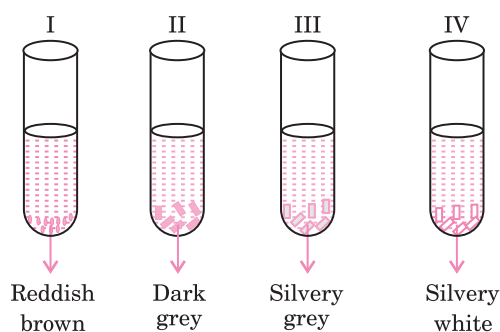




# PRACTICAL QUESTIONS

## Multiple Choice Questions

1. A student took Cu, Al, Fe and Zn strips separately in four test tubes labelled I, II, III and IV. He added 10 mL of freshly prepared ferrous sulphate solution to each test tube as shown in the figure :



Black residue would be obtained in test tubes

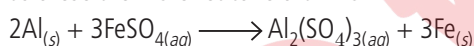
- (a) I and II                      (b) I and III  
(c) II and III                    (d) III and IV

**Ans. (d) :** Reddish brown = Cu (I)

Dark grey = Fe (II); Silvery grey = Zn (III)

Silvery white = Al (IV)

Al and Zn will displace iron from  $\text{FeSO}_4$  to form black residue as these are more reactive than iron.



2. An iron nail was immersed in aluminium sulphate solution for about an hour, then it was observed that

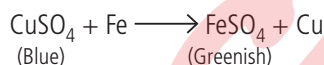
- (a) the solution becomes warm  
(b) grey metal is deposited on the iron nail  
(c) the colourless solution change to light green  
(d) the solution remains colourless and no deposition is observed on iron nail.

**Ans. (d) :** The solution remains colourless and no deposition is observed on iron nail.

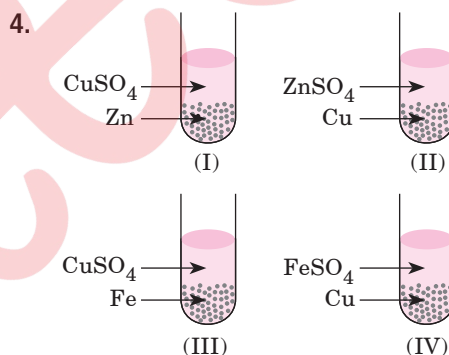
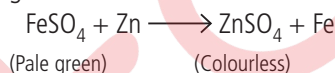
3. A student prepared an aqueous solution of  $\text{CuSO}_4$  in beaker X and an aqueous solution of  $\text{FeSO}_4$  in beaker Y. He then dropped some iron pieces in beaker X and some zinc pieces in beaker Y. After about 10 hours he observed that the solutions in X and Y respectively appear

- (a) blue and green  
(b) colourless and pale green  
(c) colourless and light blue  
(d) greenish and colourless.

**Ans. (d) :** In beaker X, iron (Fe) is more reactive than copper (Cu), so iron will displace copper to form iron sulphate solution and thus the blue coloured solution turns into greenish solution.



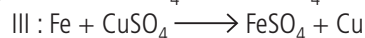
In beaker Y, zinc (Zn) is more reactive than iron (Fe). So, zinc will displace iron from its sulphate solution and thus pale green solution turns to colourless.



In which of the above test tubes reaction will take place ?

- (a) I and II                      (b) II and III  
(c) II and IV                    (d) I and III

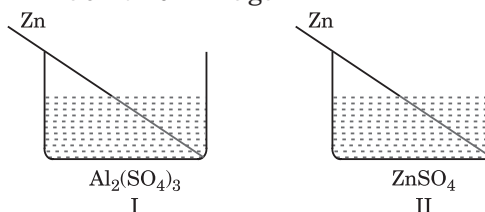
**Ans. (d) :** I :  $\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu}$

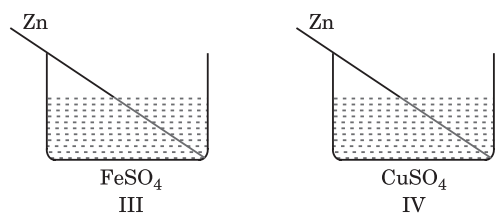


It is because Zn and Fe are more reactive than Cu.

