1 Chemical Reactions and Equations

Multiple Choice Questions (MCQs)

DIRECTIONS : *This section contains multiple choice questions. Each question has four choices (a), (b), (c) and (d) out of which only one is correct.*

1. Which of the following is a decomposition reaction?

(a) $2HgO \xrightarrow{Heat} 2Hg + O_2$

(b) $CaCO_3 \xrightarrow{Heat} CaO + CO_2$

(c) $2H_2O \xrightarrow{Electrolysis} H_2 + O_2$

(d) All of these

2. On the basis of following features, identify the correct option.

(i) This reaction occurs during corrosion.

(ii) This reaction occurs during respiration.

(a) Decomposition reaction

(b) Redox reaction

(c) Combination reaction

(d) Endothermic reaction

3. Which of the following is not a physical change?

(a) Boiling of water to give water vapour.

(b) Melting of ice to give water.

(c) Dissolution of salt in water.

(d) Combustion of Liquefied Petroleum Gas (LPG).

4. Which of the following can be decomposed by the action of light?

(a) NaCl (b) KCl

(c) AgCl (d) CuCl

5. In which of the following the identity of initial substance remains unchanged?

(a) Curdling of milk

(b) Formation of crystals by process of crystallisation

(c) Fermentation of grapes

(d) Digestion of food

6. Which of the following reactions involves the combination of two elements?

(a) $CaO + CO_2 \rightarrow CaCO_3$

(b) $4Na + O_2 \rightarrow 2Na_2O$

(c) $SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$

(d) $NH_3 + HCl \rightarrow NH_4Cl$

7. When hydrogen sulphide gas is passed through a blue solution of copper sulphate, a black precipitate of copper sulphide is obtained and the sulphuric acid so formed remains in the solution. The reaction is an example of –

(a) a combination reaction

(b) a displacement reaction

(c) a decomposition reaction

(d) a double decomposition reaction

8. What happens when copper rod is dipped in iron sulphate solution?

(a) Copper displaces iron

(b) Blue colour of copper sulphate solution is obtained

(c) No reaction takes place

(d) Reaction is exothermic

9. A student added dilute HCl to a test tube containing zinc granules and made following observations which one is correct?

(a) The zinc surface became dull and black.

(b) A gas evolved which burns with a pop sound.

(c) The solution remained colourless.

(d) The solution becomes green in colour.

10. A dilute solution of sodium carbonate was added to two test tubes (A) containing dil HCl and (B) containing dilute NaOH. The correct observation was –

(a) a brown coloured gas liberated in test tube A.

(b) a brown coloured gas liberated in test tube B.

(c) a colourless gas liberated in test tube A.

(d) a colourless gas liberated in test tube B.

11. A balanced chemical equation is in accordance with –
(a) Avogadro's law
(b) law of multiple proportion
(c) law of conservation of mass
(d) law of gaseous volumes.

12. The equation

$Cu + xHNO_3 \rightarrow Cu(NO_3)_2 + yNO_2 + 2H_2O$

The values of x and y are –
(a) 3 and 5 (b) 8 and 6
(c) 4 and 2 (d) 7 and 1

13. $Zn + H_2SO_4(dil) \longrightarrow ZnSO_4 + H_2\uparrow$

Above reaction is –
(a) decomposition reaction
(b) single displacement reaction
(c) combination reaction
(d) synthesis reaction

14. The reaction in which two compounds exchange their ions to form two new compounds is –
(a) a displacement reaction
(b) a decomposition reaction
(c) an isomerization reaction
(d) a double displacement reaction

15. When the gases sulphur dioxide and hydrogen sulphide mix in the presence of water, the reaction is

$SO_2 + 2H_2S \rightarrow 2H_2O + 2S$. Here hydrogen sulphide is acting as –
(a) an oxidising agent (b) a reducing agent
(c) a dehydrating agent (d) a catalyst

16. $CuO + H_2 \rightarrow H_2O + Cu$, reaction is an example of –
(a) redox reaction (b) synthesis reaction
(c) neutralisation (d) analysis reaction

17. A substance which oxidises itself and reduces other is known as –
(a) oxidising agent (b) reducing agent
(c) both of these (d) none of these

18. A redox reaction is one in which –
(a) both the substances are reduced.
(b) both the substances are oxidised.
(c) an acid is neutralised by the base.
(d) one substance is oxidised while the other is reduced.

