

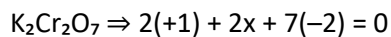
Q1. The oxidation number of Cr in  $K_2Cr_2O_7$  is:

- A. +6
- B. +3
- C. +2
- D. +7

Answer: A. +6

Explanation:

Let oxidation number of Cr = x



$$2 + 2x - 14 = 0 \rightarrow 2x = 12 \rightarrow x = +6$$

Q2. Which of the following species acts as both oxidising and reducing agent?

- A.  $Cl_2$
- B. NaCl
- C. HCl
- D.  $Cl^-$

Answer: A.  $Cl_2$

Explanation:

$Cl_2$  can gain electrons to become  $Cl^-$  (oxidising) and lose electrons to become  $Cl^+$  (reducing). Hence, disproportionation is possible.

Q3. Which of the following is not a redox reaction?

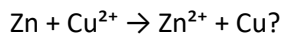
- A.  $Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$
- B.  $H_2 + Br_2 \rightarrow 2HBr$
- C.  $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$
- D.  $Cu + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$

Answer: C.  $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

Explanation:

There is no change in oxidation states, just a double displacement.

Q4. Which is the oxidizing agent in the reaction:



- A. Zn
- B.  $\text{Cu}^{2+}$
- C. Cu
- D.  $\text{Zn}^{2+}$

Answer: B.  $\text{Cu}^{2+}$

Explanation:

$\text{Cu}^{2+}$  gains electrons  $\rightarrow$  reduced  $\rightarrow$  acts as oxidizing agent.

Q5. In which of the following compounds is the oxidation number of nitrogen not  $-3$ ?

- A.  $\text{NH}_3$
- B.  $\text{N}_2\text{H}_4$
- C.  $\text{NO}_3^-$
- D.  $(\text{NH}_4)_2\text{SO}_4$

Answer: C.  $\text{NO}_3^-$

Explanation:

In  $\text{NO}_3^-$ , N =  $+5$ ; in other options, N is  $-3$ .

Q6. In a redox reaction, reducing agent:

- A. Gets oxidized
- B. Gets reduced
- C. Gains electrons
- D. Increases oxidation number of others

Answer: A. Gets oxidized

Explanation:

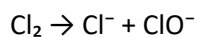
Reducing agent donates electrons  $\rightarrow$  itself oxidized.

Q7. Which of the following undergoes disproportionation?

- A.  $F_2$
- B.  $Cl_2$
- C.  $I_2$
- D.  $Br_2$

Answer: B.  $Cl_2$

Explanation:



Element oxidised and reduced  $\rightarrow$  disproportionation.

Q8. What is the oxidation number of Mn in  $KMnO_4$ ?

- A. +2
- B. +4
- C. +6
- D. +7

Answer: D. +7

Explanation:

K = +1, O = -2, Let Mn = x

$$+1 + x + 4(-2) = 0 \rightarrow x = +7$$

Q9. Oxidation involves:

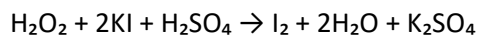
- A. Gain of electrons
- B. Loss of electrons
- C. Gain of protons
- D. Loss of neutrons

Answer: B. Loss of electrons

Explanation:

OILRIG: Oxidation Is Loss, Reduction Is Gain of electrons.

Q10. In the reaction



Which is the reducing agent?

- A.  $\text{H}_2\text{O}_2$
- B. KI
- C.  $\text{H}_2\text{SO}_4$
- D.  $\text{I}_2$

Answer: B. KI

Explanation:

$\text{I}^-$  is oxidized to  $\text{I}_2 \rightarrow$  acts as reducing agent.

Q11. Which of the following is the correct oxidation number of S in  $\text{H}_2\text{SO}_4$ ?

- A. +4
- B. +6
- C. +2
- D. -2

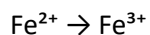
Answer: B. +6

Explanation:

$$\text{H} = +1 \times 2 = +2, \text{O} = -2 \times 4 = -8$$

$$\text{Total} = 0 \rightarrow +2 + \text{S} - 8 = 0 \rightarrow \text{S} = +6$$

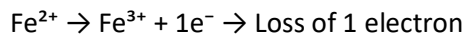
Q12. What is the number of electrons involved in the following half-reaction?



