



## CHEMISTRY

### PHYSICAL, INORGANIC, AND ORGANIC CHEMISTRY

### QUALITATIVE ANALYSIS

#### INORGANIC CHEMISTRY(Qualitative analysis)

1.  $S_1$ : Silver iodide is fairly soluble in hypo solution.

$S_2$ : Heavy metal chloride like  $AgCl$ ,  $HgCl_2$  etc. also respond to Chromyl chloride test.

$S_3$ : Bromine reacts with  $KI$  liberating violet vapours of iodine.

$S_4$ : Diphenylamine reagent test is also given by nitrites chlorates, bromates, iodates, etc. in addition to  $NO_3^-$

A. *T T T F*

B. *T F T T*

C. *TTFF*

D. *FFTT*

**Answer: B**

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2. Three test tubes, *A*, *B*, *C*, contain  $Pb^{2+}$ ,  $Hg_2^{2+}$  and  $Ag^+$  ( but unknown ) . To each aqueous solution,  $NaOH$  is added in excess .

Following changes occur.

*A*: Black ppt, *B*: Brown ppt, *C*: White ppt but dissolves in excess of  $NaOH$

*A*, *B* and *C* contain respectively.

A.  $Pb^{2+}$ ,  $Hg_2^{2+}$ ,  $Ag^+$

B.  $Hg_2^{2+}$ ,  $Ag^+$ ,  $Pb^{2+}$

C.  $Ag^+$ ,  $Pb^{2+}$ ,  $Hg_2^{2+}$

D.  $Ag^+$ ,  $H_2^{2+}$ ,  $Pb_2^{2+}$

**Answer: B**

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3. Ammonium salts on heating with slaked lime liberates a colourless gas ( $X$ ). Identify the correct statement for gas ( $X$ ) and ammonium salt.

A. It turns red litmus blue and gives yellow ppt. with  $Na_3[Co(NO_2)_6]$

B. It turns filter paper moistened with mercurous nitrate black and gives intense blue coloured solution with  $CuSO_4(aq)$

C. It when passed through Nessler reagent produces a brown colour ppt.

D. All of these

**Answer: 4**

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4. A white powder when strongly heated gives off brown fumes. A solution of this powder gives a yellow ppt with a solution of KI. When a solution of barium chloride is added to a solution of powder, a white ppt results. This white powder may be :

A. A soluble sulphate

B.  $KBr$  or  $NaBr$

C.  $Ba(NO_3)_2$

D.  $AgNO_3$

**Answer: 4**



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5. Consider the following statements :

$S_1$  : A metal chloride on heating with an aqueous solution of  $K_2Cr_2O_7$  and central  $H_2SO_4$  produces deep red vapours.

$S_2$  : Lead nitrate dissolved in water responds to brown ring test.

$S_3$  : Deep red solution of ferric acetate on boiling with water turns to



brownishred solution.

$S_4$ :  $NaNO_2$  solution acidified with acetic acid produces blue colour with iodide solution and starch paste of these.

- A.  $S_1$ ,  $S_2$  and  $S_3$  are correct
- B.  $S_1$ ,  $S_3$  and  $S_4$  are incorrect
- C. Only  $S_3$  and  $S_4$  are in correct
- D. All are incorrect

**Answer: 1**



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6. Which one of the following statement is correct ?

- A. From a mixed precipitate of  $AgCl$  and  $AgI$  , ammonia solution dissolves only  $AgCl$  completely.
- B.  $I^-$  ions gives red precipitate with  $Hg_2^{2+}$  ions solution

C. On boiling a solution having  $Ca^{2+}$ ,  $K$  and  $HCO_3$  ions we get white precipitate.

D. (1) and (3) both

**Answer: 4**

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7. All nitrates on heating with conc.  $H_2SO_4$  in presence of paper pellet evolve  $NO_2$  gas. The function of the paper pellet is :

A. reduce  $HNO_3$  to  $N_2$

B. to reduce  $HNO_3$  to  $NO$

C. to reduce  $HNO_3$  to  $NO_2$

D. to reduce  $HNO_3$  to  $NH_3$

**Answer: 3**

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8.  $Na_2S + Na_2[Fe(CN)_5NO] \rightarrow Na_4[Fe(NH)_5nos]$ , oxidation number of Fe in reactant ( complex ) and product ( complex) are :

A. 2, 1

B. 2, 2

C. 2, 3

D. 3, 3

**Answer: B**

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9. A sodium salt on treatment with  $MgCl_2$  gives white precipitate only on heating. The anion of the sodium salt is :

A.  $HCO_3^-$

B.  $CO_3^{2-}$



**Answer: 1**



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10. A substance on treatment with dilute  $\text{H}_2\text{SO}_4$  liberates a colourless gas which produces (i) turbidity with baryta water and (ii) turns acidified dichromate solution green. The reaction indicates the presence of :

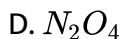
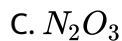
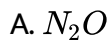


**Answer: C**



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11. Which of the following combines with  $Fe(II)$  ions to form a brown complex ?



**Answer: 2**



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12. Which of the following reagents can be used for making the distinction between  $AgCl$  and  $AgI$  ?

A. Sodium thiosulphate solution

B. Dilute ammonia solution

C. Potassium cyanide solution

D. Dilute  $HNO_3$

**Answer: B**



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13. A colourless solution of a compound gives a precipitate with  $AgNO_3$  solution but no precipitate with a solution of  $Na_2CO_3$ . The action of concentrated  $H_2SO_4$  on the compound liberates a suffocating reddish brown gas.

The compound is :

A.  $Ba(CH_3COO)_2$

B.  $CaCl_2$

C.  $NaI$

D.  $NaBr$

**Answer: 4**

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14.  $H_2S$  in the presence of  $HCl$  precipitates II group but not IV group because :

- A.  $HCl$  activates  $H_2S$
- B.  $HCl$  increases concentration of  $Cl^-$
- C.  $HCl$  decreases concentration of  $S^{2-}$
- D.  $HCl$  lowers the solubility of  $H_2S$  in solution

**Answer: 3**

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15. A metal chloride original solution (*i. e. O. S*) on mixing with  $K_2CrO_4$  solution gives a yellow precipitate soluble in aqueous sodium hydroxide.

The metal may be :

A. mercury

B. iron

C. silver

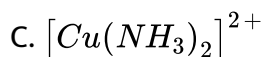
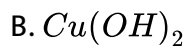
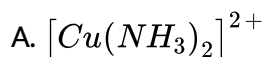
D. lead

**Answer: 4**



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16. When  $NH_4OH$  is added to copper sulphate solution, blue colour is obtained due to formation of





**Answer: 3**



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17. When  $NH_4Cl$  is added to a solution of  $NH_4OH$ :

- A. the dissociation of  $NH_4OH$  increases
- B. the concentration of  $OH^-$  increases.
- C. the concentration of both  $OH^-$  and  $NH_4^+$  increase
- D. the concentration of  $OH^-$  ion decreases.

**Answer: D**



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18. Turnbull's blue is a .....

- A. ferricyanide

B. ferrous ferricyanide

C. ferrous cyanide

D. ferri ferrocyanide

**Answer: 2**

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19.  $Fe(OH)_3$  and  $Cr(OH)_3$  precipitates can be completely separated by :

A. *Aq.  $NH_3$*

B. *HCl*

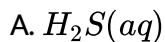
C. *NaOH /  $H_2O_2$*

D.  *$H_2SO_4$*

**Answer: 3**

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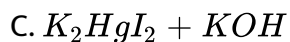
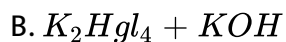
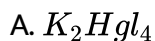
20.  $Cu^{2+}$  and  $Ag^+$  are both present in the same solution. To precipitate one of the ions and leave the other in solution, add

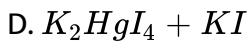


**Answer: B**

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21. Nessler's reagent is :



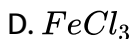


**Answer: 2**



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22. When sodium carbonate is added in excess to a metal chloride solution followed by the bromine water and then mixture is slightly heated , the solution turns apple green. The metal chloride is :



**Answer: B**



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23. Barium sulphate on fusion charcoal and sodium carbonate yields a compound ( $X$ ). ( $X$ ) on reaction with dilute HCl liberates a gas ( $Y$ ). The gas ( $Y$ ) can be identified by :

- A. blackening of filter paper moistened with lead acetate solution.
- B. turning the filter paper yellow moistened with cadmium acetate solution.
- C. turning the filter paper purple moistened with sodium nitroprusside made alkaline with ammonia solution
- D. all of these

**Answer: 4**

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24. Which of the following compound is formed in borax bead test ?

- A. Orthoborate

B. Metaborate

C. Double oxide

D. Tetraborate

**Answer: 2**



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**25.** A substance responds to the following test :

(a) It gives a green precipitate with ammonia solution which dissolves in excess reagent forming deep blue solution.

(b) it gives green precipitate with potassium cyanide solution which dissolves in excess reagent forming a yellow solution.

(c) It gives green a reddish – brown / brown – borax bead test in the oxidising flame.

The substance is :

A.  $Sr^{2+}$  salt

B.  $Ni^{2+}$  salts

C.  $Mn^{2+}$  salts

D.  $Zn^{2+}$  salts

**Answer: 2**

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26. An original solution of an inorganic salt in dilute  $HCl$  gives a brown colouration with potassium hexacyanidoferrate ( $III$ ) and reddish brown colouration with sodium acetate solution. The cation of the salt is :

A.  $Ni^{2+}$

B.  $Fe^{3+}$

C.  $Cu^{2+}$

D. none

**Answer: 2**

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27. Which of the following statements is / are correct ?

(I) White precipitate of  $Zn(OH)_2$  is soluble in excess ammonia and in solutions of ammonium salts.

(II) Yellow precipitate of barium chromate is soluble in dilute acetic acid as well as in mineral acids.

(III) Green precipitate of  $Ni(OH)_2$  is soluble in excess sodium hydroxide.

A. only (I)

B. only (I) and (II)

C. only (II) and (III)

D. all

**Answer: 1**



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28. Match the List -I (containing anions ) with List -II (containing reagent used in testing ) using the codes as given below in the column.

List – I

(anions)

(a)  $S^{2-}$

(b)  $NO_3^-$

(c)  $I^-$

(d)  $SO_4^{2-}$

List – II

(reagents)

(p) Barium chloride solution in presence of HCl

(q) Sodium nitroprusside

(r) chlorine water and chloroform

(s) iron(II) sulphate solution and conc.  $H_2SO_4$

Code :

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

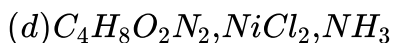
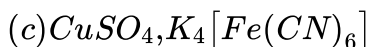
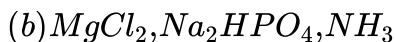
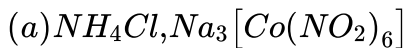
Answer: 1



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29. List-I contains the reactants and the List-II contains the particulars about the reaction products. Match the entries of List-I with the correct entries of the List-II using the codes as given below .

List – I



List – II

(p) Red complex

(q) Brown complex

(r) Yellow complex

(s) White crystalline compound

Code :

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

Answer: 1



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30. A substance ( $A$ ) is water insoluble. On bubbling  $Cl_2$  through its suspension in water, it produces a coloured aqueous solution, forming a single product, ( $A$ ) may be :

A.  $BiOCl$

B.  $CuCl$

C.  $Hg_2Cl_2$

D. All of these

Answer: 2



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31. A solution of a sodium salt gives yellow precipitate with both  $Pb^{2+}$  and  $Ag^+$  ions. Moreover, the acidified solution of sodium salt with  $KNO_2$  liberates a coloured gas which turns starch paper blue. The anion is :

A.  $I^-$

B.  $Br^-$

C.  $NO_3^-$

D.  $SO_3^{2-}$

**Answer: 1**

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**32.** Which of the following statements is incorrect ?

A. A filter paper moistened with cadmium acetate solution turns yellow, when brought in contact with  $H_2S$  gas.

B. Both carbonate ions as well as bicarbonate ions in the solutions, give reddish – brown precipitate with mercury (*II*) chloride.

C. Sulphites in presence of zinc, reacts with dilute  $H_2SO_4$  to liberate  $H_2S$  gas.

D. A filter paper moistened with  $KIO_3$  and starch turns blue in contact with  $SO_2$  vapours.

**Answer: 2**

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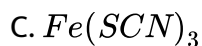
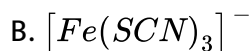
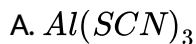
33. How do we differentiate between  $CO_3^{2-}$  and  $SO_3^{2-}$  in dilute  $H_2OSO_4$  group ? ( Note : These are sodium salts ?

- A. By passing gas liberated with dilute  $H_2SO_4$  through lime water.
- B. By passing gas liberated with dilute  $H_2SO_4$  through acidified  $K_2Cr_2O_7$  solution.
- C. By the addition of lead acetate solution in their aqueous solutions
- D. By the addition of silver nitrate solution in their aqueous solutions.

**Answer: 2**

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34. Ferric alum gives deep red colour with  $NH_4SCN$  due to the formation of :

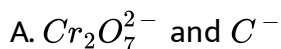


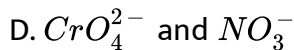
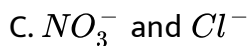
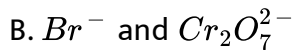
D. None of these

**Answer: 3**

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35. A mixture upon adding conc.  $H_2SO_4$  gives deep red fumes. It may contain the anions pair :





**Answer: 1**



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## PROBLEM

1.  $BaCl_2$  solution gives a white precipitate with a solution of a salt, which dissolves in dilute hydrochloric acid with the evolution of colourless, pungent smelling gas. The gas as well as the salt both are used as bleaching agent in the textile industries. The salt contains:

A. sulphite

B. sulphide

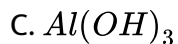
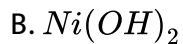
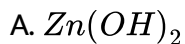
C. acetate

D. carbonate

**Answer: A**

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2. Which of the following precipitate(s) does /do not dissolve in excess of ammonia solution ?



D. B and C both

**Answer: C**

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3. Chocolate brown precipitate is formed with:

- A.  $Cu^{2+}$  ions and  $[Fe(CN)_6]^{3-}$
- B.  $Cu^{2+}$  ions and  $[Fe(CN)_6]^{4-}$
- C.  $Fe^{2+}$  ions and  $[Fe(CN)_6]^{4-}$
- D.  $Fe^{2+}$  ions and dimethylglyoxime

**Answer: B**



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4. Pink colour of acidified  $KMnO_4$  is decolourised but there is no evolution of any gas. This may happen with the compound containing the following acid radical.

- A.  $SO_3^{2-}$
- B.  $NO_2^-$
- C.  $S^{2-}$

D. All of these

**Answer: D**

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5. Which of the following gives a precipitate with  $Pb(NO_3)_2$ ?

A. Sodium chloride

B. Sodium acetate

C. Sodium nitrate

D. Disodium hydrogen phosphate

**Answer: A**

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6. Colour of cobalt chloride solution is:

A. pink

B. black

C. colourless

D. green

**Answer: A**

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7. A red colouration or precipitate is not obtained when:

A.  $Fe^{3+}$  reacts with potassium thiocyanate

B.  $Fe^{2+}$  reacts with dimethylglyoxime.

C.  $Hg^{2+}$  reacts with potassium iodide.

D. None

**Answer: D**

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8. When  $H_2S$  gas is passed through an ammonical salt solution  $X$ , a slightly white precipitate is formed. The  $X$  can be:

- A. a cobalt salt
- B. a lead salt
- C. a zinc salt
- D. a silver salt

**Answer: C**



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9. Consider the following statement:

$S_1$ :  $Cu^{2+}$  ions are reduced to  $Cu^+$  by potassium iodide and potassium cyanide both, when taken in excess

$S_2$ :  $H_2S$  will precipitate the sulphide of all the metals from the solutions of chlorides of  $Cu$ ,  $Zn$  and  $Cd$  if the solution is aqueous.

$S_3$ : The presence of magnesium is confirmed in qualitative analysis by the formation of a white crystal

$S_4$ : Calomel on reaction with potassium iodide gives red precipitate.

and arrange in the order of true/false.

A.  $\top FF$

B.  $TFTF$

C.  $TTTT$

D.  $TTTF$

**Answer: D**



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10. Statement-1 : Addition of  $NH_4OH$  to an aqueous solution of  $BaCl_2$  in presence of  $NH_4Cl$ (excess) precipitates  $Ba(OH)_2$ .

Statement-2:  $Ba(OH)_2$  is water soluble.

- A. Both Statement-1 and Statement-2 are true and Statement-2 is the correct explanation of Statement-1.
- B. Both Statement-1 and Statement-2 are true and Statement-2 is not correct explanation of Statement-1.
- C. Statement-1 is true but Statement-2 is false.
- D. Statement-1 is false but Statement-2 is true.

**Answer: D**

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**11.** Statement-1 : Sodium meta aluminate on boiling with ammonium chloride produces white gelatinous precipitate.

Statement-2 :Aluminium hydroxide is formed which is not soluble in water

- A. Both Statement-1 and Statement-2 are true and Statement-2 is the correct explanation of Statement-1.

- B. Both Statement-1 and Statement-2 are true and Statement-2 is not correct explanation of Statement-1.
- C. Statement-1 is true but Statement-2 is false.
- D. Statement-1 is false but Statement-2 is true.

**Answer: A**

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**12.** Which of the following statement(s) is (are) incorrect ?

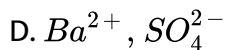
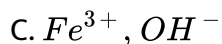
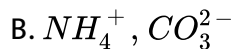
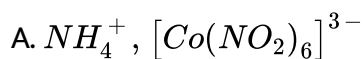
- A.  $Fe^{2+}$  ions give a dark blue precipitate with potassium hexacyanidoferrate (*III*) solution.
- B.  $Fe^{3+}$  ions give intense blue precipitate with potassium hexacyanidoferrate (*II*) solution.
- C.  $Fe^{3+}$  ions give a brown colouration with potassium hexacyanidoferrate (*III*) solution.

