

- Which of the following is not a physical change?
  - Boiling of water to give water vapour
  - Melting of ice to give water
  - Dissolution of salt in water
  - Combustion of Liquefied Petroleum Gas (LPG)
- The following reaction is an example of a  $4\text{NH}_3(\text{g}) + 5\text{O}_2(\text{g}) \rightarrow 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}(\text{g})$ 
  - displacement reaction
  - combination reaction
  - redox reaction
  - neutralisation reaction
  - (i) and (iv)
  - (ii) and (iii)
  - (i) and (iii)
  - (iii) and (iv)
- Which of the following statements about the given reaction are correct?  $3\text{Fe}(\text{s}) + 4\text{H}_2\text{O}(\text{g}) \rightarrow \text{Fe}_3\text{O}_4(\text{s}) + 4\text{H}_2(\text{g})$ 
  - Iron metal is getting oxidised
  - Water is getting reduced
  - Water is acting as reducing agent
  - Water is acting as oxidising agent
  - (i), (ii) and (iii)
  - (iii) and (iv)
  - (i), (ii) and (iv)
  - (ii) and (iv)
- Which of the following are exothermic processes?
  - Reaction of water with quick lime
  - Dilution of an acid
  - Evaporation of water
  - Sublimation of camphor (crystals)
  - (i) and (ii)
  - (ii) and (iii)
  - (i) and (iv)
  - (iii) and (iv)
- Three beakers labelled as A, B and C each containing 25 mL of water were taken. A small amount of NaOH, anhydrous  $\text{CuSO}_4$  and NaCl were added to the beakers A, B and C respectively. It was observed that there was an increase in the temperature of the solutions contained in beakers A and B, whereas in case of beaker C, the temperature of the solution falls. Which one of the following statement(s) is (are) correct?
  - In beakers A and B, exothermic process has occurred.
  - In beakers A and B, endothermic process has occurred.
  - In beaker C exothermic process has occurred.
  - In beaker C endothermic process has occurred.
- (i) only
  - (ii) only
  - (i) and (iv)
  - (ii) and (iii)
- A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?
  - $\text{KMnO}_4$  is an oxidising agent, it oxidises  $\text{FeSO}_4$
  - $\text{FeSO}_4$  acts as an oxidising agent and oxidises  $\text{KMnO}_4$
  - The colour disappears due to dilution; no reaction is involved
  - $\text{KMnO}_4$  is an unstable compound and decomposes in presence of  $\text{FeSO}_4$  to a colourless compound.
- Which among the following is (are) double displacement reaction(s)?
  - $\text{Pb} + \text{CuCl}_2 \rightarrow \text{PbCl}_2 + \text{Cu}$
  - $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{BaSO}_4 + 2\text{NaCl}$
  - $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$
  - $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$
  - (i) and (iv)
  - (ii) only
  - (i) and (ii)
  - (iii) and (iv)
- Which among the following statement(s) is (are) true? Exposure of silver chloride to sunlight for a long duration turns grey due to
  - the formation of silver by decomposition of silver chloride
  - sublimation of silver chloride
  - decomposition of chlorine gas from silver chloride
  - oxidation of silver chloride
  - (i) only
  - (i) and (iii)
  - (ii) and (iii)
  - (iv) only

(CBSE Sample Paper 2010)
- Solid calcium oxide reacts vigorously with water to form calcium hydroxide accompanied by liberation of heat. This process is called slaking of lime. Calcium hydroxide dissolves in water to form its solution called lime water. Which among the following is (are) true about slaking of lime and the solution formed?
  - It is an endothermic reaction
  - It is an exothermic reaction
  - The pH of the resulting solution will be more than seven



- (iv) The pH of the resulting solution will be less than seven  
 (a) (i) and (ii) (b) (ii) and (iii)  
 (c) (i) and (iv) (d) (iii) and (iv)

(CBSE Sample Paper 2010)

10. Barium chloride on reacting with ammonium sulphate forms barium sulphate and ammonium chloride. Which of the following correctly represents the type of the reaction involved?

- (i) Displacement reaction  
 (ii) Precipitation reaction  
 (iii) Combination reaction  
 (iv) Double displacement reaction

- (a) (i) only (b) (ii) only  
 (c) (iv) only (d) (ii) and (iv)

11. Electrolysis of water is a decomposition reaction. The mole ratio of hydrogen and oxygen gases liberated during electrolysis of water is

- (a) 1:1 (b) 2:1 (c) 4:1 (d) 1:2

12. Which of the following is(are) an endothermic process(es)?

- (i) Dilution of sulphuric acid  
 (ii) Sublimation of dry ice  
 (iii) Condensation of water vapours  
 (iv) Evaporation of water

- (a) (i) and (iii) (b) (ii) only  
 (c) (iii) only (d) (ii) and (iv)

13. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?