- A. 1
- B. 2
- C. 3
- D. 4

Answer: A. 1

Explanation:



Q13. The correct set of oxidising agents is:

- A.  $\text{F}_2$ ,  $\text{Cl}_2$ ,  $\text{O}_3$
- B.  $\text{H}_2$ ,  $\text{CH}_4$ ,  $\text{Na}$
- C.  $\text{I}^-$ ,  $\text{Br}^-$ ,  $\text{Fe}^{2+}$
- D.  $\text{H}_2\text{O}$ ,  $\text{CO}_2$ ,  $\text{NH}_3$

Answer: A.  $\text{F}_2$ ,  $\text{Cl}_2$ ,  $\text{O}_3$

Explanation:

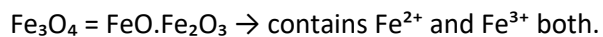
These substances accept electrons  $\rightarrow$  oxidising agents.

Q14. The oxidation number of Fe in  $\text{Fe}_3\text{O}_4$  is:

- A. +2
- B. +3
- C. Both +2 and +3
- D. +8/3

Answer: C. Both +2 and +3

Explanation:



Q15. Which of the following reactions is disproportionation?

- A.  $2\text{Cu}^+ \rightarrow \text{Cu}^{2+} + \text{Cu}$
- B.  $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$
- C.  $\text{Zn} + \text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
- D.  $\text{Na} + \text{H}_2\text{O} \rightarrow \text{NaOH} + \text{H}_2$

Answer: A.  $2\text{Cu}^+ \rightarrow \text{Cu}^{2+} + \text{Cu}$

Explanation:

Same species ( $\text{Cu}^+$ ) oxidizes to  $\text{Cu}^{2+}$  and reduces to  $\text{Cu}^0$ .

Q16. In acidic medium,  $\text{MnO}_4^-$  is reduced to  $\text{Mn}^{2+}$ . The number of electrons gained per Mn atom is:

- A. 3
- B. 5
- C. 7
- D. 2

Answer: B. 5

Explanation:

Mn in  $\text{MnO}_4^- = +7$ , Mn in  $\text{Mn}^{2+} = +2 \rightarrow$  gain of 5 electrons.

Q17. In a redox reaction, the substance undergoing increase in oxidation number is:

- A. Oxidised
- B. Reduced
- C. Oxidising agent
- D. Catalyst

Answer: A. Oxidised

Explanation:

Increase in oxidation number = loss of electrons = oxidation.

Q18. Which of the following is the best reducing agent?

- A.  $\text{F}_2$
- B.  $\text{Cl}_2$
- C. Na
- D.  $\text{H}_2\text{O}_2$

Answer: C. Na

Explanation:

Na easily loses electrons  $\rightarrow$  strong reducing agent.

Q19. Which of the following represents autoredox (disproportionation) reaction?

- A.  $2\text{H}_2\text{O} \rightarrow 2\text{H}_2 + \text{O}_2$
- B.  $2\text{Cu}^+ \rightarrow \text{Cu} + \text{Cu}^{2+}$
- C.  $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$
- D.  $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$

Answer: B.  $2\text{Cu}^+ \rightarrow \text{Cu} + \text{Cu}^{2+}$

Explanation:

Same element oxidised and reduced  $\rightarrow$  disproportionation.

Q20. Which one of the following does not represent a redox reaction?

- A.  $\text{H}_2 + \text{Br}_2 \rightarrow 2\text{HBr}$
- B.  $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$
- C.  $\text{Zn} + \text{CuSO}_4 \rightarrow \text{ZnSO}_4 + \text{Cu}$
- D.  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$

Answer: B.  $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$

Explanation:

It is a double displacement reaction, not redox.

Q21. The oxidation number of Fe in  $\text{K}_4[\text{Fe}(\text{CN})_6]$  is:

- A. +2
- B. +3
- C. +6
- D. 0

Answer: A. +2

Explanation:

$\text{K}_4[\text{Fe}(\text{CN})_6]$ :  $\text{CN} = -1$ ,  $6 \text{ CN} = -6$ ,  $\text{K} = +1 \times 4 = +4$   
 $\rightarrow +4 + x - 6 = 0 \Rightarrow x = +2$

Q22. Which of the following statements is correct for a redox reaction?

- A. Oxidation is gain of electrons
- B. Reduction is increase in oxidation number
- C. Oxidising agent is itself reduced
- D. Reducing agent is itself reduced

Answer: C. Oxidising agent is itself reduced

Explanation:

Oxidising agent gains electrons  $\rightarrow$  reduced.

Q23. Which of the following is not a disproportionation reaction?

- A.  $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow \text{HCl} + \text{HOCl}$
- B.  $2\text{Cu}^+ \rightarrow \text{Cu}^{2+} + \text{Cu}$
- C.  $2\text{NO}_2 \rightarrow \text{NO}_3^- + \text{NO}$
- D.  $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$

Answer: D.  $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu}$

Explanation:

This is a redox reaction, but not disproportionation.

