Answer: A::B::D

View Text Solution

6. The oxidation states of the most elecrtronegative element in the products of rection between BaO^2 and diluent H_2SO_4 are:

A. -1

B. $+1$

C. -2

D. 0

Answer: A::C

View Text Solution

Assertion Reason Type Questions

1. Assertion: In queous solution, SO_2 reacts with H_2S liberating sulphur

Reason : SO_2 is an effective reducing agent.

A. If both assetion and reson are corect and reason is correct explanation for assertion

B. If both assetion and reason are correct but reason is not correct explanation for assertion

C. If asertion is correct but reason is incorrect

D. If both assetion and reason are incorrect

Answer: B

View Text Solution

2. Assetion: An acidifiedd queous solution of $KCIO_3$ when boiled with iodine produces KIO_3

Reason : $KCIO_3$ is an oxidising agent while KIO_3 is not

A. If both assetion and reson are corect and reason is correct explanation for assertion

B. If both assetion and reason are correct but reason is not correct explanation for assertion

C. If asertion is correct but reason is incorrect

D. If both assetion and reason are incorrect

Answer: A

View Text Solution

3. Assertion: Pb^{4+} ion can easily reduced to Pb^{2+} ion.

Reason: Pb^{2+} ion is paramagnetic in nature

A. If both assetion and reson are corect and reason is correct explanation for assertion

B. If both assetion and reason are correct but reason is not correct explanation for assertion

C. If asertion is correct but reason is incorrect

D. If both assetion and reason are incorrect

Answer: C

View Text Solution

4. Assertion : Zinc diplaces copper from copper suphate solution

Reason: The E° of Zn is- 0.76 V and that of Cu is +0.34 V.

A. If both assetion and reson are corect and reason is correct explanation for assertion

B. If both assetion and reason are correct but reason is not correct explanation for assertion

C. If asertion is correct but reason is incorrect

D. If both assetion and reason are incorrect

Answer: A

View Text Solution

5. Assetion : An electrochemical cell can be set up only if redox reaction is sponttaneous.

Reason: A reaction is spontaneous if free energy change $(\triangle G)$ is negative

A. If both assetion and reson are corect and reason is correct explanation for assertion

B. If both assetion and reason are correct but reason is not correct explanation for assertion

C. If asertion is correct but reason is incorrect

D. If both assetion and reason are incorrect

Answer: A

View Text Solution

6. Assertion : Oxidation state of carbon in its compounds is +4

Reason : An element has a fixed oxidation state.

A. If both assetion and reson are corect and reason is correct explanation for assertion

B. If both assetion and reason are correct but reason is not correct explanation for assertion

C. If asertion is correct but reason is incorrect

D. If both assetion and reason are incorrect

Answer: D

View Text Solution

Reasoning Type Questions

1. Statement -1. copper liberates hydrogen from a dilute solution of hydrochloric acid

Statement-2 E° of Cu is higher than that of H_2

A. Statement -1 is true, statement -2 is also true, statement -2 is the correct explanation of statement-1

B. Statement -1 is true, statement -2 is also true, statement-2 is not the corect explanation of statement-1

C. Statement -1 is true, statement -2 false

D. Statement -1 is false, statement -2 is true.

Answer: D

View Text Solution

2. Statement -1. HNO_2 can act both as an oxidising agnet oas well as reducing agent

Statement-2. In the O.S of $N(+3)\text{in}HNO_2$ can undergo increase as well as decrease in its value

A. Statement -1 is true, statement -2 is also true, statement -2 is the correct explanation of statement-1

B. Statement -1 is true, statement -2 is also true, statement-2 is not the corect explanation of statement-1

C. Statement -1 is true, statement -2 false

D. Statement -1 is false, statement -2 is true.

Answer: A

View Text Solution

3. Statement-1. Oxidation number of Ni in $Ni(CO)_4$, is zero

Statement-2. Oxidation number of CO has been taken as zero.

A. Statement -1 is true, statement -2 is also true, statement -2 is the correct explanation of statement-1

B. Statement -1 is true, statement -2 is also true, statement-2 is not the corect explanation of statement-1

C. Statement -1 is true, statement -2 false

D. Statement -1 is false, statement -2 is true.

Answer: A

View Text Solution

4. Statement -1. $HCIO_4$ is a stronger oxidising agent than $HCIO_3$.

Statement-2. Oxidation state of CI in $HCIO_4$ is +7 and in $HCIO_3$, it is +5.

View Text Solution