- (a) Lead sulphate (insoluble)  
 (b) Lead acetate  
 (c) Ammonium nitrate  
 (d) Potassium sulphate

14. Which of the following gases can be used for storage of fresh sample of an oil for a long time?

- (a) Carbon dioxide or oxygen  
 (b) Nitrogen or oxygen  
 (c) Carbon dioxide or helium  
 (d) Helium or nitrogen

15. The following reaction is used for the preparation of oxygen gas in the laboratory



- Which of the following statement(s) is(are) correct about the reaction?

- (a) It is a decomposition reaction and endothermic in nature  
 (b) It is a combination reaction  
 (c) It is a decomposition reaction and accompanied by release of heat  
 (d) It is a photochemical decomposition reaction and exothermic in nature

16. Which one of the following processes involve chemical reactions?

- (a) Storing of oxygen gas under pressure in a gas cylinder  
 (b) Liquefaction of air  
 (c) Keeping petrol in a china dish in the open  
 (d) Heating copper wire in presence of air at high temperature

17. In which of the following chemical equations, the abbreviations represent the correct states of the reactants and products involved at reaction temperature?

- (a)  $2\text{H}_2(l) + \text{O}_2(l) \rightarrow 2\text{H}_2\text{O}(g)$   
 (b)  $2\text{H}_2(g) + \text{O}_2(l) \rightarrow 2\text{H}_2\text{O}(l)$   
 (c)  $2\text{H}_2(g) + \text{O}_2(g) \rightarrow 2\text{H}_2\text{O}(l)$   
 (d)  $2\text{H}_2(g) + \text{O}_2(g) \rightarrow 2\text{H}_2\text{O}(g)$

18. Which of the following are combination reactions?

- (i)  $2\text{KClO}_3 \xrightarrow{\text{Heat}} 2\text{KCl} + 3\text{O}_2$   
 (ii)  $\text{MgO} + \text{H}_2\text{O} \rightarrow \text{Mg}(\text{OH})_2$   
 (iii)  $4\text{Al} + 3\text{O}_2 \rightarrow 2\text{Al}_2\text{O}_3$   
 (iv)  $\text{Zn} + \text{FeSO}_4 \rightarrow \text{ZnSO}_4 + \text{Fe}$   
 (a) (i) and (iii) (b) (iii) and (iv)  
 (c) (ii) and (iv) (d) (ii) and (iii)

### ANSWERS AND HINTS: NCERT Exemplar Problems

1. (d)  
 2. (c) : Oxygen has displaced hydrogen from  $\text{NH}_3$ . It is also a redox reaction.  
 3. (c) : The substance which oxidises the other substance is called oxidising agent. So, water is an oxidising agent.  
 4. (a)  
 5. (c) : In beakers A and B exothermic reactions occur while in beaker C endothermic reaction occurs.  
 6. (a) 7. (b) 8. (a)  
 9. (b) : It is an exothermic reaction forming basic solution having pH more than 7.  
 10. (d) 11. (b) 12. (d)  
 13. (b) : Only lead salts can be used. Lead sulphate being insoluble will not give  $\text{Pb}^{2+}$  ions.  
 14. (d) 15. (a) 16. (d)  
 17. (d) 18. (d)



# NTSE – Target: Scholastic Aptitude Test-SAT

1. Which of the following is a displacement reaction?
  - (a)  $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca(OH)}_2$
  - (b)  $\text{MgCO}_3 \longrightarrow \text{MgO} + \text{CO}_2$
  - (c)  $2\text{Na} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH} + \text{H}_2$
  - (d)  $\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$
2. The formula of sulphur trioxide is
  - (a)  $\text{S}_2\text{O}_3$
  - (b)  $\text{SO}_3$
  - (c)  $\text{SO}_2$
  - (d)  $\text{H}_2\text{S}$
3. In the balanced equation
 
$$a \text{Fe}_2\text{O}_3 + b \text{H}_2 \longrightarrow c \text{Fe} + d \text{H}_2\text{O}$$
 The values of  $a$ ,  $b$ ,  $c$  and  $d$  are the respectively:
  - (a) 1, 1, 2, 3
  - (b) 1, 1, 1, 1
  - (c) 1, 3, 2, 3
  - (d) 1, 2, 2, 3
4. The process of reduction involves
  - (a) removal of hydrogen
  - (b) gain of electrons
  - (c) addition of oxygen
  - (d) loss of electrons
5. Oxidation is a process which involves
  - (a) addition of oxygen
  - (b) addition of hydrogen
  - (c) gain of electrons
  - (d) none of these
6. Which of the following is a decomposition reaction?
  - (a)  $\text{ZnCO}_3 \longrightarrow \text{ZnO} + \text{CO}_2$
  - (b)  $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$
  - (c)  $\text{Zn} + 2\text{HCl} (\text{aq}) \longrightarrow \text{ZnCl}_2 (\text{aq}) + \text{H}_2$
  - (d)  $3\text{MnO}_2 + 4\text{Al} \longrightarrow 3\text{Mn} + 2\text{Al}_2\text{O}_3$
7. In the reaction
 