D.  $Fe^{2+}$  ions give a deep red colouration with ammonium thicyanate.

**Answer: D**

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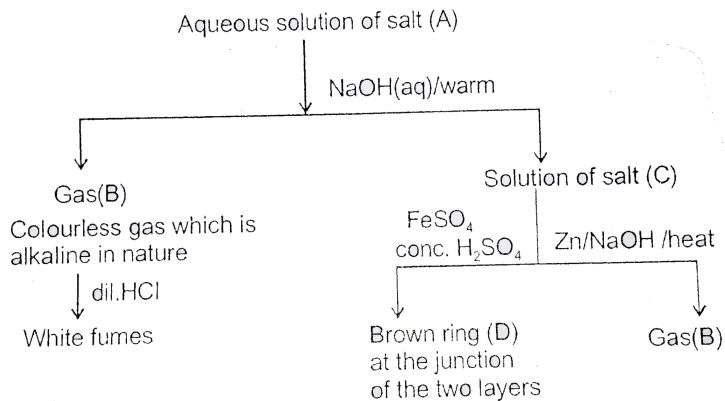
**13.** Which of the following pair (s) of ions would be expected to form precipitate when dilute solutions are mixed?



**Answer: A,C,D**

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14.

Salt(A) on heating gives a colourless neutral gas which supports combustion.

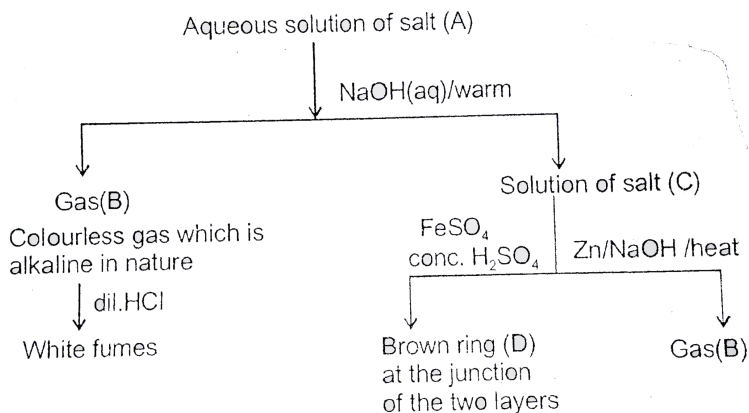
From the aforesaid, flow diagram, answer the following questions.

The compound (A) contains the following acid radical.



Answer: B

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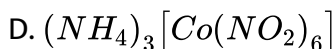
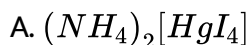


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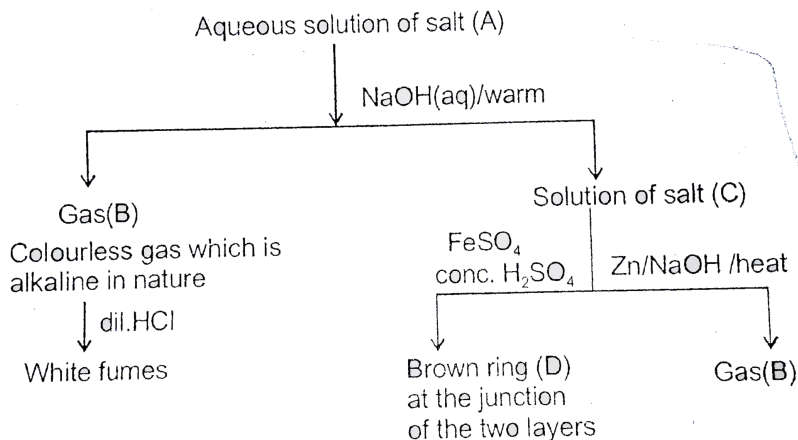
Salt(A) on heating gives a colourless neutral gas which supports combustion.

From the aforesaid, flow diagram, answer the following questions.

The basic radical of salt (A) and gas B both gives brown precipitate with Nessler's reagent. The composition of the brown precipitate is:



Answer: C



16.

Salt(A) on heating gives a colourless neutral gas which supports combustion.

From the aforesaid, flow diagram, answer the following questions.

Which of the following statement is correct ?

A. Salt (A) gives yellow precipitate with chloroplatinic acid as well as with sodium cobaltinitrite.

B. The brown ring is formed due to the formation of nitroso ferrous sulphate  $[Fe(NO)]^{2+} SO_4^-$ .

C. Salt *C* reacts with silver nitrate solution to form white precipitate.

D. (A) and (B) both.

**Answer: D**

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17. Magnesium is precipitated from its salt solution as only magnesium ammonium phosphate by adding disodium hydrogen phosphate solution in absence of ammonium chloride and aqueous ammonia.

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18. When a solution of nitrite acidified with dilute hydrochloric acid is treated with solid urea, the nitrile is decomposed, and nitrogen and carbon dioxide are evolved.

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19. Solution of alkali metal cyanide containing freshly prepared ion ( $II$ ) sulphate solution and dilute  $H_2SO_4$  on exposure to air produces prussian blue precipitate

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20. What happens when ?

(A) Aqueous solution of  $CrCl_3$  is added to ammonia solution.

(B) Ammonium carbonates reacts with  $MgCl_2$  (i) in absence of ammonium salts and (ii) in presence of ammonium salts:

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## Board level exercis

1. Give two examples of acid radicals detected with dilute  $H_2SO_4$ .

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2. Give two examples of acid radicals detected with concentrated  $H_2SO_4$ .

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3. Why a salt containing lead turns black in colour, when placed for a long time in laboratory?

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4.  $NO_2$  turns acidic  $KI$ -starch paper blue, why?

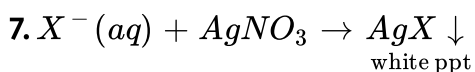
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5. Which acidic radical of dil.  $H_2SO_4$  group gives brown ring test?

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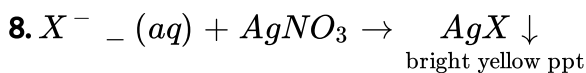
6. In acidic radical conc.  $H_2SO_4$  group which radical give's chromyl chloride test.

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White ppt of  $AgX$  dissolve in dil ammonia solution. Then  $X$  is

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Bright yellow ppt ( $AgX$ ) is insoluble in conc. ammonia solution. Then find out  $X$ .

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9. Which of the acidic radical gives canary yellow ppt in ammonium molybdate test.

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10. Salt + conc.  $H_2SO_4$  + Ethyl alcohol  $\xrightarrow{\Delta}$  Gas. Evolving gas (vapours) burns with green edged flame acidic radical may be.

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11. Basic radical which gives Nessler's reagent test in which brown precipitate or brown colouration obtained

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12. In salt solution when  $H_2S$  pass in presence of dil  $HCl$ , a orange color precipitate obtained. Radical & composition of precipitate will be



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13. In analysis of  $II^{nd}$  gp. A yellow ppt. is obtained which is insoluble in  $YAS$ . the radical may be.

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14. What is the group reagent of  $III^{rd}$  gp of basic radicals

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15. A white coloured carbonate which gives apple green color in the flame test. Give formula of that carbonate

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16. Name the three chlorides which are insoluble in dilute  $HCl$ . Name one chloride, which is soluble in hot water but insoluble in cold water.

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17. Both  $NO_2$  and  $Br_2$  are brown gases. How can they be identified if placed separately in two containers?

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18. Precipitation of second group sulphides in qualitative analysis is carried out with  $H_2S$  in presence of  $HCl$  and nitric acid. Why?

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19. When  $H_2S$  gas is passed through  $ZnCl_2$  solution.  $ZnS$  is not precipitated, why?



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20.  $HNO_3$  or  $H_2SO_4$  are not used to prepare solution for analysis of basic radicals.



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21. Hydrochloride acid contains  $Cl^-$  ions but it does not give positive chromyl chloride test, why?



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22. What happens when ?

(a) Copper sulphate is treated with excess of  $NH_4OH$

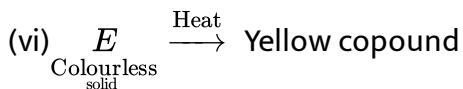
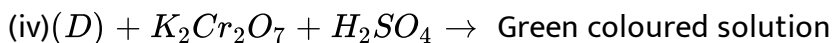
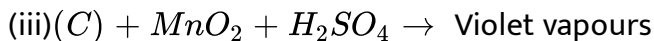
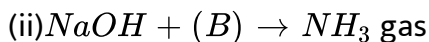
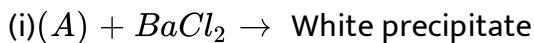
(b) Bismuth chloride is treated with sodium stannite solution in presence of  $NaOH$ .

(c) Stannous chloride is treated with mercuric chloride.



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23. Identify the unknown species and complete the following



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24. Give examples and explain with equations:

(a) Two colourless solutions give a black precipitate on mixing.

(b) Two colourless solutions give a red precipitate on mixing, soluble in excess of one of them.

(c) Two colourless solutions give a white precipitate on mixing, soluble in ammonium hydroxide.

(d) Two colourless solutions give a yellow precipitate on mixing.



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## EXERCISE 1 PART 1 QUALITATIVE ANALYSIS

1. What will happen if to a solution of  $Ca(HCO_3)_2$  formed by passing the carbon dioxide through a milky solution of  $CaCO_3$  for a longer time, ammonia solution is added?

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2. Write the names of the acidic radicals which can be tested by aqueous solution of barium chloride.

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3. Can we perform sodium nitroprusside test for sulphide, if sulphite is also present in sodium carbonate extract of sulphide?

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4. What will happen if to a white precipitate of  $BaSO_3$ , bromine water is added?

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5. A nitrite solution is added to a saturated solution of iron (*II*) acidified with dilute acetic acid or with dilute sulphuric acid. If any reactions occur then write the name and chemical composition of the product formed. Write also the chemical equations involved.

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6. What will happen? (Also write the chemical equations).

(a) When a filter paper moistened with potassium iodate and starch solution is brought in contact with sulphur dioxide gas.

(b) When  $H_2S$  gas is made to react with sodium tetrahydroxidoplumbate (*II*) solution.



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7. What happens when a sulphite reacts with dilute  $H_2SO_4$  in presence of zinc ?



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8. A compound containing acetate radical is made to react with neutral ferric chloride. The solution is then diluted with water and boiled for 1 – 2 minutes. A reddish brown precipitate is obtained. Give the chemical composition of reddish brown precipitate.



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9. In which reagents the  $AgCl$  precipitate is soluble?



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10. What will happen when free bromine, iodine and chlorine separately react with a yellow dye stuff, fluorescein?

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11. In which of the following reagents, the white precipitate of  $PbSO_4$  is soluble?

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12. Mercuric nitrate solution reacts with a soluble sulphate forming a yellow precipitate. If the statement is true then explain giving the complete balanced equation.

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13. Can we use  $Ba(NO_3)_2$  instead of  $BaCl_2$  for testing sulphate radical?

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## EXERCISE 1 PART 2 QUALITATIVE ANALYSIS

1. What is the formula of iodide of Millon's base?

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2. What happens when ammonia gas is passed into a solution of sodium cobaltinitrite ?

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3. When calomel reacts with ammonia solution, a black precipitate is formed. Write the chemical equation also name the reaction nature.

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4. What products are formed when precipitate formed by the reaction of  $Hg_2^{2+}$  ions and excess of sodium hydroxide solution is boiled?

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5. Why do lead salts turn black on keeping for a long time in the laboratory?

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6. Name one chloride which is soluble in hot water as well as in excess of  $HCl$ .

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7. Does mercuric sulphide dissolve in sodium sulphide solution (of  $2M$ )?

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8. What happens when white precipitate of  $Bi(OH)_3$  is boiled ?

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9. Why  $Na_2S$  cannot be used in place of  $H_2S$  (in presence of  $HCl$ ) as a reagent for  $II^{nd}$  group cations ?

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10. Is there any reaction other than cyanide reaction which can be used for the differentiation of  $Cu^{2+}$  and  $Cd^{2+}$  ions ?

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11. Which basic radical is tested with the help of alkaline sodium stannite?

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12. What happens when ammonium sulphide solution reacts with a solution containing a  $Cr(III)$  salt?

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13. Can  $Cr(III)$  salt be oxidised to  $Cr(VI)$  salt by potassium (or ammonium) peroxodisulphate ?

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14. Do  $Fe(III)$  salts and  $Fe(II)$  salts both give red colouration with dimethylglyoxime in ammonical solution. If not then which iron salt gives red colouration with dimethylglyoxime ?

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15. Which colour precipitate is formed by  $Fe(II)$  salt with potassium ferrocyanide, (i) in complete absence of air and (ii) under ordinary atmospheric condition ?

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16. Which basic radical(s) decolourize acidic  $KMnO_4$  ?

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17. Partial precipitation of  $Mn^{2+}$  as  $Mn(OH)_2$  occurs with ammonia solution but the precipitate is soluble in ammonium salts. Explain?

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18. What happens when  $Mn(II)$  ions free from chloride ions react with acidified solution of  $(NH_4)_2S_2O_8$  or  $K_2S_2O_8$  in presence of a few drops

of  $AgNO_3$  solution?

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19. Why  $Zn(II)$  salt is not precipitated as  $Zn(OH)_2$  by ammonia solution in the presence of excess of ammonium

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20. What will happen if the precipitation of  $V^{th}$  group cation by ammonium carbonate is carried out in neutral medium?

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21. What happens when ammonium sulphate solution is added to a solution containing both  $Sr^{2+}$  and  $Ca^{2+}$  ions?

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22. Which colour precipitate is obtained when a solution of  $Ca^{2+}$  ions reacts with potassium ferrocyanide.

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## EXERCISE 2

1. Salt +  $H_2SO_4$  (dilute)  $\rightarrow$  Coloured vapours which turns starch iodide paper blue. Identify the acid radical and the coloured vapours giving the relevant chemical equations.

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2. Which chloride of  $I^{st}$  group basic radicals turns black on treatment with  $NH_3$ ?

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3. Which basic radicals form *oxo*-cations in aqueous solutions ?

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4. Which radical of group  $IV^{th}$  gives bluish white / white precipitate with excess  $K_4[Fe(CN)_6]$ ?

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5. What products are formed ? When :

(i) Disodium hydrogen phosphate is added to magnesium sulphate in presence of ammonium chloride and aqueous ammonia.

(ii) A solution containing  $Zn^{2+}$  ions is poured in an aqueous ammonia.

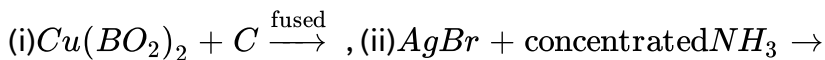
(iii)  $Bi(NO_3)_3$  solution is mixed with  $KI$  and then resulting precipitate is heated with water.

(iv) Disodium hydrogen phosphate is boiled with concentrated  $HNO_3$  and ammonium molybdate reagent.

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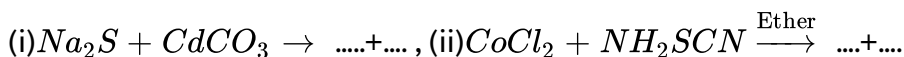


6. Complete and balance the following chemical reactions.



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7. Complete and balance the following reaction.



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8. A black coloured compound (*A*) on reaction with dilute  $H_2SO_4$  gives a gas (*B*) which on passing in a solution of an acid (*C*) gives a white turbidity (*D*). Gas (*B*) when passed in an acidified solution of a compound (*E*) gives a precipitate (*F*) soluble in dilute  $HNO_3$ . After boiling this solution when an excess of  $NH_4OH$  is added a intense blue coloured compound (*G*) is formed. To this solution on addition of acetic

acid and aqueous  $K_4[Fe(CN)_6]$  a chocolate brown precipitate ( $H$ ) is obtained. On addition of an aqueous solution of  $BaCl_2$  to an aqueous solution of ( $E$ ) a white precipitate insoluble in dilute  $HCl$  is obtained. Identify the compounds from ( $A$ ) to ( $H$ ).

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9. A compound ( $A$ ) is greenish crystalline salt, which gave the following reactions.

(i) Addition of  $BaCl_2$  solution to the solution of ( $A$ ) results in the formation of white precipitate ( $B$ ) which is insoluble in dilute  $HCl$ .

(ii) On heating ( $A$ ), water vapours and two oxides of sulphur ( $C$ ) and ( $D$ ) are liberated leaving a red brown residue ( $E$ ).

(iii) ( $E$ ) dissolves in warm concentrated  $HCl$  to give a yellow solution ( $F$ )

(iv) Solution ( $F$ ) on treatment with thiocyanate ions gives blood red coloured compound ( $G$ ).

Identify the compounds from ( $A$ ) to ( $G$ ).

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10. A white substance ( $A$ ) reacts with dilute  $H_2SO_4$  to produce a colourless gas ( $B$ ) and a colourless solution ( $C$ ). The reaction between ( $B$ ) and acidified  $K_2Cr_2O_7$  solution produces a green solution and a slightly coloured precipitate ( $D$ ). The substance ( $D$ ) burns in air to produce a gas ( $E$ ) which reacts with ( $B$ ) to yield ( $D$ ) and a colourless liquid. Anhydrous copper sulphate is turned blue on addition of this colourless liquid. Addition of aqueous  $NH_3$  or  $NaOH$  to ( $C$ ) produces first a white precipitate which dissolves in the excess of the respective reagent to produce a clear solution in each case. Identify ( $A$ ), ( $B$ ), ( $C$ ), ( $D$ ) and ( $E$ ).



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11. A mixture of two salts was treated as follows.

(i) The mixture was heated with precipitated  $MnO_2$  and concentrated  $H_2SO_4$  when a yellowish green gas was liberated.

(ii) The mixture on heating with  $NaOH$  solution gave a gas which turned

red litmus blue.

(iii) Its solution in water gave red colouration with dimethylglyoxime in alkaline solution and white precipitate with  $K_4[Fe(CN)_6]$  in absence of air.

(iv) The mixture was boiled with  $KOH$  and the liberated gas was bubbled through an alkaline solution of  $K_2HgI_4$  to give a brown precipitate.

Identify the ions present in the mixture.



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12. (i) An aqueous solution of a compound (A) is acidic towards litmus and (A) sublimes at about  $300^\circ C$ .

(ii) (A) on treatment with an excess of  $NH_4SCN$  gives a red coloured compound (B) and on treatment with a solution of  $K_4[Fe(CN)_6]$  gives a blue coloured compound (C).