In II and IV reaction will not take place because Cu is less reactive than Zn and Fe.

5. Four students A, B, C and D noted the initial colour of the solutions in beaker I, II, III and IV. After inserting zinc rods in each solution and leaving it undisturbed for two hours, noted the colour of each solution again.





They recorded their observations in the form of table given below :

Student	Colour of the solution	I	II	III	IV
A	Initial	Colourless	Colourless	Light green	Blue
	Final	Colourless	Colourless	Colourless	Colourless
B	Initial	Colourless	Light yellow	Light green	Blue
	Final	Colourless	Colourless	Light green	Colourless
C	Initial	Colourless	Colourless	Light green	Blue
	Final	Light blue	Colourless	Colourless	Light blue
D	Initial	Light green	Colourless	Light green	Blue
	Final	Colourless	Colourless	Dark green	Colourless

Which student noted the colour change in all the four beakers correctly?

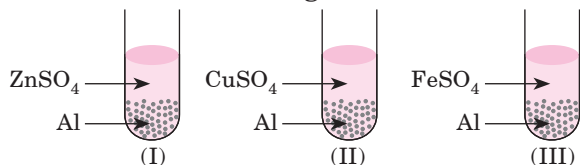
- (a) A (b) B  
(c) C (d) D

**Ans. (a) :** Student A has recorded the correct observation. In I and II, no reaction takes place.

In III, green solution of  $\text{FeSO}_4$  will change to colourless  $\text{ZnSO}_4$   
 $\text{Zn} + \text{FeSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Fe}$   
 (Green) (Colourless)

In IV, blue colour of  $\text{CuSO}_4$  will change to colourless solution.  
 $\text{Zn} + \text{CuSO}_4 \longrightarrow \text{ZnSO}_4 + \text{Cu}$   
 (Blue) (Colourless)

6. A student perform the following experiment and his observations are given in table.

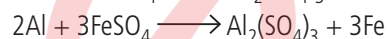


Observation	I	II	III
Solution	Colourless	Colourless	Colourless
Metal deposited	Zn	Cu	Fe

Which of the following is correct conclusion?

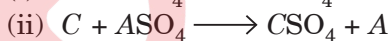
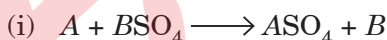
- (a) Al is more reactive than Zn, Cu and Fe.  
 (b) Al is more reactive than Zn and Cu but less reactive than Fe.  
 (c) Al is more reactive than Cu but less reactive than Zn and Fe.  
 (d) Al is more reactive than Cu and Fe but less reactive than Zn.

**Ans. (a) :**  $2\text{Al} + 3\text{ZnSO}_4 \longrightarrow \text{Al}_2(\text{SO}_4)_3 + 3\text{Zn}$



Al is most reactive among Al, Zn, Cu and Fe because it displaces them from their salt solutions.

7. Consider the following displacement reactions :

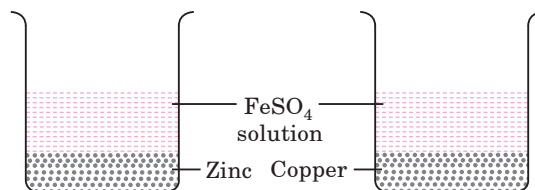


Which of the following statement is correct?

- (a) B is more reactive than A but less reactive than C.  
 (b) A is most reactive among A, B and C.  
 (c) B is more reactive than both A and C.  
 (d) C is more reactive than among A, B and C.

**Ans. (d)**

8. Two beakers A and B contain an aqueous solution of  $\text{FeSO}_4$ . In beaker A zinc granules and in beaker B copper turnings have been placed. A grey coating was observed on zinc but not on copper. From the above observations we can conclude

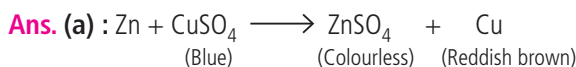


- (a) zinc is more reactive than iron and copper.  
 (b) iron is more reactive than zinc and copper.  
 (c) iron is more reactive than zinc but less than copper.  
 (d) copper is more reactive than iron but less than zinc.

