

10th Science Important Case Study Questions for Chemical Reactions And Equations 2024

10th Standard

Science

Section A

2 x 4 = 8

1) Reactions in which one element takes place of another element in a compound, are known as displacement reactions. In general, more reactive elements displaces a less reactive element from its compound. In all single displacement reactions, only one element displaces another element from its compound. The single displacement reactions are, however, written as just displacement reactions. The displacement reaction between iron (III) oxide and powdered aluminium produces so much heat that iron metal obtained is in molten form.

(i) Copper displaces which of the following metals from its salt solution?

(a) ZnSO_4 (b) FeSO_4 (c) AgNO_3 (d) NiSO_4

(ii) When zinc reacts with dilute sulphuric acid, the gas evolved is

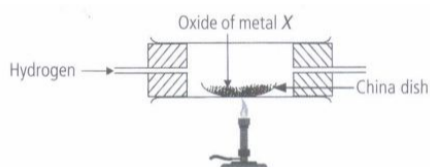
(a) red in colour and have a sweet smelling

(b) green in colour and have a foul smell

(c) colourless, odourless and burns with a pop sound

(d) colourless, pungent smelling and burns with a pop sound

(iii) When dry hydrogen is passed over a heated oxide of metal X using the apparatus shown below, a reddishbrown residue is obtained



The reddish -brown residue could be

(a) copper (b) lead (c) silver (d) zinc

(iv) Which of the following reactions is a displacement reaction?

(a) $\text{CaO} + \text{H}_2\text{O} \longrightarrow \text{Ca}(\text{OH})_2$ (b) $\text{MgCO}_3 \longrightarrow \text{Mg} + \text{CO}_2$

(c) $\text{Mg} + \text{CuSO}_4 \longrightarrow \text{MgSO}_4 + \text{Cu}$ (d) $\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$

(v) When dilute hydrochloric acid is added to granulated zinc placed in a test tube, the observation made is

(a) the surface of the metal turns shining

(b) the reaction mixture turns milky

(c) greenish yellow gas is evolved

(d) the colourless and odourless gas evolves with a pop sound.

Answer : (i) (c) : $\text{Cu} + 2\text{AgNO}_3 \longrightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$

Copper can displace silver from its salt solution since, copper is more reactive than silver.

(ii) (c) : $\text{Zn} + \text{H}_2\text{SO}_4(\text{dil.}) \longrightarrow \text{ZnSO}_4 + \text{H}_2 \uparrow$

H_2 is a colourless, odourless gas and burns with a pop sound.

(iii) (a) : $\text{CuO} + \text{H}_2 \xrightarrow{\text{Heat}} \text{Cu} + \text{H}_2\text{O}$

Copper Hydrogen Copper Water
oxide (Reddish-brown) vapour

(iv) (c): It is a single displacement reaction.

(v) (d) : $\text{Zn} + 2\text{HCl} \longrightarrow \text{ZnCl}_2 + \text{H}_2 \uparrow$

2) Oxidation has damaging effect on metals as well as on food. The damaging effect of oxidation on metal is studied as corrosion and that on food is studied as rancidity. The phenomenon due to which

metals are slowly eaten away by the reaction of air, water and chemicals present in atmosphere, is called corrosion. For example, iron articles are shiny when new, but get coated with a reddish brown powder when left for sometime. This process is known as rusting of iron. Rancidity is the process of slow oxidation of oil and fat (which are volatile in nature) present in the food materials resulting in the change of smell and taste in them.

(i) Rancidity can be prevented by

(a) adding antioxidants (b) packaging oily food in nitrogen gas

(c) both (a) and (b) (d) none of these.

(ii) Combination of phosphorus and oxygen is an example of

(a) oxidation (b) reduction (c) rancidity (d) none of these

(iii) A science teacher wrote the following statements about rancidity :

(I) When fats and oils are reduced, they become rancid.

(II) In chips packet, rancidity is prevented by oxygen.

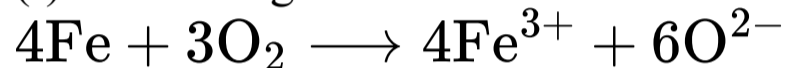
(III) Rancidity is prevented by adding antioxidants.

Select the correct option.

(a) (I) only (b) (II) and (III) only (c) (III) only (d) (I), (II), and (III)

(iv) Two statements are given below regarding rusting of iron.

(I) The rusting of iron is a redox reaction and reaction occurs as,



(II) The metallic iron is oxidised to Fe^{2+} and O_2 is reduced to O^{2-}

Select the correct statement(s).

(a) I only (b) II only (c) Both I and II (d) None of these

(v) Which of the following measures can be adopted to prevent or slow down rancidity?

(I) Food materials should be packed in air tight container.

(II) Food should be refrigerated.

(III) Food materials and cooked food should be kept away from direct sunlight

(a) Only II (b) Only I (c) Only II (d) I, II and III

Answer : (i) (c): Antioxidants and nitrogen gas prevent oxidation of food



(iii) (c): The oils and fats are slowly oxidised to certain bad smelling compounds, which release foul smell. This is known as rancidity. Rancidity is prevented by filling nitrogen gas in chips packets.

(iv) (a)

(v) (d)