19. In the following equations :

$Na_2CO_3 + x\ HCl \rightarrow 2\ NaCl + CO_2 + H_2O$, the value of x is–
(a) 1 (b) 2
(c) 3 (d) 4

20. In the equation, $NaOH + HNO_3 \rightarrow NaNO_3 + H_2O$

nitric acid is acting as –
(a) an oxidising agent (b) an acid
(c) a nitrating agent (d) a dehydrating agent

21. $Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$

The above reaction is an example of a –
(a) combination reaction
(b) double displacement reaction
(c) decomposition reaction
(d) displacement reaction

22. White silver chloride in sunlight turns to –
(a) grey (b) yellow
(c) remain white (d) red

23. Black and white photography uses –
(a) decomposition of silver chloride.
(b) decomposition of silver bromide.
(c) both
(d) none of these

24. When copper powder is heated it gets coated with –
(a) black copper oxide (b) yellow copper oxide
(c) red copper oxide (d) None of these

25. Combination of phosphorus and oxygen is an example of–
(a) oxidation (b) reduction
(c) rancidity (d) None of these

26. Rusting of iron is an example of –
(a) reduction (b) redox
(c) oxidation (d) dissociation

27. Which of the following does not corrode when exposed to the atmosphere?
(a) Iron (b) Copper
(c) Gold (d) Silver

28. Take about 1.0g $CaCO_3$ in a test tube. Heat it over a flame, a colourless gas comes out. The reaction is called a
(a) decomposition reaction
(b) displacement reaction
(c) double decomposition reaction
(d) double displacement reaction

29. Hydrogen sulphide (H_2S) is a strong reducing agent. Which of the following reactions shows its reducing action?
(a) $Cd(NO_3)_2 + H_2S \longrightarrow CdS + + 2HNO_3$
(b) $CuSO_4 + H_2S \longrightarrow CuS + H_2SO_4$
(c) $2FeCl_3 + H_2S \longrightarrow 2FeCl_2 + 2HCl + S$
(d) $Pb(NO_3)_2 + H_2S \longrightarrow PbS + 2CH_3COOH$

Chemical Reactions and Equations

30. $2CuI \rightarrow Cu + CuI_2$, the reaction is –

(a) redox (b) neutralisation

(c) oxidation (d) reduction

31. When copper turnings are added to silver nitrate solution, a blue coloured solution is formed after some time. It is because, copper –

(a) displaces silver from the solution

(b) forms a blue coloured complex with $AgNO_3$

(c) is oxidised to Cu^{2+}

(d) is reduced to Cu^{2+}

32. $Zn^{2+}(aq) + 2e^- \rightarrow Zn(s)$. This is –

(a) oxidation (b) reduction

(c) redox reaction (d) none of these

33. A substance A reacts with another substance B to produce the product C and a gas D. If a mixture of the gas D and ammonia is passed through an aqueous solution of C, baking soda is formed. The substances A and B are

(a) HCl and NaOH (b) HCl and Na_2CO_3

(c) Na and HCl (d) Na_2CO_3 and H_2O

34. Chemically the 'water gas' is

(a) H_2O (gaseous) (b) $CO_2 + H_2$

(c) $CH_4 + H_2O$ (d) $CO + H_2$

35. The oxidation number of sulphur is –4 in

(a) H_2S (b) CS_2

(c) Na_2SO_4 (d) Na_2SO_3

36. Identify the endothermic process from the following

(a) Addition of conc. HCl to water

(b) $CH_4(g) + 2O_2(g) \longrightarrow CO_2(g) + 2H_2O(1)$

(c) $H_2O(1) \longrightarrow H_2O(g)$

(d) $CaO(s) + H_2O(1) \longrightarrow Ca(OH)_2(aq)$

37. The schematic diagram is given below

$$A\ (\text{solid}) \underset{\text{cool}}{\overset{\text{heat}}{\rightleftharpoons}} B\ (\text{vapour}) + HCl\ (\text{vapour})$$

heat ↓ NaOH(aq)

$$C\ (\text{Gas}) \xrightarrow{\text{conc. HCl}} D \xrightarrow[\text{shake well}]{H_2O} E(aq)\ (\text{acidic solution})$$

Which of the following is a correct statement ?