$$3\text{MnO}_2 + 4\text{Al} \longrightarrow 3\text{Mn} + 2\text{Al}_2\text{O}_3$$
 the oxidising agent is
  - (a)  $\text{MnO}_2$
  - (b)  $\text{Al}$
  - (c)  $\text{Al}_2\text{O}_3$
  - (d)  $\text{Mn}$
8. Which of the following statements is correct?
  - (a) Oxidation involves gain of electrons
  - (b) The substance which gets reduced acts as a reducing agent
  - (c) Exothermic reactions proceed with absorption of heat
  - (d)  $\text{NaHCO}_3$  is sodium bicarbonate.
9. When magnesium ribbon is burnt in air, the ash formed is
  - (a) white
  - (b) green
  - (c) yellow
  - (d) black
10. Carbon dioxide turns lime water milky due to the formation of
  - (a)  $\text{MgCO}_3$
  - (b)  $\text{CaSO}_4$
  - (c)  $\text{CaCO}_3$
  - (d)  $\text{Na}_2\text{CO}_3$
11. .... is a process in which there is loss of electrons.
  - (a) Oxidation
  - (b) Reduction
  - (c) Redox reaction
  - (d) both (a) and (b)

(NTSE 2011-12)
12.  $\text{H}_2\text{S} + \text{Cl}_2 \longrightarrow 2\text{HCl} + \text{S}$   
 The reaction is interpreted as
  - (a)  $\text{H}_2\text{S}$  is getting oxidised and  $\text{Cl}_2$  is getting reduced
  - (b)  $\text{H}_2\text{S}$  is getting reduced and  $\text{Cl}_2$  is getting oxidised
  - (c) Only  $\text{H}_2\text{S}$  is oxidised
  - (d) Both  $\text{H}_2\text{S}$  and  $\text{Cl}_2$  are reduced

(NTSE 2012-13)
13. The reaction:
 
$$\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$$
 is an example of a
  - (a) decomposition reaction
  - (b) combination reaction
  - (c) displacement reaction
  - (d) double displacement reaction
14. Identify the type of reaction taking place in
 
$$\text{Fe} + \text{CuSO}_4 \longrightarrow \text{Cu} + \text{FeSO}_4$$
  - (a) Redox reaction
  - (b) Displacement reaction
  - (c) Neutralization reaction
  - (d) Precipitation reaction

(NTSE 2014-15)
15. The chemical reaction :
 
$$\text{HNO}_3 + \text{KOH} \longrightarrow \text{KNO}_3 + \text{H}_2\text{O}$$
 is an example of
  - (a) neutralisation
  - (b) double displacement
  - (c) neutralisation and double displacement
  - (d) combination

(NTSE 2014-15)
16. The formulae of quick lime and limestone are respectively
  - (a)  $\text{MgCO}_3$ ,  $\text{Mg(OH)}_2$
  - (b)  $\text{Ca(OH)}_2$ ,  $\text{CaCO}_3$
  - (c)  $\text{CaO}$ ,  $\text{CaCO}_3$
  - (d)  $\text{CaCO}_3$ ,  $\text{CaO}$
17. The values of  $a$ ,  $b$ ,  $c$  and  $d$  in the balanced chemical equation :
 
$$a \text{BaCl}_2 + b \text{Al}_2(\text{SO}_4)_3 \longrightarrow c \text{AlCl}_3 + d \text{BaSO}_4$$
 are
  - (a) 3, 2, 2, 3
  - (b) 3, 1, 2, 3
  - (c) 2, 4, 2, 3
  - (d) 3, 1, 3, 2
18. In the reaction :
 
$$\text{CuO} + \text{H}_2 \xrightarrow{\text{Heat}} \text{Cu} + \text{H}_2\text{O}$$
 which substance is reduced?
  - (a)  $\text{CuO}$
  - (b)  $\text{Cu}$
  - (c)  $\text{H}_2$
  - (d)  $\text{H}_2\text{O}$

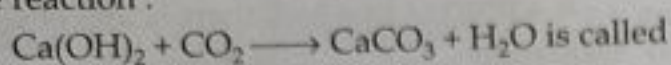


19. Which is reducing agent in the reaction ?



- (a) C (b) Zn  
(c) CO (d) ZnO

20. The reaction :



- (a) displacement reaction  
(b) combination reaction  
(c) redox reaction  
(d) decomposition reaction

21. Which one of the following four metals would be displaced from the solution of its salt by other three metals ?

- (a) Mg (b) Ag  
(c) Zn (d) Cu

22. A dilute ferrous sulphate solution was gradually added to the beaker containing acidified permanganate solution. The light purple colour of the solution fades and finally disappears. Which of the following is the correct explanation for the observation?