(iii) (A) on heating with excess of  $K_2Cr_2O_7$  in the presence of concentrated  $H_2SO_4$  evolves deep red vapours of (D).

(iv) On passing the vapour of (D) into a solution of NaOH and then adding the solution of acetic acid and lead acetate, a yellow precipitate of

compound (E) is obtained.

Identify (A) to (E) and give chemical equations for the reactions.

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13. (i) A blue coloured compound (*A*) on heating gives two products (*B*) & (*C*).

(ii) A metal (*D*) is deposited on passing hydrogen through heated (*B*).

(iii) The solution of (*B*) in *HCl* on treatment with the  $[Fe(CN)_6]^{4-}$  gives a chocolate brown coloured precipitate of compound (*E*).

(iv) (*C*) turns lime water milky which disappears on continuous passage of (*C*) forming a compound (*F*).

Identify (*A*) to (*F*) and give chemical equations for the reactions at step (i) to (iv).

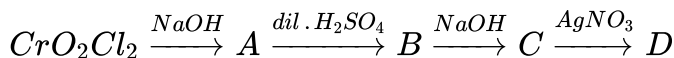
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14. Why in cobalt nitrate test for aluminium salts, excess of cobalt nitrate should not be added ?



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15. In the reaction sequence:



Identify [A] to [D].



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16. What happens when ?

(a) To a  $Zn^{2+}$  ions solution faintly acidified with  $2M$  acetic acid,  $0.1mL$  of  $0.25M CuSO_4$  solution and  $2mL$  of ammonium tetrathiocyanatomercurate (II) reagents is added.

(b) The above test is performed in absence of  $CuSO_4$  solution.



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### EXERCISE 3

1. A mixture consists (*A*) (red solid) and (*B*) (colourless solid) which gives lilac colour in flame.

(a) Mixture gives black precipitate (*C*) on passing  $H_2S(g)$ .

(b) (*C*) is soluble in aquaregia and on evaporation of aquaregia and adding  $SnCl_2$  gives greyish black precipitate (*D*).

The salt solution with  $NH_4OH$  gives a brown precipitate.

(i) The sodium extract of the salt with  $CCl_4 / FeCl_3$  gives a violent layer.

(ii) The sodium extract gives yellow precipitate with  $AgNO_3$  solution which is insoluble in dilute ammonia solution.

Identify (*A*) and (*B*), and the precipitates (*C*) and (*D*).



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2. A sodium salt on treatment with  $MgCl_2$  gives white precipitate only on heating. The anion of sodium salt is



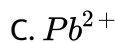
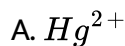


**Answer: A**



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3. A metal nitrate reacts with  $KI$  to give a black precipitate which on addition of excess of  $KI$  is converted into orange colour solution. The cation of the metal nitrate is :



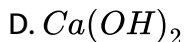
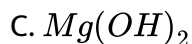
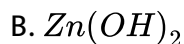
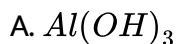
**Answer: B**



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4. A white precipitate is obtained when a solution is diluted with  $H_2O$  and boiled. On addition of excess  $NH_4Cl/NH_4OH$ , the volume of precipitate decreases leaving behind a white gelatinous precipitate. Identify the precipitate which dissolves in ammonia solution or  $NH_4Cl$

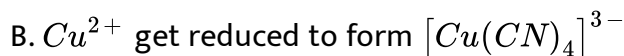
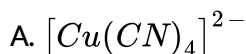


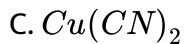
**Answer: B**



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5. In blue solution of copper sulphate excess of  $KCN$  is added then solution becomes colourless due to the formation of :

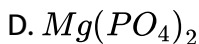
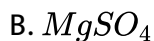
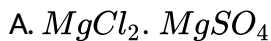




**Answer: B**

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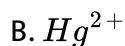
6.  $MgSO_4 + NH_4OH + Na_2HPO_4 \rightarrow$  white crystalline precipitate. The formula of crystalline precipitate is:



**Answer: C**

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7. A solution of a metal ion when treated with  $KI$  gives a red precipitate which dissolves in excess  $KI$  to give a colourless solution. Moreover, the solution of metal ion on treatment with a solution of cobalt ( $II$ ) thiocyanate gives rise to a deep blue crystalline precipitate. The metal ion is:



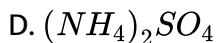
**Answer: B**



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8. A solution of colourless salt  $H$  on boiling with excess  $NaOH$  produces a nonflammable gas. The gas evolution ceases after some time. Upon

addition of  $Zn$  dust to the same solution, the gas evolution restarts. The colourless salt(s)  $H$  is (are) :



**Answer: A,B**

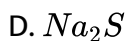
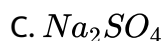
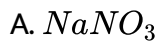


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9. *p*-Amino-*N*, *N*-dimethylaniline is added to a strongly acidic solution of *X*. The resulting solution is treated with few drops of aqueous solution of *Y* to yield blue colouration due to the formation of methylene blue. Treatment of the aqueous solution of *Y* with the reagent potassium hexacyanoferrate(II) leads to the formation of an intense blue precipitate. The precipitate dissolves on excess addition of the reagent. Similarly, treatment of the solution of *Y* with the solution of

potassium hexacyanoferrate(*III*) leads to a brown coloration due to the formation of *Z*.

The compound *X* is:



**Answer: C**

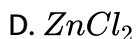
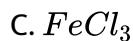
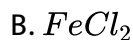
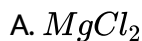


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reagent. Similarly, treatment of the solution of  $Y$  with the solution of potassium hexacyanoferrate(*III*) leads to a brown coloration due to the formation of  $Z$ .

The compound  $Y$  is :



**Answer: C**

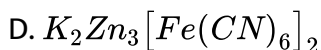
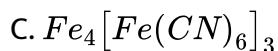
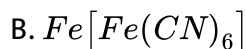
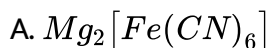


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precipitate. The precipitate dissolves on excess addition of the reagent. Similarly, treatment of the solution of  $Y$  with the solution of potassium hexacyanoferrate( $III$ ) leads to a brown coloration due to the formation of  $Z$ .

The compound  $Z$  is:



**Answer: B**



[View Text Solution](#)

12. When a metal rod  $M$  is dipped into an aqueous colourless concentrated solution of compound  $N$  the solution turns light blue. Addition of aqueous  $NaCl$  to the blue solution gives a white precipitate  $O$ . Addition of aqueous  $NH_3$  dissolves  $O$  and gives an intense

blue solution.

The metal rod  $M$  is :

A.  $Fe$

B.  $Cu$

C.  $Ni$

D.  $Co$

**Answer: B**

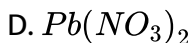
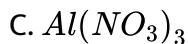
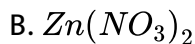
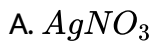


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The compound  $N$  is :



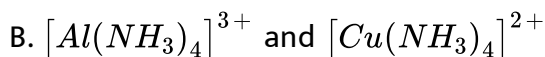
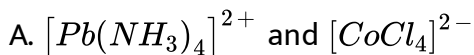


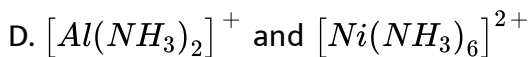
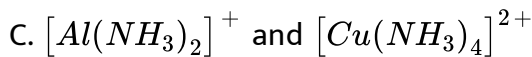
**Answer: A**

 [View Text Solution](#)

14. When a metal rod  $M$  is dipped into an aqueous colourless concentrated solution of compound  $N$  the solution turns light blue. Addition of aqueous  $NaCl$  to the blue solution gives a white precipitate  $O$ . Addition of aqueous  $NH_3$  dissolves  $O$  and gives an intense blue solution.

The final solution contains

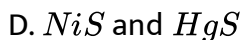
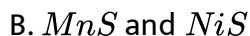
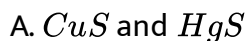




**Answer: C**

 [View Text Solution](#)

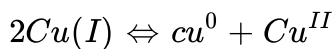
15. Passing  $H_2S$  gas into a mixture of  $Mn^{2+}$ ,  $Ni^{2+}$ ,  $Cu^{2+}$  and  $Hg^{2+}$  ions in an acidified aqueous solution precipitates:



**Answer: A**

 [View Text Solution](#)

## 16. The equilibrium



in aqueous medium at  $25^\circ C$  shifts towards the left in the presence of :

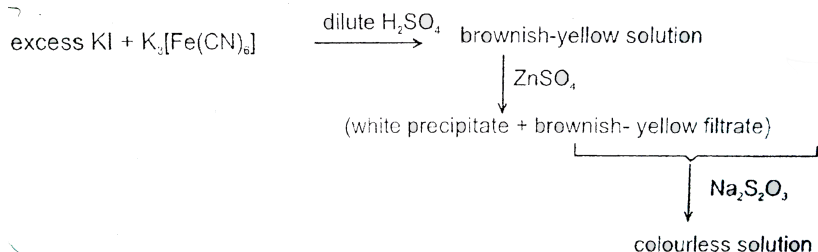
- A.  $NO_3^-$
- B.  $Cl^-$
- C.  $SCN^-$
- D.  $CN^-$

**Answer: B,C,D**



**View Text Solution**

## 17. For the given aqueous reaction which of the statement(s) is (are) true?



A. The first reaction is a redox reaction

B. White precipitate is  $Zn_3[Fe(CN)_6]_2$

C. Addition of filtrate to starch solution gives a blue colour.

D. White precipitate is soluble in  $NaOH$  solution

**Answer: A,C,D**

 [View Text Solution](#)

**18.** Concentrated nitric acid, upon long standing, turns yellow-brown due to the formation of:

A.  $NO$

B.  $NO_2$

C.  $N_2O$

D.  $N_2O_4$

**Answer: B**

 [View Text Solution](#)

19. Upon treatment with ammoniacal  $H_2S$ , the metal ion that precipitates as a sulfide is:

A.  $Fe(III)$

B.  $Al(III)$

C.  $Mg(II)$

D.  $Zn(II)$

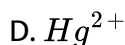
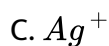
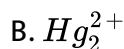
**Answer: D**

 [View Text Solution](#)

20. An aqueous solution of a mixture of two inorganic salts, when treated with dilute  $HCl$ , gave a precipitate ( $P$ ) and a filtrate ( $Q$ ). The precipitate  $P$  was found to dissolve in hot water. The filtrate ( $Q$ ) remained unchanged, when treated with  $H_2S$  in a dilute mineral acid medium.

However, it gave a precipitate ( $R$ ) with  $H_2S$  in an ammoniacal medium. The precipitate  $R$  gave a coloured solution ( $S$ ), when treated with  $H_2O_2$  in an aqueous  $NaOH$  medium.

The precipitate  $P$  contains



**Answer: A**

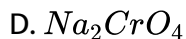
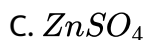
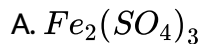


[View Text Solution](#)

21. An aqueous solution of a mixture of two inorganic salts, when treated with dilute  $HCl$ , gave a precipitate ( $P$ ) and a filtrate ( $Q$ ). The precipitate  $P$  was found to dissolve in hot water. The filtrate ( $Q$ ) remained unchanged, when treated with  $H_2S$  in a dilute mineral acid medium. However, it gave a precipitate ( $R$ ) with  $H_2S$  in an ammoniacal

medium. The precipitate  $R$  gave a coloured solution ( $S$ ), when treated with  $H_2O_2$  in an aqueous  $NaOH$  medium.

The coloured solution  $S$  contains



**Answer: D**



[View Text Solution](#)

22. Which one of the following statement is correct?

A. From a mixed precipitate of  $AgCl$  and  $AgI$ , ammonia solution dissolves only  $AgCl$

B. Ferric ions gave a deep green precipitate on adding potassium ferrocyanide solution.

C. On boiling a solution having  $K^+$ ,  $Ca^{2+}$  and  $HCO_3^-$  ions we get a precipitate of  $K_2Ca(CO_3)_2$

D. Manganese salts give a violet borax bead test in the reducing flame

**Answer: 1**

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**ALP**

1. A red solid is insoluble in water. However it becomes soluble if some  $KI$  is added to water. Heating the red solid in a test tube results in liberation of some violet coloured fumes and droplets of a metal appear on the cooler parts of the test tube. The red solid is :

A.  $(NH_4)_2Cr_2O_7$



B.  $HgI_2$

C.  $HgO$

D.  $Pb_3O_4$

**Answer: 2**

 [View Text Solution](#)

2. When a salt is heated with dilute  $H_2SO_4$  and  $KMnO_4$  solution, the pink colour of  $KMnO_4$  is discharged, the salt is:

A. a sulphite

B. a carbonate

C. a nitrate

D. a bicarbonate

**Answer: A**

 [View Text Solution](#)

3. Solution of a salt in dilute  $H_2SO_4$  or acetic acid produces deep blue colour with starch iodide solution. The salt contains:



**Answer: D**



[View Text Solution](#)

4. A test tube containing a nitrate and another containing a bromide and  $MnO_2$  are treated with concentrated  $H_2SO_4$ . The reddish brown fumes evolved are passed through water. The water will be coloured by :

A. the nitrate

B. the bromide

C. both

D. none of the two

**Answer: B**



[View Text Solution](#)

5. An inorganic salt when heated with concentrated  $H_2SO_4$  evolves a colourless pungent smelling gas but with concentrated  $H_2SO_4$  and  $MnO_2$  evolves a coloured pungent smelling gas which bleaches moist litmus paper. The coloured gas is:

A.  $NO_2$

B.  $Cl_2$

C.  $Br_2$

D.  $I_2$

**Answer: B**



[View Text Solution](#)

6. Chromyl chloride vapours are dissolved in water and acetic acid and barium acetate solution is added then:

- A. the solution will remain colourless
- B. the solution will become dark green
- C. a yellow solution will be obtained
- D. a yellow precipitate will be obtained

**Answer: D**



[View Text Solution](#)

7. When  $CS_2$  layer containing both  $Br_2$  and  $I_2(2:1)$  is shaken with excess of chlorine ( $Cl_2$ ) water, the violet colour due to  $I_2$  disappears and a pale

yellow colour appears in the solution. The disappearance of violet colour and appearance of pale yellow colour is due to the formation of:

- A.  $I_3^-$  and  $Br_2$  respectively
- B.  $HIO_3$  and  $BrCl$  respectively
- C.  $ICl$  and  $BrCl$  respectively
- D.  $I^-$  and  $Br^-$  respectively

**Answer: B**



[View Text Solution](#)

8. A metal salt solution gives a yellow precipitate with silver nitrate. The precipitate dissolves in dilute nitric acid as well as in dilute ammonia solution. The solution contains :

- A. bromide ions
- B. iodide ions
- C. phosphate ions

D. chromate ions

Answer: C

 [View Text Solution](#)

9. Which of the following will not give positive chromyl chloride test ?

A. Copper chloride,  $CuCl_2$

B. Mercuric chloride,  $HgCl_2$

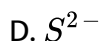
C. Zinc chloride,  $ZnCl_2$

D. Anilinium chloride  $C_6H_5NH_3Cl$

Answer: B

 [View Text Solution](#)

10. A white sodium salt dissolves in water to give a solution which is neutral to litmus. When silver nitrate solution is added to the solution, a white precipitate is obtained which does not dissolve in dilute  $HNO_3$ . The anion is



**Answer: B**



[View Text Solution](#)

11. A one litre flask is full of reddish brown bromine fumes. The intensity of brown colour of vapour will not decrease appreciably on adding to the flask some:

- A. pieces of marble
- B. animal charcoal powder
- C. carbon tetrachloride
- D. carbonisulphide

**Answer: A**

 [View Text Solution](#)

**12.** Identify the compound which turns black with ammonia solution.

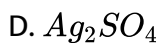
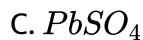
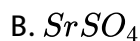
- A. Lead chloride
- B. Mercurous chloride
- C. Mercuric chloride
- D. Silver chloride

**Answer: B**

 [View Text Solution](#)



13. A white crystalline substance dissolves in water. On passing  $H_2S$  in this solution, a black precipitate is obtained. The black precipitate dissolves completely in hot  $HNO_3$ . On adding a few drops of concentrated  $H_2SO_4$ , a white precipitate is obtained which is soluble in ammonium acetate. The white precipitate is that of ,

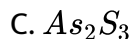
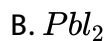


**Answer: C**



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14. The composition of golden spangles is:



**Answer: B**

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15. Select the incorrect statement(s).

A. Ammonium ions produce yellow colour solution with sodium hexanitrito-*N*-cobaltate (*III*).

B. Ammonia gas develops a brown colour on filter paper moistened with a solution of  $MnCl_2$  and  $H_2O_2$

C. Ammonium ions produce white precipitate with saturated sodium hydrogen tartrate solution.

D. Ammonium salts in presence of sodium hydroxide solution produces red precipitate with 4-nitrobenzene diazonium chloride reagent.

**Answer: A,D**

 [View Text Solution](#)

16. Original solution of salt or mixture should not be prepared in concentrated  $HNO_3$  because it:

A. is highly corrosive

B. oxidises  $H_2S$  to  $S$  in  $II^{nd}$  group.

C. undergoes disproportionation reaction

D. converts sulphide of  $Ba$ ,  $Sr$  and  $Pb$  into insoluble sulphates

**Answer: B,D**

 [View Text Solution](#)

17. White precipitate of  $PbSO_4$  gets dissolved in:

A. concentrated  $H_2SO_4$  on heating

B. concentrated  $NaOH$

C.  $(NH_4)_2CO_3$

D. Dilute  $HNO_3$

**Answer: A,B**



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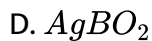
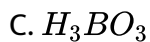
18. What final product(s) is/are formed in the following series of reactions

?