Q24. In alkaline medium, which ion reduces  $\text{MnO}_4^-$  to  $\text{MnO}_2$ ?

- A.  $\text{NO}_2^-$
- B.  $\text{SO}_4^{2-}$
- C.  $\text{C}_2\text{O}_4^{2-}$
- D.  $\text{OH}^-$

Answer: A.  $\text{NO}_2^-$

Explanation:

$\text{NO}_2^-$  acts as reducing agent in alkaline  $\text{KMnO}_4$  reactions.

Q25. What is the equivalent weight of  $\text{KMnO}_4$  in acidic medium?



- A. Molar mass / 1
- B. Molar mass / 5
- C. Molar mass / 3
- D. Molar mass / 7

Answer: B. Molar mass / 5

Explanation:

In acidic medium,  $\text{KMnO}_4$  gains 5 electrons  $\rightarrow n = 5$ .

Q26. Which one is a redox couple?

- A.  $\text{Fe}^{3+} / \text{Fe}^{2+}$
- B.  $\text{H}_2\text{O} / \text{OH}^-$
- C.  $\text{NH}_4^+ / \text{NH}_3$
- D. All of these

Answer: D. All of these

Explanation:

All represent oxidised and reduced forms  $\rightarrow$  redox couples.

Q27. In the reaction



Cl is undergoing:

- A. Oxidation only
- B. Reduction only
- C. Both oxidation and reduction
- D. No redox change

Answer: C. Both oxidation and reduction

Explanation:

$\text{HClO}$  disproportionates: Cl goes to +1 in  $\text{HClO}$  to  $-1$  in  $\text{HCl}$  and  $+5$  in  $\text{HClO}_3$ .

Q28. The change in oxidation number of sulphur in the conversion

$\text{H}_2\text{S} \rightarrow \text{H}_2\text{SO}_4$  is:

- A. -2 to +6
- B. +2 to +4
- C. 0 to +4
- D. +4 to +6

Answer: A. -2 to +6

Explanation:

S in  $\text{H}_2\text{S} = -2$ , in  $\text{H}_2\text{SO}_4 = +6 \rightarrow$  increase of 8 units.

Q29. What is the oxidation number of chromium in  $\text{Cr}_2\text{O}_7^{2-}$ ?

- A. +2
- B. +3
- C. +6
- D. +7

Answer: C. +6

Explanation:

$$2x + 7(-2) = -2 \rightarrow x = +6$$

Q30. Which of the following is not a correct redox pair?

- A.  $\text{Mn}^{2+} / \text{MnO}_4^-$
- B.  $\text{Fe}^{2+} / \text{Fe}^{3+}$
- C.  $\text{NO}_2^- / \text{NO}_3^-$
- D.  $\text{Zn}^{2+} / \text{ZnSO}_4$

Answer: D.  $\text{Zn}^{2+} / \text{ZnSO}_4$

Explanation:

$\text{Zn}^{2+}$  and  $\text{ZnSO}_4$  are not a redox pair;  $\text{SO}_4^{2-}$  is spectator ion.

Q31. Which of the following does not involve oxidation?

- A. Loss of hydrogen
- B. Loss of electrons
- C. Addition of oxygen
- D. Gain of electrons

Answer: D. Gain of electrons

Explanation:

Gain of electrons = reduction, not oxidation.

Q32. Which of the following is not a redox reaction?

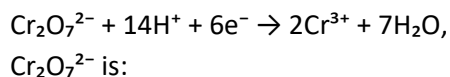
- A.  $\text{H}_2 + \text{Cl}_2 \rightarrow 2\text{HCl}$
- B.  $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$
- C.  $\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$
- D.  $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$

Answer: B.  $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

Explanation:

It's an acid-base neutralisation, not redox.

Q33. In the reaction:



- A. Reducing agent
- B. Oxidising agent
- C. Catalyst
- D. Base

Answer: B. Oxidising agent

Explanation:

It gains electrons (gets reduced)  $\rightarrow$  oxidises others.

Q34. The oxidation number of S in  $\text{Na}_2\text{S}_2\text{O}_3$  is:

- A. +2
- B. +6
- C. +3
- D. +2 and +6

Answer: D. +2 and +6

Explanation:

One S is in  $-2$  (terminal), other in  $+6 \rightarrow \text{average} = +2$ .

Q35. What is the oxidation number of nitrogen in  $\text{NO}_3^-$ ?