(a) A and E are chemically same.

(b) A and D are chemically same.

(c) D and E are chemically same.

(d) C and E are chemically same.

38. The oxidation states of P atom in $POCl_3$, H_2PO_3 and $H_2P_2O_6$, respectively are

(a) + 5, + 4, + 4 (b) + 5, + 5, + 4

(c) + 4, + 4, + 5 (d) + 3, + 4, + 5

39. The process of respiration is :

(a) Oxidation reaction which is endothermic

(b) Reduction reaction which is endothermic

(c) Combination reaction which is exothermic

(d) Oxidation reaction which is exothermic

40. Silver articles become black when exposed to air. It is due to the formation of

(a) Silver oxide (b) Silver nitrate

(c) Silver chloride (d) Silve sulphide

41. A test tube along with calcium carbonate in it initially weighed 30.08 g. A heating experiment was performed on this test tube till calcium carbonate completely decomposed with evolution of a gas. Loss of weight during this experiment was 4.40 g. What is the weight of the empty test tube in this experiment?

(a) 20.08 g (b) 21.00 g

(c) 24.50 g (d) 2.008 g

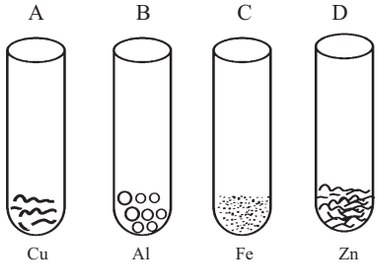
42. Match chemical reactions given in the List I with the type of chemical reactions given in List II and select the correct answer using the options given below:

List I (Chemical reactions)	List II (Type of Chemical reactions)
A. Formation of NH_3 from N_2 and H_2	I. Decomposition
B. Calcination of zinc carbonate.	II. Double displacement
C. Reaction of aqueous $BaCl_2$ solution with dilute H_2SO_4	III. Combination
D. Rancidity of oils	IV. Redox
	V. Displacement

(a) A-I, B-V, C-III, D-IV (b) A-III, B-IV, C-V, D-I

(c) A-IV, B-III, C-V, D-I (d) A-III, B-I, C-II, D-IV

43.



If we added $FeSO_4$ to above four test tubes, in which test tube we observe black residue?

(a) "A" and "B" (b) "B" and "C"

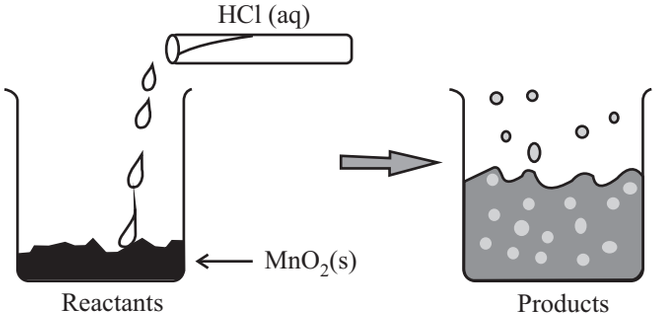
(c) "A" and "C" (d) "B" and "D"

Case/Passage Based Questions

DIRECTIONS : *Study the given case/passage and answer the following questions.*

Case/Passage - 1

The reaction between MnO_2 with HCl is depicted in the following diagram. It was observed that a gas with bleaching abilities was released . **[From CBSE Question Bank-2021]**



44. The chemical reaction between MnO_2 and HCl is an example of:
- (a) displacement reaction
- (b) combination reaction
- (c) redox reaction
- (d) decomposition reaction.

45. Chlorine gas reacts with _____ to form bleaching powder.
- (a) dry $Ca(OH)_2$
- (b) dil. solution of $Ca(OH)_2$
- (c) conc. solution of $Ca(OH)_2$
- (d) dry CaO

46. Identify the correct statement from the following:
- (a) MnO_2 is getting reduced whereas HCl is getting oxidized
- (b) MnO_2 is getting oxidized whereas HCl is getting reduced.
- (c) MnO_2 and HCl both are getting reduced.
- (d) MnO_2 and HCl both are getting oxidized.