- (a)  $\text{KMnO}_4$  is an oxidizing agent, it oxidizes  $\text{FeSO}_4$   
(b)  $\text{FeSO}_4$  acts as an oxidizing agent and oxidizes  $\text{KMnO}_4$   
(c) The colour disappears due to dilution: no reaction is involved  
(d)  $\text{KMnO}_4$  is an unstable compound and decomposes in the presence of  $\text{FeSO}_4$  to a colourless compound (NTSE 2014-15)

23. In the double displacement reaction between aqueous potassium iodide and aqueous lead nitrate, a yellow precipitate of lead iodide is formed. While performing the activity if lead nitrate is not available, which of the following can be used in place of lead nitrate?

- (a) Lead sulphate (insoluble)  
(b) Lead acetate  
(c) Ammonium nitrate  
(d) Potassium sulphate (NTSE 2013-14)

24. Which of the following are exothermic processes?

1. Reaction of water with quick lime
2. Dilution of an acid
3. Evaporation of water
4. Sublimation of camphor crystals

- (a) 1 and 2 (b) 2 and 3  
(c) 1 and 4 (d) 3 and 4

(NTSE 2014-15)

25. Silver chloride turns grey in sunlight because of its decomposition into

- (a) silver  
(b) silver and chlorine  
(c) silver and chloride  
(d) silver oxide and chlorine

26. In order to prevent spoilage of potato chips, these are packed in plastic bags in an atmosphere of

- (a)  $\text{H}_2$  (b)  $\text{N}_2$   
(c)  $\text{CO}_2$  (d)  $\text{O}_2$

27. Which of the following is decomposed by sunlight?

- (a)  $\text{CuCl}_2$  (b)  $(\text{NH}_4)_2\text{CO}_3$   
(c)  $\text{AgBr}$  (d)  $\text{NaCl}$

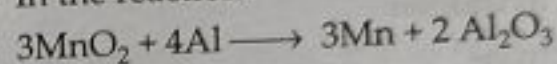
28. The formula of rust is

- (a)  $\text{Fe}_3\text{O}_4$  (b)  $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$   
(c)  $\text{FeCl}_3 \cdot x\text{H}_2\text{O}$  (d)  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

29. Which of the following are exothermic reactions.

- (i) Burning of coal  
(ii) Reaction of water with quick lime  
(iii) Respiration  
(iv) Evaporation of water  
(a) (i), (ii) and (iv) (b) (i) and (ii) only  
(c) (ii) and (iii) only (d) (i), (ii) and (iii)

30. In the reaction



the oxidising agent is

- (a)  $\text{MnO}_2$  (b) Al  
(c)  $\text{Al}_2\text{O}_3$  (d) Mn

31. Carbon dioxide turns lime water milky due to the formation of

- (a)  $\text{MgCO}_3$  (b)  $\text{CaSO}_4$   
(c)  $\text{CaCO}_3$  (d)  $\text{Na}_2\text{CO}_3$

32. When a solution of barium chloride in water is added to an aqueous solution of sodium sulphate, the following happens :

- (a) a white precipitate is formed  
(b) a red precipitate is formed  
(c) the colour of the solution turns blue  
(d) a pungent smelling gas is evolved.

33. A white precipitate can be formed when dil  $\text{H}_2\text{SO}_4$  is added to aqueous solution of

- (a) NaCl (b)  $\text{BaCl}_2$   
(c)  $\text{Na}_2\text{SO}_4$  (d)  $\text{CuSO}_4$

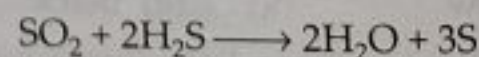
34. The removal of oxygen from a substance is called

- (a) corrosion (b) oxidation  
(c) reduction (d) rancidity

35. The process of respiration is

- (a) a reduction and exothermic reaction  
(b) an oxidation and exothermic reaction  
(c) a combination and exothermic reaction  
(d) an oxidation and endothermic reaction

36. In the reaction:



which of the following statement is true?

- (a)  $\text{SO}_2$  is reduced  
(b)  $\text{H}_2\text{S}$  is oxidised