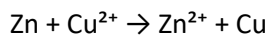
- A. +3
- B. +5
- C. +2
- D.  $-1$

Answer: B. +5

Explanation:

$\text{O} = -2, 3\text{O} = -6 \rightarrow x - 6 = -1 \Rightarrow x = +5$

Q36. Identify the correct ionic equation for the redox reaction:



- A.  $\text{Zn} \rightarrow \text{Zn}^{2+} + 2\text{e}^-$
- B.  $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$
- C. Both A and B
- D. None

Answer: C. Both A and B

Explanation:

Zn loses electrons (oxidation),  $\text{Cu}^{2+}$  gains (reduction).

Q37. Which of the following shows a redox change?

- A.  $\text{NH}_3 + \text{HCl} \rightarrow \text{NH}_4\text{Cl}$
- B.  $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
- C.  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- D.  $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$

Answer: C.  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

Explanation:

H is oxidised, O is reduced  $\rightarrow$  redox.

Q38. In a galvanic cell, the anode is:

- A. Site of reduction
- B. Positively charged
- C. Site of oxidation
- D. Does not participate

Answer: C. Site of oxidation

Explanation:

Anode is where oxidation occurs and electrons are released.

Q39. Which of the following reactions is a combination and redox reaction?

- A.  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$
- B.  $\text{AgNO}_3 + \text{NaCl} \rightarrow \text{AgCl} + \text{NaNO}_3$
- C.  $\text{BaCl}_2 + \text{H}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{HCl}$
- D.  $\text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O}$

Answer: A.  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$

Explanation:

Combination of elements + oxidation/reduction.

Q40. Which of the following is not a correct statement?

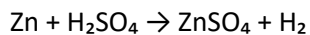
- A. Oxidation involves gain of oxygen
- B. Reduction involves gain of electrons
- C. Oxidising agent is oxidised
- D. Reducing agent loses electrons

Answer: C. Oxidising agent is oxidised

Explanation:

Oxidising agent is reduced, not oxidised.

Q41. Identify the oxidising agent in the following reaction:



- A. Zn
- B.  $\text{H}_2\text{SO}_4$
- C.  $\text{H}_2$
- D.  $\text{SO}_4^{2-}$

Answer: B.  $\text{H}_2\text{SO}_4$

Explanation:

$\text{H}^+$  in  $\text{H}_2\text{SO}_4$  is reduced  $\rightarrow \text{H}_2\text{SO}_4$  is oxidising agent.

Q42. In acidic medium, the correct half reaction for  $\text{Cr}_2\text{O}_7^{2-}$  is:

- A.  $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{e}^- \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$
- B.  $\text{Cr}_2\text{O}_7^{2-} + 6\text{e}^- \rightarrow \text{Cr}^{3+}$
- C.  $\text{Cr}_2\text{O}_7^{2-} \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O} + 14\text{H}^+$
- D.  $\text{Cr}_2\text{O}_7^{2-} + 3\text{e}^- \rightarrow \text{Cr}^{2+}$

Answer: A.  $\text{Cr}_2\text{O}_7^{2-} + 14\text{H}^+ + 6\text{e}^- \rightarrow 2\text{Cr}^{3+} + 7\text{H}_2\text{O}$

Explanation:

This is the balanced half reaction in acidic medium.

Q43. The change in oxidation number of chlorine in:

$\text{Cl}_2 + 2\text{NaOH} \rightarrow \text{NaCl} + \text{NaClO} + \text{H}_2\text{O}$  is:

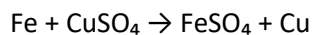
- A. 0 to  $-1$  and 0 to  $+1$
- B. 0 to  $-1$  only
- C. 0 to  $+1$  only
- D.  $-1$  to  $+1$

Answer: A. 0 to  $-1$  and 0 to  $+1$

Explanation:

$\text{Cl}_2$  disproportionates  $\rightarrow$  forms  $\text{NaCl}$  ( $-1$ ) and  $\text{NaClO}$  ( $+1$ ).

Q44. Identify the species that is oxidised in the reaction:



- A. Fe
- B. Cu
- C.  $\text{Cu}^{2+}$
- D.  $\text{SO}_4^{2-}$

Answer: A. Fe

Explanation:

$\text{Fe} \rightarrow \text{Fe}^{2+}$  = loss of electrons = oxidation.

Q45. Which of the following is the correct statement for a redox reaction?

- A. Oxidising agent is electron donor
- B. Reducing agent is electron acceptor
- C. Oxidation is electron gain
- D. Reducing agent loses electrons

Answer: D. Reducing agent loses electrons

Explanation:

Reducing agent donates electrons (gets oxidised).