Concentrated borax solution + silver nitrate solution  $\rightarrow$  Precipitate

$\xrightarrow[\text{boiling}]{H_2O}$  Products (final)

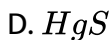
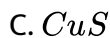
A.  $Ag_3BO_3$



**Answer: B,C**

 [View Text Solution](#)

**19.** Which of the following sulphides do not dissolve in 50%  $HNO_3$  but dissolve in aquaregia ?



**Answer: A,B,D**

 [View Text Solution](#)

20. Which of the following statement(s) is/are correct ?

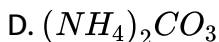
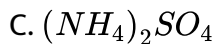
- A. Yellow precipitated of silver arsenite is soluble in both nitric acid and ammonia
- B. Potassium cyanide when added in very small quantity to copper sulphate solution, produces first yellow precipitate which quickly converts in to white precipitate.
- C. Black precipitate of  $BiI_3$  turns orange on heating with water.
- D. White precipitate of  $Bi(OH)_3$  turns yellowish brown, when boiled.

Answer: A,B,C



[View Text Solution](#)

21. The following can be used to regulate the concentration of  $OH^-$  ions for the scheme of basic radical analysis (*III* group)



**Answer: A,B**

 [View Text Solution](#)

**22. Select the correct statement(s)**

A. In group III,  $Fe^{3+}$  and  $Cr^{3+}$  can be differentiated by increasing

$NH_4^+$  ion concentration

B. In  $V^{th}$ ,  $Na_2CO_3$  is added to precipitate out only the carbonates of

$Ba^{2+}$ ,  $Sr^{2+}$  and  $Ca^{2+}$

C. Like brown ring test, diphenylamine test is given only by salts

containing  $NO_3^-$

D. Sodium chloride on heating with aqueous solution of  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$  produces deep vapour

**Answer: A**

 [View Text Solution](#)

**23.** Which of the following statement(s) is/are not correct?

- A. Nickel salts give rosy red precipitate with dimethyl glyoxime in excess of  $NH_4OH$
- B.  $Fe(III)$  salts give red colour with potassium sulphocyanide
- C. In nitroprusside the iron and  $NO$  exists as  $Fe(III)$  and  $NO$
- D.  $Mn(II)$  salts give white precipitate with  $NaOH$  which turns brown on adding  $Br_2$  water.

**Answer: C**

 [View Text Solution](#)



24. Which of the following will give the same colour in oxidising flame as well as in the reducing flame in borax be test (when cold) ?

- A. Chromium
- B. Copper
- C. Cobalt
- D. Nickel

**Answer: A,C**



[View Text Solution](#)

25.  $Ni + H_2SO_4$  (hot and concentrated)  $\rightarrow X(g)$

The liberated gas (select the correct statement)

- A. develops blue colour spots on the filter paper moistened with potassium iodate and starch solution

B. turns acidified  $K_2Cr_2O_7$  solution green

C. produces black precipitate with lead acetate solution

D. reacts with  $Cl_2$  water to produce an acid which gives white fumes with ammonia.

**Answer: A,B,D**

 [View Text Solution](#)

26.  $Co^{2+} + KCN$  (not in excess)  $\rightarrow$  precipitate.

Select the correct statement(s) with respect to the precipitate.

A. It is yellow in colour

B. It is reddish-brown in colour

C. It dissolves in excess of the reagent forming a brown solution

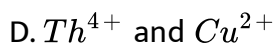
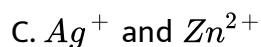
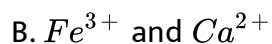
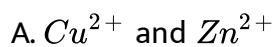
D. It is obtained when brown solution (option C) is acidified with dilute  $HCl$  in the cold.

**Answer: B,C,D**



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**27. Potassium ferrocyanide is used for testing**



**Answer: A,B,C,D**



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**28. Which of the following statements is/are correct ?**

- A. An aqueous solution of  $Co(II)$  thiocyanate (10% freshly prepared) and mercuric nitrate solution taken in equal volumes on stirring the wall of the vessel with a glass rod produce deep-blue precipitate.
- B. White precipitate of  $Al(OH)_3$  is soluble in sodium hydroxide as well as in ammonia solution
- C. Green precipitate of  $Cr(OH)_3$  readily dissolves in excess of sodium hydroxide forming a green solution
- D. Chromium (III) salts give green coloured borax bead in both oxidising and reducing flame.

**Answer: A,C,D**



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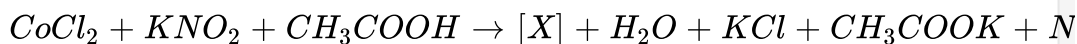
29. Which of the following imparts green/apple green colour to the Bunsen flame ?

- A. Calcium chloride
- B. Volatile boron trifluoride
- C. Barium chloride
- D. Ethyl borate

**Answer: B,C,D**

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**30.**



(Unbalanced equation)

- A.  $X$  is a yellow crystalline solid insoluble in water.
- B.  $X$  is a green coloured compounds known as kinman's green
- C. *IUPAC* name of  $X$  is potassium hexanitrito-*N*-cobaltate (II)
- D. The compound  $X$  is an inner orbital complex.

**Answer: A,D**

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**31.** How many of the following salts impart characteristic colours to the Bunsen flame ?

$NaCl$ ,  $KCl$ ,  $CuCl_2$ ,  $BaCl_2$ ,  $CaCl_2$ ,  $SrCl_2$ ,  $ZnCl_2$ ,  $MgCl_2$ ,  $AlCl_3$

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**32.** How many of the following liberate coloured vapour/gas with concentrated  $H_2SO_4$ ?

$KCl(s)$  +  $K_2Cr_2O_7(s)$ ,  $KNO_2(s)$ ,  $KI(s)$ ,  $KBr(s)$ ,  $KCl(s)$

$KBr(s)$  +  $MnO_2(s)$ ,  $KNO_3$ ,  $KCl(s)$  +  $MnO_2$ ,  $K_2SO_3$

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33. How many of the following pairs of ions can be separated by  $H_2S$  in dilute  $HCl$ ?

$Bi^{3+}$  and  $Sn^{4+}$ ,  $Al^{3+}$  and  $Hg^{2+}$ ,  $Cd^{2+}$  and  $Zn^{2+}$ ,  $Fe^{3+}$  and  $Cu^{2+}$ ,  $As^{3+}$  and  $Sb^{3+}$

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34. Amongst the following, the total number of compounds soluble in concentrated  $NH_3$  solution is:

(A)  $Ag_2CrO_4$  , (B)  $Cu(OH)_2 \cdot CuSO_4$  , ( C)  $PbSO_3$  , (D)  $Al(OH)_3$  , (E)  $Ni(OH)_2$   
(F)  $Zn_3(PO_4)_2$  , (G)  $BaSO_4$  , (H)  $Bi(OH)_2NO_3$  , (I)  $Mn(OH)_2$

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35. An alcoholic solution of dimethylglyoxime is added to an aqueous solution of nickel(II) chloride. Slow addition of ammonium hydroxide led to the precipitation of a bright-red coloured metal complex.

Find out the number of hydrogen bonds present in the structure of the complex.

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36.  $Fe^{2+}(aq) + NO_3^-(aq) + H_2SO_4(conc.) \rightarrow$  Brown ring

The brown ring is due to the formation of complex,  $[Fe(H_2O)_5NO]SO_4$ .

What is the oxidation state of iron in the complex ?

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37. An aqueous solution contains  $Hg^{2+}$ ,  $Hg_2^{2+}$ ,  $Pb^{2+}$ ,  $Ag^+$ ,  $Bi_{3+}$  and  $Cd^{2+}$ . Out of these, how many ions will produce white precipitate with dilute  $HCl$  ?

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38. What happens when 4-nitrobenzene diazonium chloride reagent reacts with an ammonium salt in the presence of sodium hydroxide solution?

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39. (i) A black coloured compound ( $B$ ) is formed on passing  $H_2S$  through the solution of a compound ( $A$ ) in  $NH_4OH$

(ii) ( $B$ ) on treatment with  $HCl$  and potassium chlorate or aquaregia gives ( $A$ )

(iii) ( $A$ ) on treatment with  $KCN$  gives a buff/reddish-brown coloured precipitate which dissolves in excess of this reagent forming a compound ( $C$ ).

(iv) The compound ( $C$ ) is changed into a compound ( $D$ ) when its aqueous solution is boiled in air.

(v) The solution of ( $A$ ) was treated with excess of  $NaHCO_3$  & then with bromine water. On cooling & shaking for some time, a green colour of compound ( $E$ ) is formed. No change is observed on heating.

Identify ( $A$ ) to ( $E$ ) and give chemical equations.

## Miscellaneous Solved Problems (MSPs)

1. Pink colour of acidified  $KMnO_4$  is decolourised but there is no evolution of any gas. This may happen with the compound containing the following acid radical.



D. All of these

**Answer: D**

2. Which of the following gives a precipitate with  $Pb(NO_3)_2$  but not with  $Ba(NO_3)_2$  ?

- A. Sodium chloride
- B. Sodium acetate
- C. Sodium nitrate
- D. Disodium hydrogen phosphate

**Answer: A**



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3. When  $H_2S$  gas is passed through an ammonical salt solution X, a slightly white precipitate is formed. The X can be :

- A. a cobalt salt
- B. a lead salt
- C. a zinc salt

D. a silver salt

**Answer: C**



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4. Which anion does not liberate any gas with dilute as well as conc.  $H_2SO_4$ .



**Answer: D**



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5. A salt having  $BO_3^{3-}$  on burning with alcohol and conc.  $H_2SO_4$  gives, which colour edge flame.

- A. green
- B. yellow
- C. red
- D. white

**Answer: A**



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6. When solution of KCl, KF and KBr are treated with  $I_2$  ?

- A.  $Cl_2$  and  $Br_2$  are evolved
- B.  $Cl_2$  is evolved
- C.  $Cl_2$ ,  $F_2$  and  $Br_2$  are evolved
- D. None of these

**Answer: D**

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7. A mixture when rubbed with organic acid smells like vinegar. It contains

:

A. Sulphate

B. Nitrate

C. Nitrite

D. Acetate

**Answer: D**

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8. Nitrate & Nitrite both give brown ring test, can be distinguish by -

A.  $HOSO_2NH_2$  (Sulphonic acid)

B.  $NH_2HgO.Hgl$  ("Million base")

C.  $FeSO_4$

D. None

**Answer: A**

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9. Which reagent is used to remove  $SO_4^{2-}$  or  $Cl^-$  from water ?

A. NaOH

B.  $Pb(NO_3)_2$

C.  $BaSO_4$

D. KOH

**Answer: B**

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10. Which of the following statements is/are correct for chromyl chloride test ?

- A. Formation of chromyl chloride vapour
- B. Liberation of chlorine gas
- C. Formation of lead chromate
- D. Formation of reddish-brown vapour

**Answer: A::C::D**



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11. Which of the following statements are incorrect ?

- A. In thiourea test for nitrite, a green coloured solution is obtained.
- B. It is not necessary to carried out the chromyl chloride test in a dry test tube.



C. Suspension of  $CdCO_3$  gives black precipitate with  $Na_2S$  solution.

D. In  $PbNO_3$ , the brown ring test can be performed with its water extract.

**Answer: A::B::C::D**

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12. Conc.  $H_2SO_4$  will not give any gas with :

A.  $ZnSO_4$

B.  $Ba_3(PO_4)_2$

C.  $Mg_3(BO_2)_2$

D.  $NaNO_3$

**Answer: A::B::C**

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13. Why does only the organic layer assure colour and not the aqueous layer when the tests for halides are done ?

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14. What will happen when free bromine, iodine and chlorine separately react with a yellow dye stuff, fluorescein ?

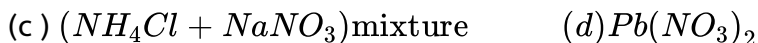
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## Exercise-1

1. What is importance of dry tests and it is applicable to which kind of substances ?

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2. Give the observation when each of the following is heated in a dry test tube. Also give balanced equations :



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3. Why compounds shows colours in flame test ?

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4. Is intensity of colour in flame test, depends upon the concentration of metal present ?

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5. Why is a green flame not obtained in the case of barium sulphate or barium phosphate ?

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6. colourless salt (A)  $\xrightarrow[740^{\circ}C]{\Delta}$  (B) + (C)  $\xrightarrow[Cu^{2+}, \Delta]{\Delta}$  blue coloured bead (D)

Identify the compound (A),(B),(C) and (D).

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7. Why is sodium carbonate extract acidified before performing the confirmatory test for anions ?

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8. Can sodium carbonate extract be used test for  $CO_3^{2-}$  ions ?

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9. What will happen if a solution of  $Ca(HCO_3)_2$ , formed by passing the carbon dioxide through a milky solution of  $CaCO_3$  for a longer time if, ammonia solution is added ?

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10. What will happen if bromine water is added in a white precipitate of  $BaSO_3$  ?

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11. Salt (A) + lime water  $\rightarrow$  white precipitate  $\downarrow$

white precipitate + prolong passage of gas (B)  $\rightarrow$  it forms soluble salt (C), gas (B) has burning sulphur smell Identify the anion of salt (A) and (C).

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12. What will happen ? (Also write the chemical equations).

(a) When a filter paper moistened with potassium iodate and starch solution is brought in contact with sulphur dioxide gas.

(b) When  $H_2S$  gas is made to react with sodium tetrahydroxidoplumbate (II) solution.

(c) When sulphite reacts with dilute  $H_2SO_4$  in presence of zinc

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13. A nitrite solution is added to a saturated solution of iron (II) acidified with dilute acetic acid or with dilute sulphuric acid. If any reactions occurs then write the name and chemical composition of the products formed.

Also write the chemical equations involved.

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14. Why is it necessary to test for the acid radicals first with dil.  $H_2SO_4$  and then with conc.  $H_2SO_4$  ?



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15. Why chromyl chloride test is carried out in a dry test tube ?



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16. Why bromides and iodides do not respond to chromyl chloride test ?



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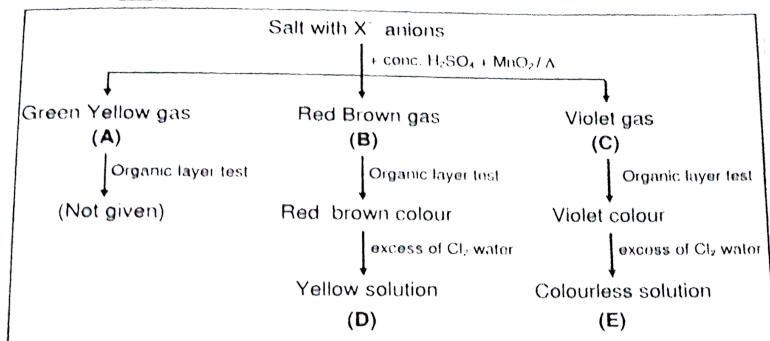
17. NaCl on heating with conc.  $H_2SO_4$  gives HCl where as NaBr and NaI give  $Br_2$  and  $I_2$  respectively, why ?



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18. Dilute Hydrochloric acid contains chloride ions but it doesnot give positive chromyl chloride test, why ?

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19.

Identify the gas A, B and C.

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20. Why heavy metal chlorides such as  $Hg_2Cl_2$ ,  $AgCl$ ,  $PbCl_2$  etc. do not respond to chromyl chloride test.

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21. Why is a freshly prepared solution of  $FeSO_4$  used for the detection of nitrate and nitrite ?





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22.  $Cu^{2+}$  and  $Ba^{2+}$  interfere in the flame test for borate, why ?



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23. In which of the following reagents, the white precipitate of  $PbSO_4$  is soluble ?

dilute HCl, hot concentrated  $H_2SO_4$ , ammonium acetate (6M), ammonium tartrate 6M in the presence of ammonia, sodium hydroxide solution.



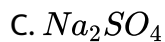
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24. How will you distinguish between sulphite and sulphate ions ?



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25. When a metal sulphate is heated in dry test tube, the colour changes from blue to white. Then metal sulphate may be :



D. None of these

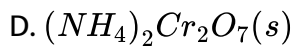
**Answer: B**



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26. Which of the following can not evolve more than one gas (vapour) if heated in dry test tube.



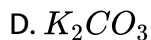
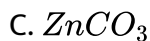
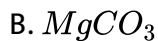
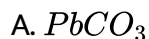


**Answer: B**



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27. On heating, a white amorphous inorganic compound becomes yellow and on cooling, turns white again. The salt may be



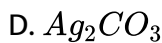
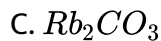
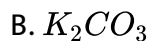
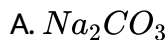
**Answer: C**



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28. Which of the following metal carbonates liberate  $CO_2(g)$  on heating

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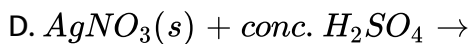
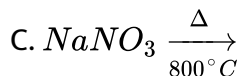
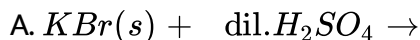


**Answer: D**



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29. In which of the following reactions a brown coloured gas is evolved ?



**Answer: D**



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**30.** Why is concentrated HCl used to dissolve the given metal salt in the flame test ?

- A. strong acids produce better flame test.
- B. HCl is volatile
- C. Volatile metal chloride produce better flame test.
- D. sharper coloured are seen in the flame in presence of  $Cl^-$  ions.

**Answer: C**



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**31.** The hottest part of the flame of a Bunsen burner is the

- A. Blue Zone
- B. Zone of complete combustion
- C. Zone fo partial combustion
- D. All parts of the flame are equally hot.

**Answer: B**

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**32.** Metal (M) shows crimson red colour in flame test and its halide is deliquescent then metal (M) could be :

- A. Li
- B. Mg
- C. Ca
- D. Ba

**Answer: A**

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33. In Borax bead test, metal oxides react with  $B_2O_3$  and form a coloured bead. This bead contains

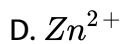
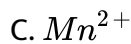
- A. orthoborate ion
- B. metaborate ion
- C. double oxide
- D. tetraborate ion

**Answer: B**

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34. Which does not give borax bead test?

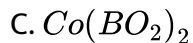
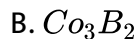
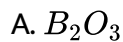
- A.  $Cr^{3+}$
- B.  $Cu^{2+}$



**Answer: D**

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**35.** In the Borax bead test of  $Co^{2+}$ , the blue colour of bead is due to the formation of :

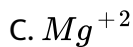


**Answer: C**

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36. A salt gives white residue in charcoal cavity test but in cobalt nitrate test it gives pink mass. It represents :

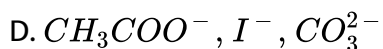
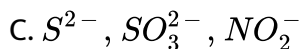


Answer: C



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37. Which of the following anions are identified by dil. HCl :

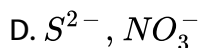
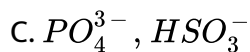
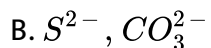
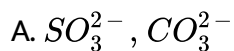


**Answer: C**



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**38.** Two inorganic compounds A and B were heated in a dry test tube. A evolved a colourless gas which turned lead acetate paper black and B evolved a gas which turned lime water milky. The anions in A and B respectively are :



**Answer: B**



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39. If addition of conc.  $H_2SO_4$  is made to an unknown salt, a colourless and odourless gas is produced then which of the following can be present ?

