CHEMISTRY STUDY MATERIALS FOR CLASS 10
(NCERT Based notes of Chapter -03)

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METALS AND NON-METALS

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Question 1: Why is sodium kept immersed in kerosene oil?

Answer : Sodium and potassium are very reactive metals and combine explosively with air as well as water. Hence, they catch fire if kept in open. Therefore, to prevent accidental fires and accidents, sodium is stored in kerosene oil.

Question 2: Write equations for the reactions of

(i) iron with steam

(ii) calcium and potassium with water

Answers:

(i) $3Fe_{(s)} + 4H_2O_{(g)} \longrightarrow Fe_3O_{4(aq)} + 4H_{2(g)}$

Iron Steam Iron (II,III) oxide Hydrogen

(ii) $Ca_{(s)} + 2H_2O_{(l)} \longrightarrow Ca(OH)_{2(aq)} + H_{2(g)} + Heat$

$2K_{(s)} + 2H_2O_{(l)} \longrightarrow 2KOH_{(aq)} + H_{2(g)} + Heat$

Calcium/ Potassium Water Calcium Hydroxide/ Potassium hydroxide Hydrogen

Question 3: Samples of four metals A, B, C and D were taken and added to the following solution one by one. The results obtained have been tabulated as follows.

Metal	Iron(II) sulphate	Copper(II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement		
B	Displacement		No reaction	
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Use the Table above to answer the following questions about metals A, B, C and D.

(i) Which is the most reactive metal?

(ii) What would you observe if B is added to a solution of copper (II) sulphate?

(iii) Arrange the metals A, B, C and D in the order of decreasing reactivity.

Answer: Explanation

A + $FeSO_4$ → No reaction, i.e., A is less reactive than iron

A + $CuSO_4$ →Displacement, i.e., A is more reactive than copper

B + $FeSO_4$ →Displacement, i.e., B is more reactive than iron

B + $ZnSO_4$ →No reaction, i.e., B is less reactive than zinc

C + $FeSO_4$ →No reaction, i.e., C is less reactive than iron

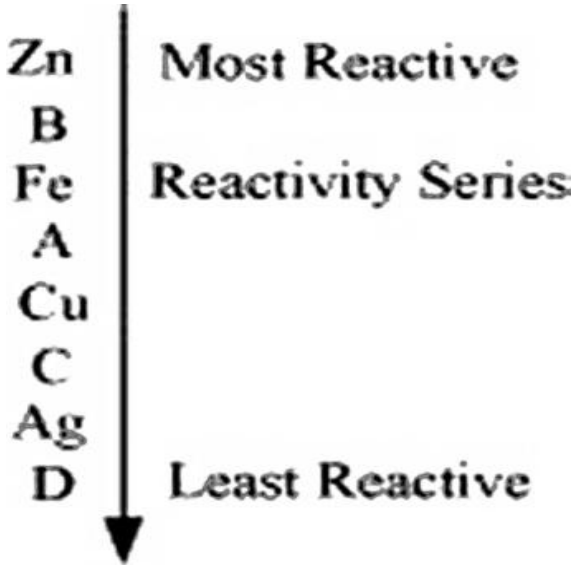
C + $CuSO_4$ →No reaction, i.e., C is less reactive than copper

C + $ZnSO_4$ →No reaction, i.e., C is less reactive than zinc

C + $AgNO_3$ → Displacement, i.e., C is more reactive than silver

D + $FeSO_4$/$CuSO_4$/$ZnSO_4$/$AgNO_3$ →No reaction, i.e., D is less reactive than iron, copper, zinc, and silver

From the above equations, we obtain:



(i) B is the most reactive metal.

(ii) If B is added to a solution of copper (II) sulphate, then it would displace copper.

B + CuSO4 →Displacement

(iii) The arrangement of the metals in the order of decreasing reactivity is:

B > A > C > D

Q 4: Which gas is produced when dilute hydrochloric acid is added to a reactive metal? Write the chemical reaction when iron reacts with dilute H_2SO_4.

Answer: Hydrogen gas is evolved when dilute hydrochloric acid is added to a reactive metal. When iron reacts with dilute H2SO4, iron (II) sulphate with the evolution of hydrogen gas is formed.

$$Fe_{(s)} + H_2SO_{4(aq)} \longrightarrow FeSO_{4(aq)} + H_{2(g)}$$

Question 5: What would you observe when zinc is added to a solution of iron (II) sulphate? Write the chemical reaction that takes place.

Answer: Zinc is more reactive than iron. Therefore, if zinc is added to a solution of iron (II) sulphate, then it would displace iron from the solution.

$$Zn_{(s)} + FeSO_{4(aq)} \longrightarrow ZnSO_{4(aq)} + Fe_{(s)}$$

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