**Ans. (a)**

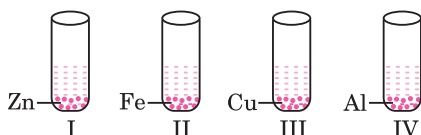
9. When zinc metal is dipped in copper sulphate solution

- the solution becomes colourless and reddish brown copper metal gets deposited.
- no reaction takes place
- the solution becomes green and copper metal gets deposited
- the solution remains blue and copper metal gets deposited.



The solution becomes colourless due to formation of  $\text{ZnSO}_4$  and copper metal gets deposited.

10. An aqueous solution of zinc sulphate was taken in four test tubes. Zinc, iron, copper and aluminium pieces were dropped into separate test tubes as given below :



A reaction will be observed in test tube(s)

- only I and II
- only I and III
- only II and III
- only IV.

**Ans. (d) :** As aluminium is more reactive than zinc, so aluminium displaces zinc from zinc sulphate solution. Therefore, reaction will be observed only in test tube IV.

## Subjective Questions

11. State which of the following chemical reaction will take place or not, giving suitable reason for each.

- $\text{Zn}_{(s)} + \text{CuSO}_{4(aq)} \longrightarrow \text{ZnSO}_{4(aq)} + \text{Cu}_{(s)}$
- $\text{Fe}_{(s)} + \text{ZnSO}_{4(aq)} \longrightarrow \text{FeSO}_{4(aq)} + \text{Zn}_{(s)}$
- $\text{Zn}_{(s)} + \text{FeSO}_{4(aq)} \longrightarrow \text{ZnSO}_{4(aq)} + \text{Fe}_{(s)}$

**Ans.** Reaction (i) will take place because zinc is more reactive than copper (higher in activity series) and can displace copper from copper sulphate solution.

The reaction (ii) will not take place because Fe is less reactive than Zn (low in activity series) and hence cannot displace more reactive Zn from  $\text{ZnSO}_4$  solution.

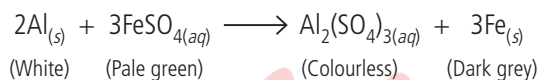
The reaction (iii) will take place because zinc is more reactive than iron and hence can displace iron from iron sulphate solution.

12. A student added few pieces of aluminium metal to two test tubes A and B containing aqueous solutions of iron sulphate and copper

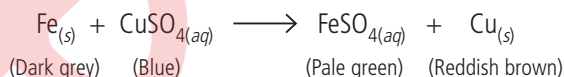
sulphate. In the second part of her experiment, she added iron metal to another test tubes C and D containing aqueous solutions of aluminium sulphate and copper sulphate.

In which test tube or test tubes will she observe colour change? On the basis of this experiment, state which one is the most reactive metal and why?

**Ans.** As aluminium is more reactive than iron and copper, so it will displace iron from iron sulphate solution and copper from copper sulphate solution.



Hence, in both test tubes A and B, colour change is observed. Iron is less reactive than aluminium, hence, iron cannot displace aluminium from aluminium sulphate solution and therefore, no colour change is observed in test tube C. As iron is more reactive than copper it displaces copper from copper sulphate solution.



Hence, colour change is observed in test tube D.

As aluminium can displace both copper and iron from the salt solutions, thus, it is most reactive. The order of reactivity is  $\text{Al} > \text{Fe} > \text{Cu}$ .

13. What is your observation when copper is added in iron sulphate solution?

**Ans.** When copper is added in iron sulphate solution, no reaction occurs as Cu is less reactive than iron and it cannot displace Fe from  $\text{FeSO}_4$  Solution.

14. Why can we safely preserve iron sulphate in a copper vessel whereas the same can't be safely preserved in zinc vessel?

**Ans.** Because copper is less reactive than iron so there is no reaction occur between iron sulphate and Cu but zinc is more reactive than Fe. So, it will displace iron from its sulphate solution.

15. What would you observe on adding zinc granules to freshly prepared ferrous sulphate solution? Give reason for your answer.

**Ans.** When zinc granules are added to freshly prepared ferrous sulphate solution, the colour of solution changes from pale green to colourless. This is because zinc being more reactive than iron, displaces iron from its sulphate solution.