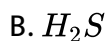


**Answer: A**



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40. A gas turns lime water milky and acidified  $K_2Cr_2O_7$  solution green then gas is :



C.  $SO_2$

D.  $CO_2$

**Answer: C**



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41. A gas has smell like rotten egg and turns lead acetate paper black. The gas is :

A.  $NO_2$

B.  $H_2S$

C.  $CO_2$

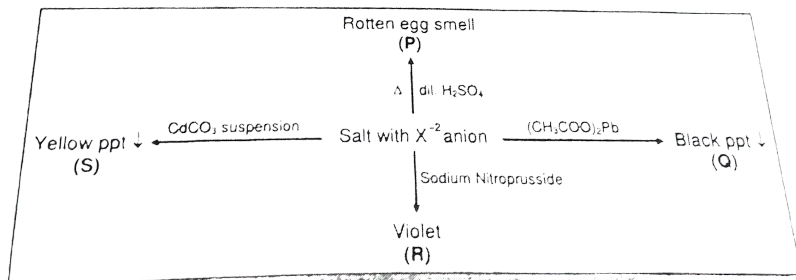
D.  $SO_2$

**Answer: B**

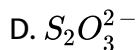
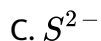


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42.



Anion (X<sup>2-</sup>) is :



Answer: C



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43. The acidic solution of a salt produced a deep blue colour with starch iodine solution. The salt may be

A. Suphite

B. Bromide

C. Nitrite

D. Chloride

**Answer: C**

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44. Sulphide ion reacts with  $[Fe(CN)_5NO]$  to form a purple coloured compound (X). In this reaction oxidation state of iron .

A. changes from +2 to +3

B. changes from +3 to +2

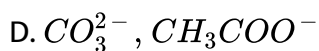
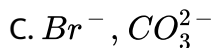
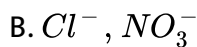
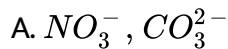
C. changes from +2 to +4

D. does not change.

**Answer: D**

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45. Which of the following pair of anions are identified by conc.  $H_2SO_4$ .



**Answer: B**



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46. Which of the following anion behaves in a different manner than other on heating with conc.  $H_2SO_4$ ?



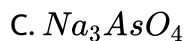
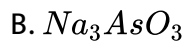
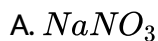
D. All behave in a similar manner

**Answer: A**



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47. Which of the following reagents turns white precipitate of AgCl yellow ?



**Answer: B**



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48. A Unknown salt (S) when heated with dil  $H_2SO_4$  does not evolve brown vapours but with conc.  $H_2SO_4$  brown vapours are obtained. The vapours when brought in contact with  $AgNO_3$  solution do not give any precipitate. The salt (S) contains.



**Answer: B**



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49. When a mixture of solid NaCl, solid  $K_2Cr_2O_7$  is heated with conc.  $H_2SO_4$  orange red vapours are obtained. These are of the compound

A. chromous chloride

B. chromyl chloride

C. chromic chloride

D. chromic sulphate

**Answer: B**

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50. AgCl dissolves in ammonia solution giving

A.  $Ag^+$ ,  $NH_4^+$  and  $Cl^-$

B.  $[Ag(NH_3)]^+$  and  $Cl^-$

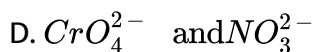
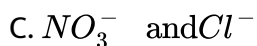
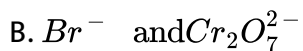
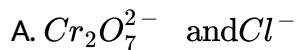
C.  $[Ag_2(NH_3)]^{2+}$  and  $Cl^-$

D.  $[Ag(NH_3)_2]^+$  and  $Cl^-$

**Answer: D**

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51. A mixture upon adding conc.  $H_2SO_4$  gives deep red fumes. It may contain the anions pair :



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52. The acidic solution of a salt produced a deep blue colour with starch iodine solution. The salt may be

A. chloride

B. carbonate

C. acetate

D. bromide

**Answer: A**

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53. A colourless solution of a compound gives a precipitate with  $AgNO_3$  solution but no precipitate with a solution of  $Na_2CO_3$ . The action of concentrated  $H_2SO_4$  on the compound liberates a suffocating reddish brown gas.

The compound is :



**Answer: D**

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54. Which of the following gas turn starch iodide paper blue ?

A.  $CO_2$

B.  $SO_2$

C.  $NO_2$

D.  $H_2S$

**Answer: D**



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55. Nitrate is confirmed by ring test. The brown colour of the ring is due to formation of

A. ferrous nitrite

B. nitroso ferrous sulphate

C. ferrous nitrate

D.  $FeSO_4 \cdot NO_2$

**Answer: C**

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56. When a mixture containing phosphate is heated with conc.  $HNO_3$  and ammonium molybdate solution, a canary yellow precipitate is formed. The formula of the yellow precipitate is

A.  $(NH_4)_3PO_4$

B.  $(NH_4)_3PO_4 \cdot 12MoO_4$

C.  $(NH_4)_3PO_4 \cdot 12MoO_3$

D.  $(NH_4)_3PO_4 \cdot (NH_4)_2MO_4$

**Answer: B**

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57. A metal salt solution gives a yellow precipitate with silver nitrate. The precipitate dissolves in dilute nitric acid as well as in ammonium hydroxide. The solution contains



Answer: C

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58. Match the anions with the changes observed on qualitative analysis :

	Column-I		Column-II
(A)	$SO_4^{2-}$	(p)	Canary yellow ppt. with ammonium molybdate.
(B)	$NO_3^-$	(q)	Brown ring test.
(C)	$NO_2^-$	(r)	White ppt. with $BaCl_2$ solution.
(D)	$PO_4^{3-}$	(s)	Yellow ppt. with $AgNO_3$ solution.
		(t)	White ppt. with $AgNO_3$ solution.

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59. Match the reagent which are used in qualitative analysis of given anions :

	Column-I		Column-II
(A)	AgNO <sub>3</sub> solution	(p)	CO <sub>3</sub> <sup>2-</sup>
(B)	BaCl <sub>2</sub> solution	(q)	Cl <sup>-</sup>
(C)	Pb(NO <sub>3</sub> ) <sub>2</sub> solution	(r)	S <sup>2-</sup>
(D)	Acidified KMnO <sub>4</sub> solution	(s)	NO <sub>2</sub> <sup>-</sup>



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## Exercise-2

1. The compound formed in the borax bead test of  $Cu^{2+}$  ion in oxidising flame is :

A. Cu

B.  $CuBO_2$

C.  $Cu(BO_2)_2$



D. None of these

**Answer: C**

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2. A fire work gave green light. It probably contained a salt of

A. Ca

B. Sr

C. Ba

D. Mg

**Answer: B**

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3. Alkali metal salt "X" gives a pale violet colour in flame test "X" is :

A. NaCl

B. LiCl

C. KCl

D. None of these

**Answer: C**

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**4. Borax bead is responded generally by :**

A. Alkali metal salt

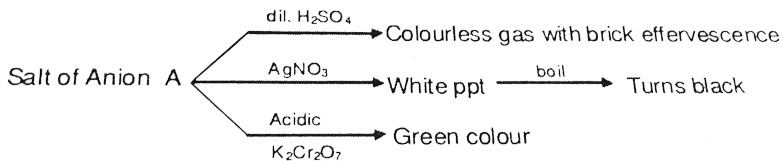
B. Alkaline earth metals

C. p-block metal salt

D. d-block metal salt

**Answer: D**

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Shape of anion A will be :

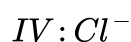
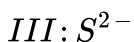
- A. Tetrahedral
- B. Trigonal planer
- C. Trigonal pyramidal
- D. Linear

Answer: C



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6. Which of the following anions are producing same gas on treatment with  $(\text{Zn} + \text{dil. H}_2\text{SO}_4)$ .



A. I and II only

B. I, II and III only

C. I, II, III and IV

D. I, III and IV only

**Answer: B**

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7. Consider the following reaction, Nitrite + Acetic acid + Thiourea  
 $\rightarrow Na_2 \uparrow + HSCN + 2H_2O$ . Formation of the product in the above  
reaction can be identified by :

A.  $FeCl_3$  / dilute HCl, when blood red colour appears.

B.  $FeCl_3$  / dilute HCl, when blue colour appears.

C.  $K_2Cr_2O_7$  / HCl, when green colour appears.

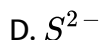
D.  $KMnO_4$  / HCl, when colourless solution is formed.

**Answer: A**



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8. A white sodium salt dissolves readily in water to give a solution which is neutral to litmus. When silver nitrate solution is added to the solution, a white precipitate is obtained which does not dissolve in dil.  $HNO_3$ . The anion could be :

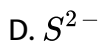


**Answer: B**



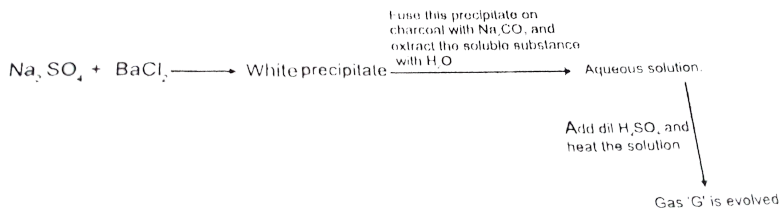
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9. A salt solution of  $Cd^{2+}$  in dilute HCl, on treatment with a solution of  $BaCl_2$  gives a white precipitate, which is insoluble in concentrated  $HNO_3$ . Anion in the salt may be :



Answer: A

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10.

The gas 'G' will show which of the following property ?

- A. It turns lead acetate filter paper black.
- B. It turns acidified  $K_2Cr_2O_7$  filter paper green.
- C. It produces purple colouration on filter paper moistened with sodium nitroprusside already made alkaline with sodium hydroxide.
- D. All of these

**Answer: D**

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11. Sodium borate on reaction with conc.  $H_2SO_4$  and  $C_2H_5OH$  gives a compound A which burns with a green edged flame. The compound A is

- A.  $H_2B_4O_7$
- B.  $(C_2H_5)_2B_4O_7$
- C.  $H_3BO_3$
- D.  $(C_2H_5)_3BO_3$

**Answer: D**



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**12.** How many compounds liberate  $NH_3$  on heating from the following ?

(i)  $(NH_4)_2SO_4$       (ii)  $(NH_4)_2CO_3$       (iii)  $NH_4Cl$

(iv)  $NH_4NO_3$       (v)  $(NH_4)_2Cr_2O_7$



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**13.** How many of following metals impart a characteristic colour to the Bunsen flame ?

(i)  $Na$       (ii)  $Li$       (iii)  $K$       (iv)  $Ba$

(v)  $Sr$       (vi)  $Mg$       (vii)  $Rb$       (viii)  $Cs$

(ix)  $Be$       (x)  $Ca$       (xi)  $Cu$



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14. Number of ions which are identified by dil. HCl from the following.

- (i)  $SO_4^{2-}$       (ii)  $CO_3^{2-}$       (iii)  $SO_3^{2-}$       (iv)  $HCO_3^-$   
(v)  $SO_3^{2-}$       (vi)  $NO_3^-$       (vii)  $CH_3COO^-$       (viii)  $PO_4^{3-}$

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15. Find the total number of acidic radical which produce volatile product with dil HCl :

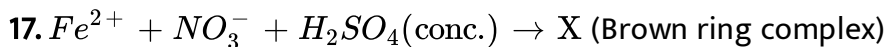
- (i)  $SO_4^{2-}$       (ii)  $I^-$       (iii)  $NO_2^-$       (iv)  $NO_3^-$   
(v)  $SO_3^{2-}$       (vi)  $HCO_3^-$

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16.  $Na_2S + Na_2[Fe(CN)_5NO] \rightarrow X$  (Violet colour)

The total number of possible isomers for complex " X " is , provided the ambident behaviour of  $CN^-$  is not considered.

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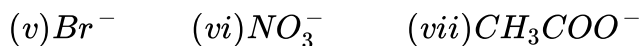


The magnetic moment of complex 'X' to its nearest integer is :

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18. How many anions evolve brownish gas when treated with dil. /con. HCl

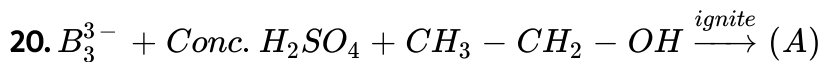
?



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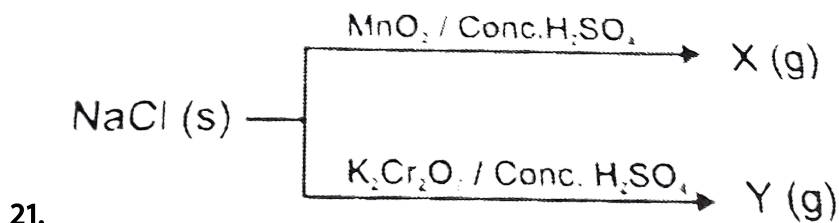
19.  $Na_2CO_3$ ,  $NaCl$ ,  $NaNO_2$ ,  $Na_2SO_3$ ,  $NaBr$ ,  $CH_3COONa$  are separately treated with  $AgNO_3$  solution. In how many cases white precipitate is/are obtained.

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What is the oxidation number of central atom that is responsible for green flame in compound (A)?

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a = difference in the oxidation number of Cl in the product X and product Y, respectively

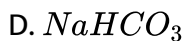
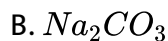
b = total number of atom in X and Y

c = total number of lone pair in X

then calculate  $a+b+c = ?$

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22. Which of the following salt liberates a colourless gas on acidification with dil.  $H_2SO_4$  ?

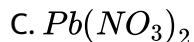


Answer: B::D



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23. Which of the following salts release reddish brown gas when heated in a dry test tube ?



D.  $AgNO_3$

Answer: A::C::D

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24. Which of the following can decompose on heating to give  $CO_2$  ?

A.  $Li_2CO_3$

B.  $Na_2CO_3$

C.  $KHCO_3$

D.  $BaCO_3$

Answer: A::C::D

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25. Metals which do not give flame test ?

A. Be

B. Li

C. Mg

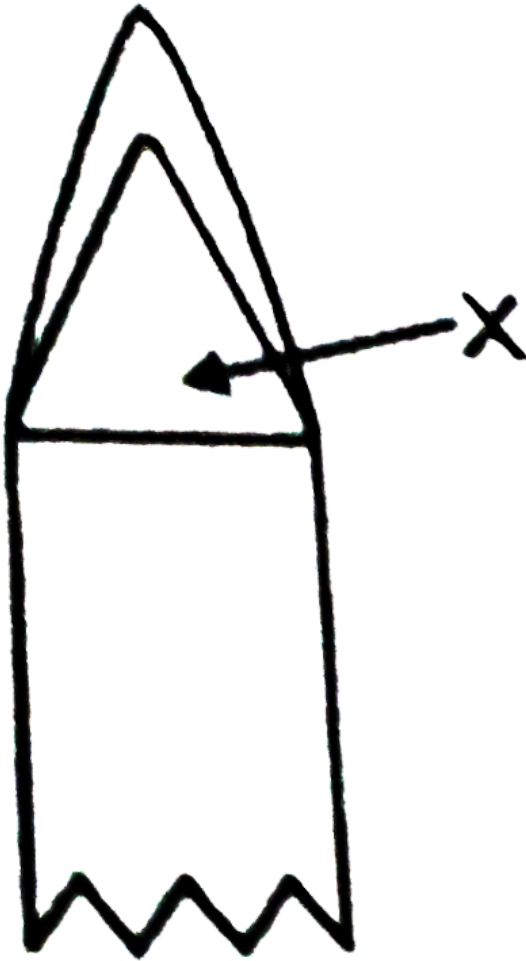
D. Ba

**Answer: A:C**



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26. In the following diagram bunsen flame the (X ) represent.



A. Oxidising zone

B. Reducing zone

C. Lower temperature zone

D. Hottest portion of flame

**Answer: B::C**

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27. Metal salts, which respond to Borax bead test ?

A. Nickel salts

B. Copper salts

C. Cobalt salts

D. Aluminium salts

**Answer: A::B::C**

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28. Which of the following gases turn lime water milky when passed through it.

A.  $SO_2$

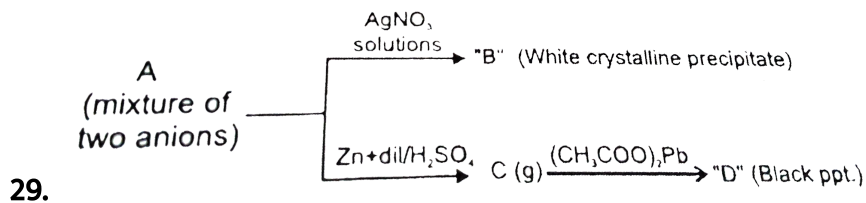
B.  $CO_2$

C.  $HCl$

D.  $H_2S$

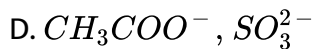
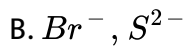
Answer: A::B

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Then A may have :

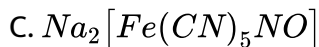
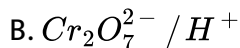
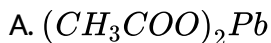
A.  $CO_3^{2-}$ ,  $Br^-$



**Answer: D**

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30.  $S^{2-}$  and  $SO_3^{2-}$  can be distinguished by :



**Answer: A::B::C**

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31. Which statements is/are correct about sodium nitroprusside test ?

A. This test is used for detection of  $SO_3^{2-}$  anion .

B.  $H_2S$  also gives positive test.

C. Formation of  $Na_2[Fe(H_2O)_5NOS]$  complex the presence of  $S^{2-}$  anion.

D. Iron has +2 oxidation state in sodiumthionitroprusside complex.

Answer: A::D



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32. Which statement(s) is /are correct about Brown ring test ?