47. In the above discussed reaction, what is the nature of MnO_2?
- (a) Acidic oxide (b) Basic oxide
- (c) Neutral oxide (d) Amphoteric oxide

48. What will happen if we take dry HCl gas instead of aqueous solution of HCl?
- (a) Reaction will occur faster.
- (b) Reaction will not occur.
- (c) Reaction rate will be slow.
- (d) Reaction rate will remain the same.

Case/Passage - 2

Chemistry in Automobiles:

For an internal combustion engine to move a vehicle down the road, it must convert the energy stored in the fuel into mechanical energy to drive the wheels. In your car, the distributor and battery provide this starting energy by creating an electrical "spark", which helps in combustion of fuels like gasoline. Below is the reaction depicting complete combustion of gasoline in full supply of air:

[From CBSE Question Bank-2021]

$$2C_8H_{18}(I) + 25O_2(g) \longrightarrow 16\ 'X' + Y$$

49. Which of the following are the products obtained from the reaction mentioned in the above case?

	Product 'X'	Product 'Y'
(a)	CO_2	H_2O_2
(b)	H_2O	CO
(c)	CH_3OH	H_2O
(d)	CO_2	H_2O

50. Identify the types of chemical reaction occurring during the combustion of fuel:
- (a) Oxidation & Endothermic reaction
- (b) Decomposition & Exothermic reaction
- (c) Oxidation & Exothermic reaction
- (d) Combination & Endothermic reaction

51. On the basis of evolution/absorption of energy, which of the following processes are similar to combustion of fuel?
- (i) Photosynthesis in plants
- (ii) Respiration in the human body
- (iii) Decomposition of vegetable matter
- (iv) Decomposition of ferrous sulphate.

(a) (ii) & (iii) (b) (i) & (ii)
(c) (iii) & (iv) (d) (ii) & (i)

52. 'A student while walking on the road observed that a cloud of black smoke belched out from the exhaust stack of moving trucks on the road.' Choose the correct reason for the production of black smoke:
- (a) Limited supply of air leads to incomplete combustion of fuel.
- (b) Rich supply of air leads to complete combustion of fuel.
- (c) Rich supply of air leads to a combination reaction.
- (d) Limited supply of air leads to complete combustion of fuel.

53. 'Although nitrogen is the most abundant gas in the atmosphere, it does not take part in combustion'. Identify the correct reason for this statement.
- (a) Nitrogen is a reactive gas
- (b) Nitrogen is an inert gas
- (c) Nitrogen is an explosive gas
- (d) Only hydrocarbons can take part in combustion

Assertion & Reason

DIRECTIONS : *Each of these questions contains an assertion followed by reason. Read them carefully and answer the question on the basis of following options. You have to select the one that best describes the two statements.*

(a) If both **Assertion** and **Reason** are **correct** and Reason is the **correct explanation** of Assertion.

(b) If both **Assertion** and **Reason** are correct, but Reason is **not the correct explanation** of Assertion.

(c) If **Assertion** is **correct** but **Reason** is **incorrect**.

(d) If **Assertion** is **incorrect** but **Reason** is **correct**.

54. **Assertion :** Chlorine gas react with potassium iodide solution to form potassium chloride and iodine.

Reason : Chlorine is more reactive than iodine therefore displaces iodine from potassium iodide.

55. **Assertion :** When copper strip is placed in ferrous sulphate solution, colour of the solution changes.

Reason : Iron is more reactive than copper.

56. **Assertion :** Decomposition of vegetable matter into compost is an endothermic reaction.

Reason : Heat is required in an endothermic reaction.

57. **Assertion :** Reaction of sodium sulphate with barium chloride is a precipitation reaction.

Reason : Precipitation reaction produces insoluble salt.

58. **Assertion:** When a mixture of hydrogen and chlorine is placed in sunlight, hydrogen chloride is formed.

Reason : It is an example of combination reaction.

59. **Assertion :** Stannous chloride gives grey precipitate with mercuric chloride, but stannic chloride does not do so.

Reason : Stannous chloride is a powerful oxidising agent which oxidises mercuric chloride to mercury.

60. **Assertion :** Corrosion of iron is commonly known as rusting.