A. This test is given by  $NO_2^-$  ,  $NO_3^-$  anions.

B. Brown ring test depend upon the reduction of  $NO_2^-$  and  $NO_3^-$  to Nitric oxide.

C. Brown ring is formed due to formation of



D. Charge on NO in brown ring complex is +1.

**Answer: A::B::D**

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**33.** Which of the following metal chloride will give chromyl chloride test ?

A. NaCl

B. KCl

C. AgCl

D.  $SbCl_3$

**Answer: A::B**

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34. Which of the following will be completely or partially dissolved in  $NH_4OH$  ?

A.  $AgCl$

B.  $AgBr$

C.  $AgI$

D.  $BaSO_4$

Answer: A::B::C



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35. Reddis-brown gas is obtained when the following are treated with conc.  $H_2SO_4$  ?

A.  $Br^-$

B.  $NO_2^-$

C.  $NO_3^-$



**Answer: A::B::C**

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**36.** Each of these are added to a mixture of aqueous solutions of iodide and  $CHCl_3$  separately. Which will give a positive test for iodine when the solution are vigorously mixed ?

A. NaCl solution

B. NaBr solution

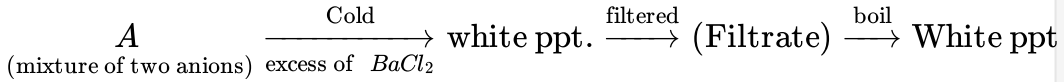
C. Chlorine water

D. Bromine water

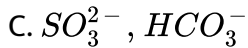
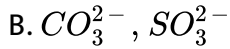
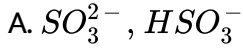
**Answer: C::D**

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37.



Anion of (A) could be :



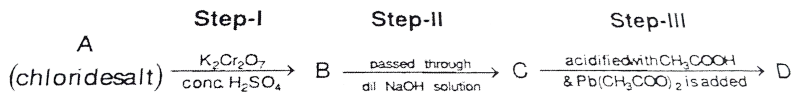
D. None of these

Answer: A::C



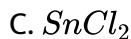
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38.



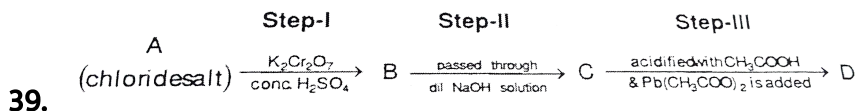
'A' can be



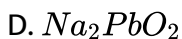
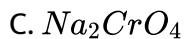


Answer: D

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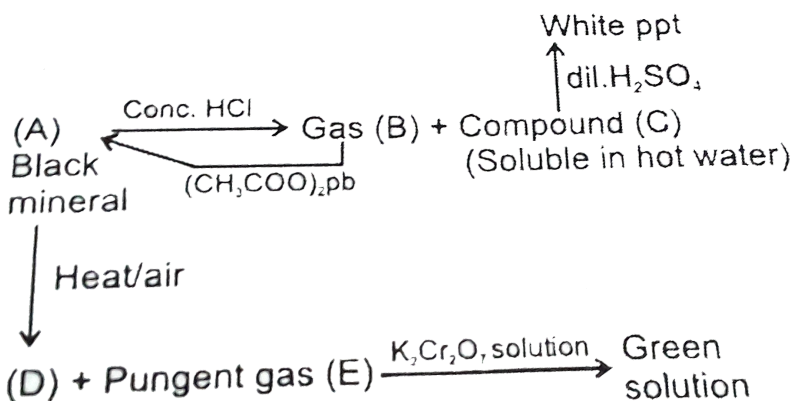
In step-III if  $\text{Pb}(\text{CH}_3\text{COO})_2$  is added without acidifying the solution with  $\text{CH}_3\text{COOH}$  then possible product may be :



Answer: A:D

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40.

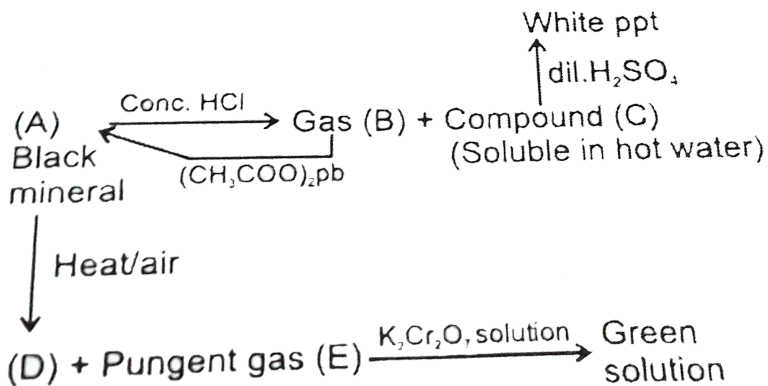
Gas (B) on passing through cadmium acetate solution will give :

- A. Black ppt
- B. Yellow ppt
- C. Orange ppt
- D. White ppt

**Answer: B**



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41.

Gas (B) and (E) are respectively :

A.  $\text{H}_2\text{S}$ ,  $\text{NH}_3$

B.  $\text{H}_2\text{S}$ ,  $\text{SO}_2$

C.  $\text{SO}_2$ ,  $\text{H}_2\text{S}$

D.  $\text{H}_2\text{S}$ ,  $\text{CO}_2$

Answer: B

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In the following three tables, information regarding Qualitative analysis of anion is given

Column-1	Column-2	Column-3
(I) $SO_4^{2-}$	(i) Reaction with $AgNO_3$	(P) Precipitate is obtained
(II) Cl	(ii) Pungent smelling product with conc. $H_2SO_4$	(Q) Product is coloured gas.
(III) $NO_3^-$	(iii) Form $X_2$ with $K_2Cr_2O_7(s)$ + conc. $H_2SO_4$	(R) Product formed is soluble in excess $NH_3$ .
(IV) Br	(iv) Reaction with $Pb(NO_3)_2(aq)$	(S) Product gives blue colour with starch iodide solution.

42.

Select the only correct option.

A. (I) (i) (P)

B. (II) (ii) (Q)

C. (I) (ii) (S)

D. (II) (iii) (Q)

Answer: A



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In the following three tables, information regarding Qualitative analysis of anion is given

Column-1	Column-2	Column-3
(I) $SO_4^{2-}$	(i) Reaction with $AgNO_3$	(P) Precipitate is obtained
(II) Cl	(ii) Pungent smelling product with conc. $H_2SO_4$	(Q) Product is coloured gas.
(III) $NO_3^-$	(iii) Form $X_2$ with $K_2Cr_2O_7(s)$ + conc. $H_2SO_4$	(R) Product formed is soluble in excess $NH_3$ .
(IV) Br	(iv) Reaction with $Pb(NO_3)_2(aq)$	(S) Product gives blue colour with starch iodide solution.

43.

Select the only incorrect option.

A. (III) (i) (P)

B. (I) (ii) (Q)

C. (IV) (i) (R)

D. (IV) (ii) (Q)

Answer: B

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In the following three tables, information regarding Qualitative analysis of anions is given

Column-1	Column-2	Column-3
(I) $\text{SO}_4^{2-}$	(i) Reaction with $\text{AgNO}_3$	(P) Precipitate is obtained
(II) $\text{Cl}^-$	(ii) Pungent smelling product with conc. $\text{H}_2\text{SO}_4$	(Q) Product is coloured gas
(III) $\text{NO}_3^-$	(iii) Form $\text{X}_2$ with $\text{K}_2\text{Cr}_2\text{O}_7(\text{s}) + \text{conc. H}_2\text{SO}_4$	(R) Product formed is soluble in excess $\text{NH}_3$
(IV) $\text{Br}^-$	(iv) Reaction with $\text{Pb}(\text{NO}_3)_2(\text{aq})$	(S) Product gives blue colour with starch iodide solution.

44.

Select the only incorrect option.

A. (III) (ii) (Q)

B. (IV) (ii) (S)

C. (II) (iv) (P)

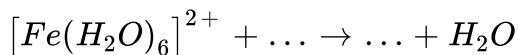
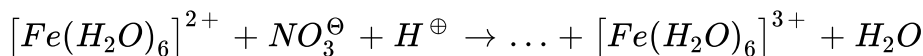
D. (II) (ii) (S)

Answer: D

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### Exercise-3

1. The acidic aqueous solution of ferrous ion forms a brown complex in the presence of  $NO_3^\ominus$  by the following two steps:



Complete and balance the equations .

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2. In nitroprusside ion the iron and NO exist as Fe (II) and  $NO^+$  rather than the Fe(III) and NO. these forms can be differentiated by

- A. estimating the concentration of Iron.
- B. measuring the concentration of CN.
- C. measuring the solid state magnetic moment.
- D. thermally decomposing the compound.

**Answer: C**

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3. Statement I Sulphate is estimated as  $BaSO_4$ , not as  $MgSO_4$ .

Statement II Ionic radius of  $Mg^{2+}$  is smaller than that of  $Ba^{2+}$ .

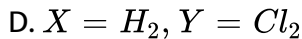
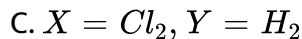
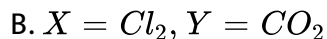
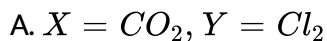
- A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- B. Both Assertion and Reason are true but Reason is not correct explanation of Assertion.
- C. Assertion is true but Reason is false.

D. Assertion is false but Reason is true.

**Answer: B**

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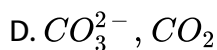
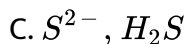
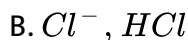
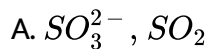
4. A gas X is passed through water to form a saturated solution. The aqueous solution on treatment with silver nitrate gives a white precipitate. The saturated aqueous solution also dissolves magnesium ribbon with evolution of a colourless gas Y. Identify X and Y.



**Answer: C**

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5.  $[X] + H_2SO_4 \rightarrow [Y]$  a colourless gas with irritating smell  
 $[Y] + K_2Cr_2O_7 + H_2SO_4 \rightarrow$  green solution  $[X]$  and  $[Y]$  are



**Answer: A**



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6. A sodium salt on treatment with  $MgCl_2$  gives white precipitate only on heating. The anion of the sodium salt is



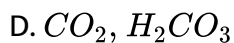
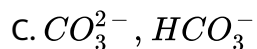
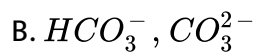
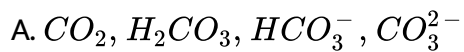




**Answer: A**

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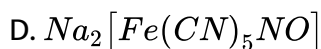
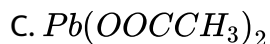
7. The species present in solution when  $CO_2$  is dissolved in water is/are:



**Answer: A**

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8. The reagent (s) that can selectively precipitate  $S^{2-}$  from a mixture of  $S^{2-}$  and  $SO_4^{2-}$  in aqueous solution is (are)



**Answer: A::C**



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9. Sodium extract is heated with concentrated  $HNO_3$  before testing for halogens because :

A. Ag reacts faster with halides in acidic medium.

B. Silver halides are totally insoluble in nitric acid.

C.  $Ag_2S$  and  $AgCN$  are soluble in acidic medium.

D.  $S^{2-}$  and  $CN^-$ , if present, are decomposed by conc.  $HNO_3$

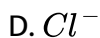
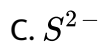
and hence do not interfere in the test.

**Answer: D**



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10. A white sodium salt dissolves readily in water to give a solution which is neutral to litmus. When silver nitrate solution is added to the aforementioned solution, a white precipitate is obtained which does not dissolved in dil. nitric acid. The anion is :



**Answer: D**



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## Additional Problems for Self Practice (APSP)

1. When a salt is heated with dilute  $H_2SO_4$  and  $KMnO_4$  solution, the pink colour of  $KMnO_4$  is discharged, the salt is :

- A. a sulphite
- B. a carbonate
- C. a nitrate
- D. a bicarbonate

**Answer: A**



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2. Solution of a salt in dilute  $H_2SO_4$  or acetic and produces deep blue colour with starch iodide solution. The salt contains :

A.  $Br^-$

B.  $I^-$

C.  $Cl^-$

D.  $NO_2^-$

**Answer: D**



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3. A test tube containing a nitrate and another containing a bromide and  $MnO_2$  are treated with concentrated  $H_2SO_4$ . The reddish brown fumes evolved are passed through water. The water will be coloured by :

A. the nitrate

B. the bromide

C. both

D. none of the two

**Answer: B**

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4. Which of the following combines with Fe(II) ions to form a brown complex ?

A.  $N_2O$

B.  $NO$

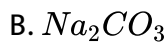
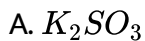
C.  $N_2O_5$

D.  $N_2O_4$

**Answer: B**

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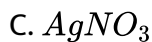
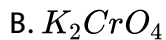
5. Colourless salt (A) + dil.  $H_2SO_4$  or  $CH_3COOH$  +  $KI \rightarrow$  blue colour with starch. (A) can be



**Answer: C**

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6. There are four test tubes containing dilute  $HCl$ ,  $BaCl_2$ ,  $HgCl_2$  and  $KNO_3$  solutions. Which of the following reagents will help in the identification of  $BaCl_2$  ?

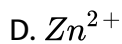


D. both (2) and (3)

**Answer: B**

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7. Which one of the following ions does not give borax bead test :



**Answer: D**

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8. A brick red colour is imparted Bunsen flame by a :

A. Ca salt



B. Sr salt

C. Na salt

D. Co salt

**Answer: A**

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9. Which one of the following metal salts produces a blue coloured bead in cobalt nitrate charcoal cavity test ?

A.  $Zn^{2+}$

B.  $Mg^{2+}$

C.  $Sn^{2+}$

D.  $Al^{3+}$

**Answer: D**

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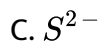
10.  $BaCl_2$  solution gives a white precipitate with a solution of a salt, which dissolves in dilute hydrochloric acid with the evolution of colourless, pungent smelling gas. The gas as well as the salt both are used as bleaching agent in the textile industries. The salt contains :

- A. sulphite
- B. sulphide
- C. acetate
- D. carbonate

**Answer: A**

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11. Pink colour of acidified  $KMnO_4$  is decolourised but there is no evolution of any gas. This may happen with the compound containing the following acid radical.



D. All of these

**Answer: D**

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12. When KI is added to acidified solution fo sodium nitrite,

A. NO gas is liberated and  $I_2$  is set free

B.  $N_2$  gas is liberated and HI is produced

C.  $N_2O$  gas is liberated and  $I_2$  is set free

D.  $N_2$  gas is liberated and HOI is produced

**Answer: A**

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13. Zinc pieces are added to acidified solution of  $SO_3^{2-}$ . Gas liberated can

:

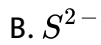
- A. turn lead acetate paper black
- B. turn lime water milky
- C. give white precipitate with  $AgNO_3$  solution
- D. None of these

**Answer: A**



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14. A substance on treatment with dilute  $H_2SO_4$  liberates a colourless gas which produces (i) turbidity with baryta water and (ii) turns acidified dichromate solution green. The reaction indicates the presence of :



**Answer: C**



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15. Ammonium molybdate test is used for the estimation of :



**Answer: A**



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16. A colourless gas is dissolved in water and the resulting solution turns red litmus blue, the gas may have been which one of the following ?

- A.  $\text{HCl}$
- B.  $\text{H}_2\text{S}$
- C.  $\text{SO}_2$
- D.  $\text{NH}_3$

**Answer: D**



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17. When Ag reacts with conc.  $\text{HCl}$ , then products will be :

- A.  $\text{AgCl}, \text{Cl}_2$
- B.  $\text{AgCl}, \text{H}_2$
- C.  $\text{AgCl}, \text{H}_2, \text{Cl}_2$

D. None of these

**Answer: D**

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**18.** Which of the following salt will evolve sulphur dioxide gas along with formation of yellowish turbidity when treated with dilute  $H_2SO_4$  ?

A. Sodium sulphide

B. Sodium sulphite

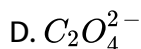
C. Sodium thiosulphate

D. Sodium sulphate

**Answer: C**

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19. Aqueous solution of a salt +  $MgSO_4$  solution  $\rightarrow$  no precipitate in cold  $\xrightarrow{\text{Heating}}$  White precipitate appears. The salt contains the acidic radical :

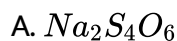
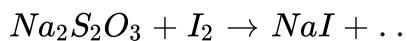


**Answer: B**

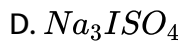
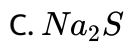
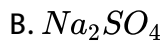


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20. In the test for iodine,  $I_2$  is treated with sodium thiosulphate ( $Na_2S_2O_3$ ) :







**Answer: A**

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21. With  $Cr_2O_3$ , colour of the bead in sodium carbonate bead test is :

A. red

B. blue

C. yellow

D. green

**Answer: D**

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22. Which metal gives violet colour in oxidising flame when heated with borax ?

A. Fe

B. Pb

C. Co

D. Mn

**Answer: D**



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23. KBr, on reaction with conc.  $H_2SO_4$ , gives reddish-brown gas :

A. Bromine

B. Mixture of bromine and HBr

C. HBr

D.  $NO_2$

**Answer: A**

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**24.** An inorganic salt when heated evolves colored gas which bleaches moist litmus paper. The evolved gas is :

A.  $NO_2$

B.  $SO_2$

C.  $N_2O$

D.  $I_2$

**Answer: A**

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**25.** Which of the following halide is soluble in water ?

A.  $AgF$

B.  $AgCl$

C.  $AgBr$

D.  $AgI$

**Answer: A**

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**26.** Which of the following radical can not be confirmed by using dil. HCl :

A.  $S^{2-}$

B.  $S_2O_3^{2-}$

C.  $NO_3^-$

D. None of these

**Answer: C**

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27. When  $K_2Cr_2O_7$  is heated with conc.  $H_2SO_4$  and soluble chloride such as KCl :

- A. red vapours of  $CrO_2Cl_2$  are evolved
- B.  $Cl^-$  ion is oxidized to  $Cl_2$  gas
- C.  $CrCl_3$  is formed
- D.  $Cr_2O_7^{2-}$  ion is reduced to green  $Cr^{3+}$  ion

**Answer: A**



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28. A white solid imparts a violet colour to a Bunsen flame. On being heated with concentrated  $H_2SO_4$ , the solid gives violet vapours that turn starch paper blue. The salt may be :

- A. KI

B. NaI

C.  $MgI_2$

D.  $CaBr_2$

**Answer: A**

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29. NaCl, NaBr, NaI mixture on adding conc.  $H_2SO_4$  gives gases, respectively :

A. HCl, HBr, HI

B.  $HCl$ ,  $Br_2$ ,  $I_2$

C.  $Cl_2$ ,  $Br_2$ ,  $I_2$

D. None of these

**Answer: B**

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30. Potassium chromate solution is added to an aqueous solution of a metal chloride. The yellow precipitate thus obtained is insoluble in acetic acid. The precipitate is subjected to flame test, the colour of the flame is :

- A. lilac
- B. apple green
- C. crimson red
- D. brick red

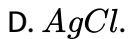
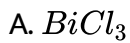
**Answer: B**



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## Part-II : National Standard Examination IN

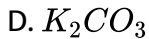
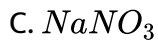
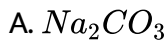
1. Which of the metal chloride is insoluble in cold water but dissolves in hot water ?



**Answer: C**

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2. A colorless salt gives violet colour to Bunsen flame and also turns moisture litmus paper blue. It is :

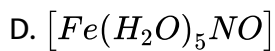
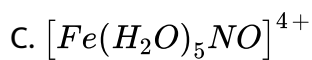
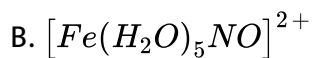
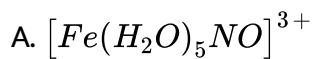


**Answer: D**



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3. The brown compound formed in the ring test for nitrates contains the ion



**Answer: B**

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4. Sodium nitroprusside  $Na_2[Fe(CN)_5NO]$  is used as a reagent for the detection of

A. sulphur

B. nitrogen

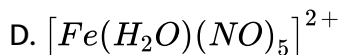
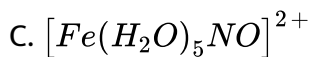
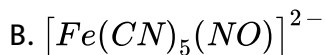
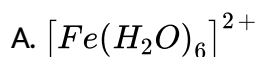
C. bromine

D. iodine.

**Answer: A**

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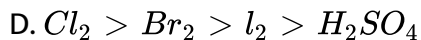
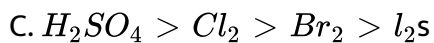
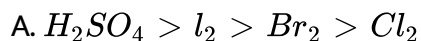
5. The brown ring test for  $NO_2^-$  and  $NO_3^-$  is due to the formation of complex ion with formula :



**Answer: C**

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6. concentrated sulphuric acid on reaction with NaCl, NaBr and NaI produces HCl, bromine and iodine respectively. What order of oxidising ability of halogens with reference to sulphuric acid can be established on the basis of this reaction ?



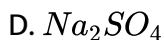
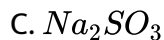
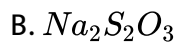
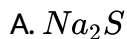
**Answer: B**

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7. Silver nitrate solution when added to a colorless aqueous solution E forms a white precipitate which dissolves in excess of E. If the white precipitate is heated with water it turns black and the supernatant

solution gives a white precipitate with acidified barium nitrate solution.

Therefore, E is :



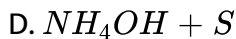
**Answer: B**



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8. If a dilute solution of aqueous  $NH_3$  is saturated with  $H_2S$  then the product formed is :

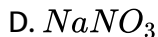
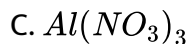
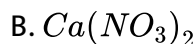
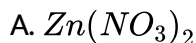




**Answer: B**

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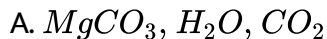
9. A colourless water-soluble compound on strong heating liberates a brown colored gas and leaves a yellow residue that turns white on cooling. An aqueous solution of the original solid gives a white precipitate with  $(NH_4)_2S$ . The original solid is :



**Answer: A**

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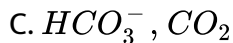
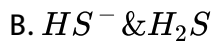
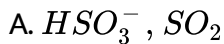
1. What are the products formed when an aqueous solution of magnesium bicarbonate is boiled ?



**Answer: A**

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2. NaX (Sodium salt of particular anion 'X') gives brisk effervescence of Y with dilute HCl. On heating, NaX evolves gas Y which can be completely absorbed in conc. KOH solution and is colorless odourless gas. Hence X and Y respectively are :



**Answer: C**

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3. White precipitate of AgCl turns to greyish or black when :



B. exposed to sunlight



D. reacts with concentrated HCl

**Answer: B**

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4. A mixture is known to contain  $NO_3^-$  and  $NO_2^-$ . Before performing ring test for  $NO_3^-$ , the aqueous solution should be made free of  $NO_2^-$ .

This is done by heating aqueous extract with :

A. conc.  $HNO_3$

B. dil  $HNO_3$

C. urea

D. zinc dust

**Answer: C**

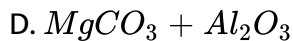
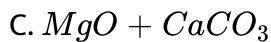
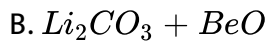


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5. Which of the following will not react with each other when heated together ?

A.  $BeO + MgO$

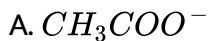




**Answer: C**

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6. An aqueous solution of salt containing an acidic radical  $X^-$  reacts with sodium hypochlorite in neutral medium. The gas evolved produces blue black colour spot on the starch paper. The anion  $X^-$  is :



**Answer: C**



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7. Precipitate of  $PbSO_4$  is soluble in :

A. ammonium acetate (6M)

B. dilute HCl

C. dilute  $H_2SO_4$

D. none of these

**Answer: A**



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8. Which of the following pair of acidic radical can be distinguished by using dil  $H_2SO_4$  ?

(I)  $C_2O_4^{2-}$  and  $NO_3^-$       (II)  $NO_3^-$  and  $NO_2^-$

(III)  $Cl^-$  and  $Br^-$       (IV)  $HCO_3^-$  and  $CO_3^{2-}$

A. I and II

B. II only

C. II and IV

D. III and IV

**Answer: B**

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## Match The Column

1.  $CuCO_3$  was strongly heated to obtain a residue A and gas B. The residue obtained was treated with a salt of sodium 'X' and oxide Y, which produced a blue colored glassy compound C on heating in oxidising flame. The same combination of x and Y gave a green colored glassy compound D when  $Cr_2(SO_4)_3$  was heated with them in oxidizing flame.

Match the following accordingly :

(A)	A	(P)	$\text{Cu}(\text{BO}_2)_2$
(B)	B	(Q)	$\text{Na}_2\text{CO}_3$
(C)	C	(R)	$\text{CuO}$
(D)	X	(S)	$\text{CO}$
		(T)	$\text{Cu}_2\text{O}$
		(U)	$\text{CO}_2$
		(V)	$\text{NaBO}_2$
		(W)	$\text{Cr}(\text{BO}_2)_2$

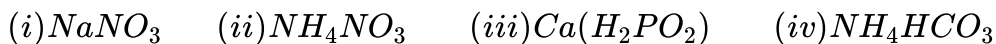
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## Single And Double Value Integer Type

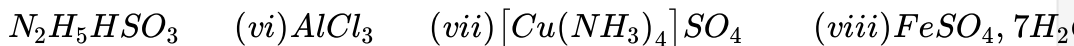
1. A metal salt evolves the dark violet fumes of (X) with  $\text{MnO}_2$  and this (X) gives the deep blue colouration with starch solution. Then number of lone pair on central atom in (X).

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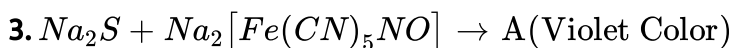
2. How many of the following will volatilize on heating leaving no solid residue ?



(v)



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In Complex "A", number of type of ambidentate ligand is/are "a" and number of d-orbital involved in hybridisation is/are "b" The  $7a+8b$  will be

:

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### One Or More Than One Options Correct Type

1. Heating which of the following salts in a dry test tube may cause a change in their colour ?

A.  $ZnCO_3$  (white)

B.  $Co(NO_3)_2 \cdot 6H_2O$  (red)

C.  $FeSO_4 \cdot 6H_2O$  (green)

D.  $MnSO_4$  (faint pink)

**Answer: A::B::C::D**



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2. Which of the following combinations will give yellowish precipitate in an aqueous medium ?

A.  $AgNO_3 + NaBr$

B.  $(CH_3COO)_2Pb + Na_2CrO_4$

C.  $AgCl + Na_3AsO_3$

D.  $AgNO_3 + NaNO_2$

**Answer: A::B**



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3. Which of the following produce red coloured flame during flame test ?

A.  $Li$

B.  $Ca^{2-}$

C.  $Sr^{2-}$

D.  $Ba^{2-}$

Answer: A::B::C



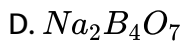
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4. When Borax is heated it forms a colourless glassy bead because of formation of :

A.  $B_2H_6$

B.  $NaBO_2$

C.  $B_2O_3$



**Answer: B::C**

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5. Which of the following anion(s) is/are easily removed from aqueous solution by precipitation ?



**Answer: A::B::D**

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6.  $H_2S$  and  $SO_2$  can be distinguished by:

A. Litmus paper

B.  $MnO_4^- / H^+$

C.  $(CH_3COO)_2Pb$

D. None of these

Answer: A::B::C



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## Comprehension

1. When compound (A) is treated with conc.  $H_2SO_4$ , a reddish brown colour gas (B) is evolved. To this solution, a solution of (C) is added slowly from the side of the test tube, a blue ring is obtained at the junction of two layers due to formation of (D).

Gas (B) may be :

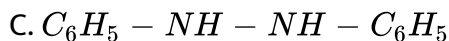
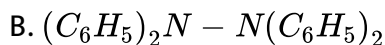


**Answer: D**

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2. When compound (A) is treated with conc.  $H_2SO_4$ , a reddish brown colour gas (B) is evolved. To this solution, a solution of (C) is added slowly from the side of the test tube, a blue ring is obtained at the junction of two layers due to formation of (D).

Compound (D) has formula :



D.

**Answer: B**

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3. When compound (A) is treated with conc.  $H_2SO_4$ , a reddish brown colour gas (B) is evolved. To this solution, a solution of (C) is added slowly from the side of the test tube, a blue ring is obtained at the junction of two layers due to formation of (D).

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## Part-IV : Practice Test-2

1. An inorganic salt when heated with concentrated  $H_2SO_4$  evolves a colourless pungent smelling gas but with concentrated

$H_2SO_4$  and  $MnO_2$ , evolves a coloured pungent smelling gas which bleaches moist litmus paper. The coloured gas is :

A.  $NO_2$

B.  $Cl_2$

C.  $Br_2$

D.  $I_2$

**Answer: B**



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### Part-IV : Practice Test-3

1. Chromyl chloride vapours are dissolved in water and acetic acid and barium acetate solution is added, then :

A. the solution will remain colourless.

B. the solution will become dark green.

C. a yellow solution will be obtained.

D. a yellow precipitate will be obtained.

**Answer: D**



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#### Part-IV : Practice Test-4

1. When  $CS_2$  layer containing both  $Br_2$  and  $I_2(2:1)$  is shaken with excess of chlorine ( $Cl_2$ ) water, the violet colour due to  $I_2$  disappears and a pale yellow colour appears in the solution. The disappearance of violet colour and appearance of pale yellow colour is due to the formation of :

A.  $I_3^-$  and  $Br_2$  respectively.

B.  $HIO_3$  and  $BrCl$  respectively.

C.  $Icl$  and  $BrCl$  respectively.

D.  $I^-$  and  $Br^-$  respectively.

**Answer: B**

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## Part-IV : Practice Test-5

1. A metal salt solution gives a yellow precipitate with silver nitrate. The precipitate dissolves in dilute nitric acid as well as in ammonium hydroxide. The solution contains

- A. bromide ions
- B. iodide ions
- C. phosphate ions
- D. chromate ions

**Answer: C**

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1. Which of the following will not give positive chromyl chloride test?

- A. Copper chloride,  $CuCl_2$ .
- B. Mercuric chloride,  $HgCl_2$ .
- C. Zinc chloride,  $ZnCl_2$
- D. Anilinium chloride  $C_6H_5NH_3Cl$ .

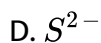
**Answer: B**



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1. A white sodium salt dissolves readily in water to give a solution which is neutral to litmus. When silver nitrate solution is added to the solution, a

white precipitate is obtained which does not dissolve in dil.  $HNO_3$ . The anion could be :



**Answer: B**



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## Part-IV : Practice Test-8

1. A one litre flask is full of reddish brown bromine fumes. The intensity of brown colour of vapour will not decrease appreciably on adding to the flask some :

A. pieces of marble



B. animal charcoal powder

C. carbon tetrachloride

D. carbondisulphide

**Answer: A**



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## Part-IV : Practice Test-9

1. Which of the following statements is/are incorrect ?

A. A filter paper moistened with cadmium acetate solution turns yellow, when brought in contact with  $H_2S$  gas.

B. Both carbonate ions as well as bicarbonate ions in the solutions, give reddish-brown precipitate with mercury (II) chloride.

C. Sulphites in presence of zinc, reacts with dilute  $H_2SO_4$  to liberate  $SO_3$  gas.

D. A filter paper moistened with  $KIO_3$  and starch turns blue in contact with  $SO_2$  vapours.

**Answer: B::C**

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## Part-IV : Practice Test-10

1. Which of the following reagents can be used for making the distinction between  $AgCl$  and  $AgI$  ?

- A. Sodium arsenite solution.
- B. Dilute ammonia solution.
- C. Potassium cyanide solution.
- D. Dilute  $HNO_3$

Answer: A::B



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## Part-IV : Practice Test-11

1. Which of the following statement(s) is/are correct with respect to bromide ions ?

A. KBr on heating with  $MnO_2$  and concentrated  $H_2SO_4$  liberates  $Br_2$  and  $SO_2$  gases.

B. KBr on heating with concentrated  $H_2SO_4$  liberates  $Br_2$  and  $SO_2$  gases.

C. KBr forms HBr with concentrated  $H_3PO_4$ .

D. KBr(s) liberates  $Br_2$  on gentle warming with concentrated  $H_2SO_4$  and  $K_2Cr_2O_7(s)$ .

**Answer: B::C::D**

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## Part-IV : Practice Test-12

1. Which of the following imparts green/apple green colour to the Bunsen flame ?

- A. Calcium chloride
- B. Volatile boron trifluoride
- C. Barium chloride
- D. Ethoxy borate

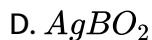
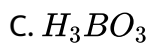
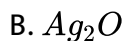
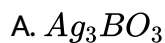
**Answer: B::C::D**

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1. What final product(s) is/are formed in the following series of reactions ?

Concentrated borax solution + silver nitrate solution  $\rightarrow$  Precipitate

$\xrightarrow[\text{boiling}]{H_2O}$  Products(final)



**Answer: B::C**



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1. How many of following metals give Borax bead test.

Sc, Ti, V, Cr, Mn, Co, Ni, Cu, Zn

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#### Part-IV : Practice Test-15

1. How many of the following salts impart characteristic colours to the Bunsen flame ?

*NaCl, KCl, CuCl<sub>2</sub>, BaCl<sub>2</sub>, CaCl<sub>2</sub>, SrCl<sub>2</sub>, ZnCl<sub>2</sub>, MgCl<sub>2</sub>, AlCl<sub>3</sub>*

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#### Part-IV : Practice Test-16

1. How many of the following liberate coloured vapour/gas with concentrated  $H_2SO_4$  ?

$KCl(s) + K_2Cr_2O_7(s), KNO_2(s), KI(s), KBr(s), KCl(s)$

$KBr(s) + MnO_2(s), KNO_3, KCl(s) + MnO_2, K_2SO_3$

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## Part-IV : Practice Test-17

1. Which of the following statements is/are incorrect

- (I) Filter paper moistened with cadmium acetate and lead acetate turn black and yellow respectively, when brought in contact with  $H_2S$  gas.
- (II) Sulphites in presence of Zinc, reacts with dilute  $H_2SO_4$  to liberate  $H_2S$  gas.
- (III) Stability of carbonates decrease with increasing metallic character.
- (IV) Borax bead test is responded generally by p and d block metal salts.
- (V) Sodium chloride on heating with aqueous solution of  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$  produced white fumes.

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## Part-IV : Practice Test-18

1. How many B-O-B bond (s) (per molecule) is/are present in compound which is used in Borax bead test ?

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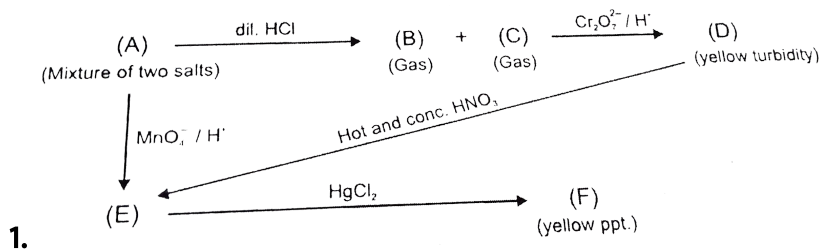
## Part-IV : Practice Test-19

1. In brown ring complex, if number of ambidentate is/are "a" and oxidation state of iron is/are "b" then  $a+b=?$

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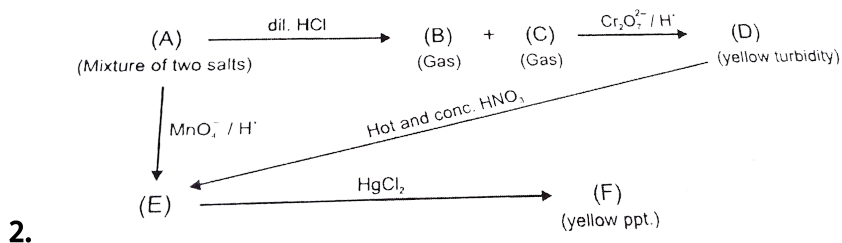
## Paragraph For Questions



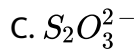
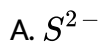


Find the anion (s) :

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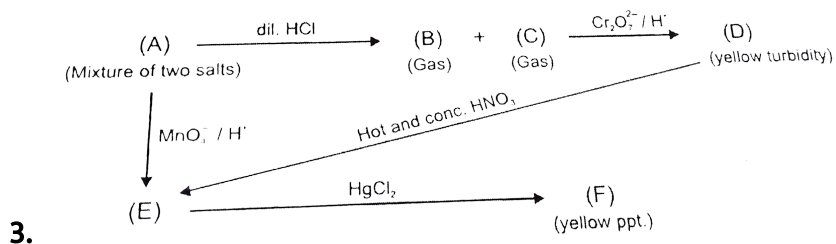


Find out (E) :

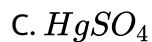


Answer: D

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Find out (F) :



Answer: A

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## Matching List Type

1. Match List-I with List-II and select the correct answer using the codes given below the lists :

	List-I		List-II
P.	White turbidity	1.	$\text{IO}_3^- + \text{SO}_2 + \text{starch} \longrightarrow$
Q.	Rotten egg smell	2.	$\text{SO}_2 + \text{MnO}_4^- \longrightarrow$
R.	Colourless solution	3.	$\text{Zn} + \text{NaOH} + \text{SO}_2 \longrightarrow$
S.	Blue colour	4.	$\text{CO}_2 + \text{Ca(OH)}_2 \longrightarrow$

A.  $P \quad Q \quad R \quad S$   
1 3 2 4

B.  $P \quad Q \quad R \quad S$   
3 2 4 1

C.  $P \quad Q \quad R \quad S$   
4 3 2 1

D.  $P \quad Q \quad R \quad S$   
4 1 2 3

**Answer: C**



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1. The carbonate of which of the following cation is soluble in water ?