Reason : Corrosion of iron occurs in presence of water and air.

61. **Assertion :** In a reaction

$Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$,

Zn is a reductant but itself get oxidized.

Reason : In a redox reaction, oxidant is reduced by accepting electrons and reductant is oxidized by losing electrons.

62. **Assertion :** A reducing agent is a substance which can either accept electron.

Reason : A substance which helps in oxidation is known as reducing agent.

63. **Assertion :** The balancing of chemical equations is based on law of conservation of mass.

Reason : Total mass of reactants is equal to total mass of products.

Match the Following

DIRECTIONS : *Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column I have to be matched with statements (p, q, r, s) in column II.*

64. Column II gives type of reaction mention in column I, match them correctly.

Column I	Column II
(A) $C + O_2 \rightarrow CO_2$	(p) Displacement
(B) $AgBr \xrightarrow{light} Ag + Br$	(q) Combination
(C) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$	(r) Decomposition
(D) $CH_3CH_2OH \xrightarrow{Cu} CH_3CHO + H_2$	(s) Oxidation

65.

Column I	Column II
(A) $KClO_3 \xrightarrow{\Delta}$	(p) O_2
(B) $ZnCO_3 \xrightarrow{\Delta}$	(q) H_2O
(C) $H_2CO_3 \xrightarrow{\Delta}$	(r) CO_2
(D) $C_2H_6 \xrightarrow{\Delta}$	(s) ZnO

	A	B	C	D
(a)	p	s, r	q, r	q, r
(b)	p	q, r	s, r	r, p
(c)	q, r	s, p	p, s	r
(d)	r	q	s	p

Fill in the Blanks

DIRECTIONS : *Complete the following statements with an appropriate word / term to be filled in the blank space(s).*

66. In a ..... reaction two or more substances combine to form a new single substance.

67. Reactions in which heat is given out along with the products are called ..... reactions.

68. Reactions in which energy is absorbed are known as ..... reactions.

69. When an element displaces another element from its compound, a ..... reaction occurs.

70. Two different atoms or groups of atoms (ions) are exchanged in ..... reactions.

71. Precipitation reactions produce ..... salts.

72. Reduction is the ..... of oxygen or gain of hydrogen.

73. The digestion of food in the body is an example of ..... reaction.

74. The addition of oxygen to a substance is called .....

75. When calcium carbonate is heated, it decomposes to give ..... and ..... .

76. The new substances produced in a reaction are called as .....

True / False

DIRECTIONS : *Read the following statements and write your answer as true or false.*

77. The number of atoms of each element is conserved in any chemical reaction.

78. Oxidation is the loss of electrons from a substance.

79. Reduction is the gain of electrons by a substance.

80. A complete chemical equation represents the reactants, products and their physical states symbolically.

81. A magnesium ribbon burns with a dazzling flame in air (oxygen) and changes into a white substance, magnesium oxide.

82. Rusting is a double decomposition reaction.

83. The reaction between nitrogen and hydrogen to give ammonia is an example of a combination reaction.

84. Action of heat on ferrous sulphate is an example of decomposition reaction.

85. The formation of Cu and H_2O in the reaction of copper oxide with hydrogen is an example of a redox reaction.

ANSWER KEY & SOLUTIONS

1. **(d)** A decomposition reaction is a type of chemical reaction in which a single compound breaks down into two or more elements or new compounds.

2. **(b)** Both are redox reactions. Redox reactions are characterised by the transfer of electrons between chemical species. One species undergoes oxidation while another species undergoes reduction.

3. **(d)** Combustion of liquefied petroleum gas is a chemical change. As it is an irreversible reaction and new products (carbon dioxide and water vapours) are formed during the change. Also, a lot of heat is released during this reaction.

4. **(c)**

5. **(b)** Formation of crystals by process of crystallization.

6. **(b)** Except (b) all other reactions involve compounds.

$$\underset{\text{(blue)}}{CuSO_4} + H_2S \longrightarrow \underset{\text{(black)}}{CuS} + H_2SO_4$$

(double decomposition reaction)

7. **(d)**

8. **(c)** Iron is more reactive than copper, hence Cu will not displace iron from iron sulphate, hence no reaction will take place.

9. **(b)** $Zn + 2HCl \longrightarrow ZnCl_2 + H_2$

Hydrogen gas burns with a pop sound.

10. **(c)** $Na_2CO_3 + 2HCl \longrightarrow 2NaCl + H_2O + CO_2$

$Na_2CO_3 + NaOH \longrightarrow$ no reaction

11. **(c)**

12. **(c)** $Cu + 4HNO_3 \longrightarrow Cu(NO_3)_2 + 2NO_2 + 2H_2O$

13. **(b)** **14.** (d)

15. **(b)** Here H_2S is behaves as a reducing agent and oxidises to H_2O.

16. **(a)** $\overset{\text{Oxidation}}{\overbrace{}}$ $CuO + H_2 \longrightarrow Cu + H_2O$ $\underbrace{}_{\text{Reduction}}$

17. **(b)** **18.** (d)

19. **(b)** $Na_2CO_3 + 2HCl \longrightarrow 2NaCl + CO_2 + H_2O$

20. **(b)** The reaction represents a neutralisation reaction in which base (NaOH) reacts with an acid (HNO_3) to form salt ($NaNO_3$) and water (H_2O).

21. **(d)**

22. **(a)** White silver chloride in sunlight turns to grey.

23. **(b)**

24. **(a)** $2Cu + O_2 \xrightarrow{\Delta} \underset{\text{Black}}{2CuO}$

25. **(a)** $4P + 3O_2 \xrightarrow{\text{(Oxidation)}} 2P_2O_3$

$4P + 5O_2 \xrightarrow{\text{(Oxidation)}} 2P_2O_5$

26. **(b)** $2Fe(s) + O_2(g) + 4H^+(aq) \longrightarrow 2Fe^{2+}(aq) + 2H_2O(l)$

27. **(c)** Gold is least reactive hence does not corrode at all.

28. **(a)** $CaCO_3 \xrightarrow{\Delta} CaO + CO_2$

29. **(c)** $\overset{\text{Reduction}}{\overbrace{}}$ $FeCl_3 + H_2S \longrightarrow FeCl_2 + HCl + S$ $\underbrace{}_{\text{Oxidation}}$

In the given reaction H_2S undergoes oxidation, hence behave as a reducing agent.

30. **(a)** $\overset{\text{reduction}}{\overbrace{}}$ $2\overset{+1}{C}uI \rightarrow \overset{0}{C}u + \overset{+2}{C}uI_2$. $\underbrace{}_{\text{oxidation}}$ Oxidation and reduction both occur so the reaction is redo

31. **(a)** Cu is more reactive than Ag.

$$\overset{0}{Cu} + 2AgNO_3 \longrightarrow \overset{+1}{CuNO_3} + 2Ag$$

32. **(b)** $\overset{+2}{Zn}(aq) + 2e^- \longrightarrow \overset{0}{Zn}(s)$; reduction

33. **(b)** $\underset{\text{(A)}}{HCl} + \underset{\text{(B)}}{Na_2CO_3} \longrightarrow NaCl(aq) + \underset{\text{(C)}}{CO_2} + \underset{\text{(D)}}{H_2O}$

$$CO_2 + NH_3 + NaCl(aq) \longrightarrow \underset{\text{Baking soda}}{NaHCO_3} + NH_4Cl$$

Hence A & B are HCl and Na_2CO_3

34. **(d)** Water gas $\rightarrow CO + H_2$

35. **(*)** Let the oxidation state of S be x

(i) H_2S

$\therefore 2 + x = 0$

$x = -2$

(ii) CS_2

$4 + 2x = 0 \Rightarrow x = -2$

(iii) Na_2SO_4

$2(+1) + x + 4(-2) = 0$

$2 + x - 8 = 0$

$x = +6$

(iv) Na_2SO_3

$2(+1) + x + 3(-2) = 0$

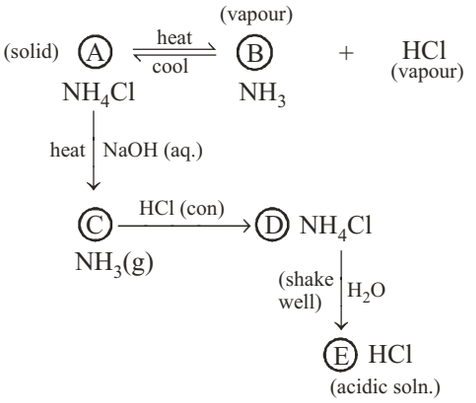
$2 + x - 6 = 0$

$x = +4$

None of these, option is correct.

36. (c) Conversion of liquid to gas is endothermic process.

37. (b)



$A = NH_4Cl$; $D = NH_4Cl$

Hence correct statement is: A and D are chemically same.

38. (a) Let the oxidation state of P-atom in $POCl_3$, H_2PO_3 and $H_4P_2O_6$ be x.

(i) $POCl_3$

$x + 1(-2) + 3(-1) = 0$

$x - 2 - 3 = 0$

$x = +5$

(ii) H_2PO_3

$2(1) + x + 3(-2) = 0$

$2 + x - 6 = 0$

$x = +4$

(iii) $H_4P_2O_6$

$4(1) + 2x + 6(-2) = 0$

$4 + 2x - 12 = 0$

$2x = 8$

$x = +4$.

39. (d) Respiration is oxidation and exothermic process.

40. (d) Layer of silver sulphide deposited on the silver articles when exposed to air.

41. (a) On thermal decomposition of calcium carbonate

$$\underset{100\text{ g}}{CaCO_3} \xrightarrow{\Delta} \underset{56\text{ g}}{CaO} + \underset{44\text{ g}}{CO_2}$$

44 g CO_2 is formed from 100 g $CaCO_3$

4.40 g CO is formed from $\frac{100}{44} \times 44 = 10$ g $CaCO_3$

If mass of $CaCO_3$ is 10 g, then weight of empty test tube = 30.08 – 10.0 = 20.08 g

42. (d) A-III, B-I, C-II, D-IV

43. (d) Zn and Al are more reactive than iron, therefore they will displace iron from its salt solution giving black residue, while Cu being less reactive than iron will not able to displace iron from its salt solution.

$FeSO_4 + 2Al \longrightarrow Al_2(SO_4)_3 + 3Fe$

$FeSO_4 + Zn \longrightarrow ZnSO_4 + Fe$

$FeSO_4 + Cu \longrightarrow$ No reaction

$FeSO_4 + Fe \longrightarrow$ No reaction

44. (c) redox reaction

45. (a) dry $Ca(OH)_2$

46. (a) MnO_2 is getting reduced whereas HCl is getting oxidized

47. (b) Basic oxide

48. (b) Reaction will not occur

49. (d)

50. (c)

51. (a)

52. (a)

53. (b)

54. (a) Chlorine displaces iodine from potassium iodide solution.

55. (d) When copper strip is placed in $FeSO_4$ solution, colour of the solution does not change.

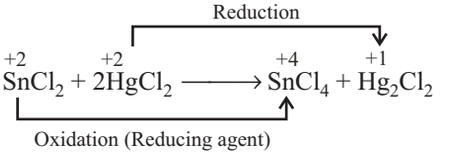
56. (d) Decomposition of vegetable matter into compost is an exothermic reaction.

57. (a) $Na_2SO_4(aq) + BaCl_2(aq) \longrightarrow$

$$\underset{\text{Precipitate}}{BaSO_4(s)} + 2NaCl(aq)$$

58. (a) A combination reaction is a reaction where two or more elements or compounds combine to form a single compound. Hydrogen and chlorine combine to give hydrogen chloride.

59. (c)



$Hg_2Cl_2 + SnCl_2 \longrightarrow 2Hg + SnCl_4$

60. (b) Corrosion occurs due to oxidation of iron.

Chemical Reactions and Equations

61. **(a)**

62. **(d)** A reducing agent is a substance which oxidizes itself but reduces others i.e., looses electrons.

63. **(a)**

64. A → (q) B → (r) C → (p) D → (s)

65. **(a)**

66. combination **67.** exothermic

68. endothermic **69.** displacement

70. double displacement **71.** insoluble

72. loss **73.** Decomposition reaction

74. oxidation **75.** CaO (s) and CO_2 (g)

76. products

77. True **78.** True **79.** True **80.** True

81. True **82.** False **83.** True **84.** True

85. True