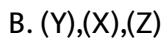
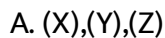
**Answer: A,B,C**



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2.  $SO_2$  and  $CO_2$  both turn lime water ( $X$ ) milky,  $SO_2$  also turns  $K_2Cr_2O_7 / H^+$  ( $Y$ ) green while  $O_2$  is soluble in pyrogallol ( $Z$ ) turning it black. These gases are to be detected in order by using these reagents.

The order is:



C. (X),(Z),(Y)

D. The correct order cannot be predicted.

**Answer: B**

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3. Colourless salt (A) + dil.  $H_2SO_4$  or  $CH_3COOH + KI \rightarrow$  blue colour with starch. (A) can be

A.  $K_2SO_3$

B.  $Na_2CO_3$

C.  $NH_4NO_3$

D.  $NH_4Cl$

**Answer: C**

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4. Zinc pieces are added to acidified solution of  $SO_3^{2-}$ . Gas liberated can:

- A. turn lead acetate paper black
- B. turn lime water milky
- C. give white precipitate with  $AgNO_3$  solution
- D. decolourize acidified  $KMnO_4$

Answer: A,D



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5. A mixture when rubbed with dilute acid smells like vinegar. It contains:

- A. sulphite
- B. nitrate
- C. nitrile
- D. acetate

**Answer: D**



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6. A substance on treatment with dilute  $H_2SO_4$  liberates a colourless gas which produces (i) turbidity with baryta water and (ii) turns acidified dichromate solution green. The reaction indicates the presence of :

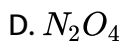
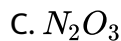
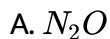


**Answer: C**



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7. Which of the following combines with  $Fe(II)$  ions to form a brown complex ?



**Answer: B**



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8. Which of the following statements is /are incorrect?

A. A filter paper moistened with cadmium acetate solution turn yellow, when brought in contact with  $H_2S$  gas.

B. Both carbonate ions as well as bicarbonate ions in the solutions, give reddish-brown precipitate with mercury ( $II$ ) chloride.



C. Sulphites in presence of zinc, reacts with dilute  $H_2SO_4$  to liberate  $SO_3$  gas.

D. A filter paper moistened with  $KIO_3$  and starch turns blue in contact with  $SO_2$  vapours.

**Answer: B,C**

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9. Which of the following reagents turns white precipitate of  $AgCl$  yellow?

A.  $NaNO_3$

B.  $Na_3AsO_3$

C.  $Na_3AsO_4$

D.  $NaCN$

**Answer: B**

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10. When a mixture of solid  $NaCl$  and solid  $K_2Cr_2O_7$  is heated with concentrated  $H_2SO_4$  deep red vapours are obtained. This is due to the formation of:

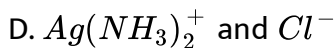
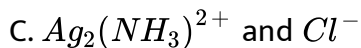
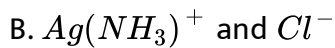
- A. chromous chloride
- B. chromyl chloride
- C. chromic chloride
- D. chromic sulphate

**Answer: B**

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11.  $AgCl$  dissolves in ammonia solution giving

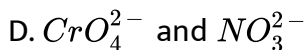
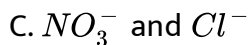
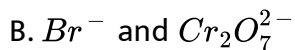
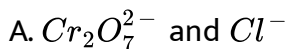
- A.  $Ag^+$ ,  $NH_4^+$  and  $Cl^-$



**Answer: D**

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12. A mixture upon adding conc.  $H_2SO_4$  gives deep red fumes. It may contain the anions pair :



**Answer: A**

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13. A solution of a salt in concentrated sulphuric acid  $H_2SO_4$  acid produced a deep blue colour with starch iodide solution. The salt may be

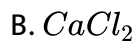
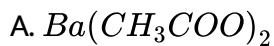
- A. chloride
- B. carbonate
- C. acetate
- D. bromide

**Answer: D**

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14. A colourless solution of a compound gives a precipitate with  $AgNO_3$  solution but no precipitate with a solution of  $Na_2CO_3$ . The action of concentrated  $H_2SO_4$  on the compound liberates a suffocating reddish brown gas.

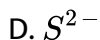
The compound is :



**Answer: D**

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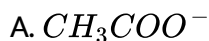
15. When chlorine ( $Cl_2$ ) water in excess is added to a salt solution containing chloroform, chloroform layer turns pale yellow. Salt contains:



**Answer: A**

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16. An aqueous solution of salt containing an acidic radical  $X^-$  reacts with sodium hypochlorite in neutral medium. The gas evolved produces blue black colour spot on the starch paper. The anion  $X^-$  is:



**Answer: C**

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17. When chlorine water is added to an aqueous solution of potassium halide in the presence of chloroform, a colour is developed but on adding more of chlorine water the colour disappears, and a colourless solution is

obtained. This test confirms the presence of the following in aqueous solution.

- A. Iodide
- B. Bromide
- C. Chloride
- D. Iodide and bromide

**Answer: A**



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**18.** Nitrates is confirmed by ring test. The brown colour of the ring is due to formation of:

- A. ferrous nitrite
- B. nitroso ferrous sulphate
- C. ferrous nitrate

D.  $FeSO_4 \cdot NO_2$

**Answer: B**

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**19.** Nitrates of all the metals except mercury and bismuth are:

A. coloured

B. unstable

C. soluble in water

D. insoluble in water

**Answer: C**

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20. Which of the following reagents can be used for making the distinction between  $AgCl$  and  $AgI$ ?

- A. Sodium arsenite solution
- B. Dilute ammonia solution
- C. Potassium cyanide solution
- D. Dilute  $HNO_3$

Answer: A,B



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21. White ppt. of  $PbSO_4$  is soluble in

- A. ammonium acetate ( $6M$ )
- B. dilute  $HCl$
- C. dilute  $H_2SO_4$
- D. none

**Answer: A**

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22. There are four test tubes containing dilute  $HCl$ ,  $BaCl_2$ ,  $CdCl_2$  and  $KNO_3$  solutions. Which of the following reagents with help in the identification of  $BaCl_2$ ?

A.  $NaOH$

B.  $K_2CrO_4$

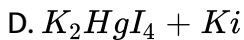
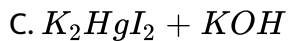
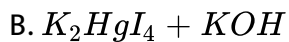
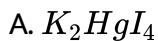
C.  $AgNO_3$

D. both (B) and (C)

**Answer: B**

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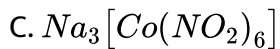
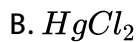
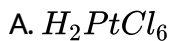
23. Nessler's reagent is



**Answer: B**

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**24.** Ammonia/ammonium ion gives yellow precipitate with:



D. (A) and (C) both

**Answer: D**

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25. Ammonium salts on heating with slaked lime liberates a colourless gas ( $X$ ). Identify the correct statement for gas ( $X$ ).

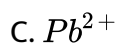
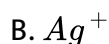
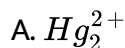
- A. ( $X$ ) turns red litmus blue and produces dense white fumes in contact with dilute  $HCl$
- B. ( $X$ ) turns filter paper moistened with mercurous nitrate black and gives intense blue coloured solution with  $CuSO_4(aq)$
- C. ( $X$ ) when passed through Nessler's reagent produces a brown colour precipitate
- D. All of these

**Answer: D**



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26. A metal nitrate reacts with  $KI$  solution to give yellow precipitate which on addition of excess of more concentrated solution ( $6M$ ) of  $KI$  dissolves forming a solution. The cation of metal nitrate is:

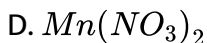
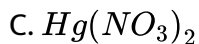
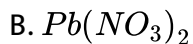
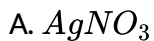


**Answer: C**



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27. Three separate samples of a solution of a single salt gave these results. One formed a white precipitate with excess ammonia solution, one formed a white precipitate with dilute  $NaCl$  solution and one formed a black precipitate with  $H_2S$ . The salt could be:



**Answer: B**

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**28.** White precipitate of silver chloride is soluble in:

A.  $KCN$  solution (excess)

B. sodium thiosulphate solution (excess)

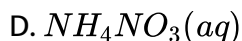
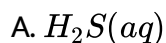
C. ammonia solution

D. concentrated solution of  $KCl$

**Answer: A,B,C,D**

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29.  $Cu^{2+}$  and  $Ag^+$  are both present in the same solution. To precipitate one of the ions and leave the other in solution, add



**Answer: B**



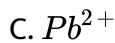
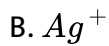
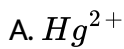
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30. Consider the following observation:



yellow precipitate.

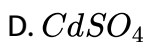
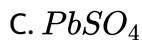
The metal ion  $M^{n+}$  will be:



**Answer: C**

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31. A white crystalline substance dissolves in water. On passing  $H_2S$  in this solution, a black precipitate is obtained. The black precipitate dissolves completely in hot  $HNO_3$ . On adding a few drops of concentrated  $H_2SO_4$ , a white precipitate is obtained. This precipitate is that of





**Answer: C**

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**32.** Sometimes yellow turbidity appears while passing  $H_2S$  gas even in slightly acidic medium in the absence of *II* group radicals. This is because:

- A. sulphur is present in the mixture as impurity.
- B. *IV* group radicals are precipitated as sulphides
- C. of the oxidation of  $H_2S$  gas by some acid radicals
- D. *III* group radicals are precipitated as hydroxides.

**Answer: C**

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33.  $H_2S$  in the presence of  $HCl$  precipitates *II* group but not *IV* group because:

- A.  $HCl$  activates  $H_2S$
- B.  $HCl$  increase concentration of  $Cl^-$
- C.  $HCl$  decreases concentration of  $S^{2-}$
- D.  $HCl$  lowers the solubility of  $H_2S$  in solution.

**Answer: C**



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34. Yellow ammonium sulphide solution is a suitable reagent for the separation of

- A.  $HgS$  and  $PbS$
- B.  $PbS$  and  $Bi_2S_3$
- C.  $Bi_2S_3$  and  $CuS$

D.  $CdS$  and  $As_2S_3$

**Answer: D**

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35. In which of the following pairs the precipitates are red and black coloured respectively and both precipitates are soluble in excess  $KI$  solution?

A.  $Hgl_2$ ,  $Hg_2l_2$

B.  $Hgl_2$ ,  $Pbl_3$

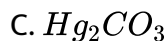
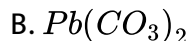
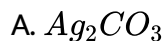
C.  $Cu_2l_2$ ,  $AgI$

D.  $Cdl_2$ ,  $Pbl_2$

**Answer: B**

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36. Which one of the following salts will produce clear and transparent original solution in  $2M HCl$ ?



**Answer: D**



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37. A metal chloride original solution (i.e. *O. S*) on mixing with  $K_2CrO_4$  solution give a yellow precipitate soluble in aqueous sodium hydroxide. The metal may be:

A. mercury

B. iron

C. silver

D. lead

**Answer: D**



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**38.** Which of the following is insoluble in dil.  $HNO_3$  but dissolves in aquaregia ?

A.  $HgS$

B.  $PbS$

C.  $Bi_2S_3$

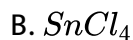
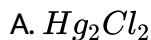
D.  $CuS$

**Answer: A**



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39. When small amount of  $\text{SnCl}_2$  is added to a solution of  $\text{Hg}^{2+}$  ions, a silky white precipitate is obtained. The silky white precipitate is due to the formation of:



**Answer: A**



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40. Which of the following reagents gives white precipitate with  $\text{Hg}(\text{NO}_3)_2$  solution?

A. Cobalt (II) thiocyanate

B. Tin (II) chloride (excess)

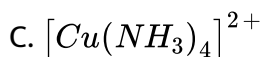
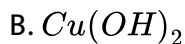
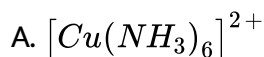
C. ammonia solution

D. Potassium cyanide solution

**Answer: C**

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41. When excess of dilute  $NH_4OH$  is added to an aqueous solution of copper sulphate an intense blue colour is developed. This is due to the formation of:



**Answer: C**

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42. A black sulphide is formed by the action of  $H_2S$  on:

- A. cupric chloride
- B. cadmium chloride
- C. zinc chloride
- D. ferric chloride

Answer: A



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43.  $Cu^{2+}$  ions will be reduced to  $Cu^+$  ions by the addition of an aqueous solution of:

- A.  $KI$
- B.  $KCl$
- C.  $KSCN$



D.  $KCN$

Answer: A,C,D



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44. When bismuth chloride is poured into a large volume of water the white precipitate produced is

A.  $BiO.OH$

B.  $Bi_2O_3$

C.  $BiOCl$

D.  $Bi(OH)_3$

Answer: C



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45. Which of the following is/are correctly matched ?

A.  $Bil \downarrow \rightarrow$  Black

B.  $Cu_2I_2 \downarrow \rightarrow$  White precipitate

C.  $Pbl_2 \downarrow \rightarrow$  Yellow precipitate

D.  $Hgl_2 \downarrow \rightarrow$  Red percipitate

Answer: A,B,C,D



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46. When  $NH_4Cl$  is added to a solution of  $NH_4OH$  :

A. the dissociation of  $NH_4OH$

B. the concentration of  $OH^-$  increases.

C. the concentrations of both  $OH^-$  an  $NH_4^+$  increase.

D. the concentration of  $OH^-$  ion decreases.

**Answer: D**

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47. An original solution of an inorganic salt in dilute  $HCl$  gives a brown colouration with potassium hexacyanidoferrate ( $III$ ) and reddish brown colouration with sodium acetate solution. The cation of the salt is:



D. none

**Answer: B**

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48. Intense blue precipitate of  $Fe_4[Fe(CN)_6]_3$  and potassium hydroxide solution when mixed gives:

- A.  $K_2Fe[Fe(CN)_6]$ -white precipitate
- B.  $Fe(OH)_3$ -reddish -brown precipitate
- C.  $Fe(CN)_3$ -reddish-brown precipitate
- D.  $KFe[Fe(CN)_6]$ -Turnbull's blue

**Answer: B**



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49. Turnbull's blue is a compound.

- A. ferricyanide
- B. ferrous ferricyanide
- C. ferrous cyanide
- D. ferri ferrocyanide

**Answer: B**

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50.  $Fe(OH)_3$  and  $Cr(OH)_3$  precipitates can be completely separated by

:

A. *Aq. NH<sub>3</sub>*

B. *HCl*

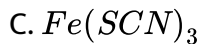
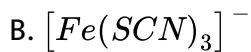
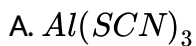
C. *NaOH / H<sub>2</sub>O<sub>2</sub>*

D. *H<sub>2</sub>SO<sub>4</sub>*

**Answer: C**

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51. Ferric alum gives deep red colour with  $NH_4SCN$  due to the formation of :



D. none of these

**Answer: C**

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52.  $NH_4SCN$  can be used to test one or more out of  $Fe^{3+}$ ,  $Co^{2+}$ ,  $Cu^{2+}$ :

A.  $Fe^{3+}$  only

B.  $Co^{2+}$ ,  $Cu^{2+}$  only

C.  $Fe^{3+}$ ,  $Cu^{2+}$  only

D. All

**Answer: D**

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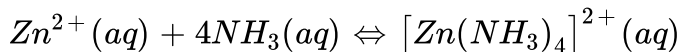
53.  $K_4[Fe(CN)_6]$  can be used to detect one or more out of  $Fe^{2+}$ ,  $Fe^{3+}$ ,  $Zn^{2+}$ ,  $Ag^+$ ,  $Ca^{2+}$ :

- A. only  $Fe^{2+}$ ,  $Fe^{3+}$
- B. only  $Fe^{3+}$ ,  $Zn^{2+}$ ,  $Cu^{2+}$
- C. all but not  $Ca^{2+}$
- D. All of these

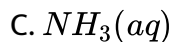
**Answer: D**

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54. To increase significantly the concentration of free  $Zn^{2+}$  ion is a solution of the complex ion  $[Zn(NH_3)_4]^{2+}$



Add to the solution some:



**Answer: B**



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55.  $CoS$  (black) obtained in group *IV* of salt analysis is dissolved in aqua regia and is treated with an excess of  $NaHCO_3$  and then  $Br_2$  water. An apple green coloured stable complex is formed. It is:

A. sodium cobaltocarbonate

B. sodium cobaltibromide

C. sodium cobaltcarbonate

D. sodium cobaltobromide



**Answer: C**

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56. A metal salt solution when treated with dimethyl glyoxime and  $NH_4OH$  give a rose red complex. The metal is

A.  $Ni$

B.  $Zn$

C.  $Co$

D.  $Mn$ .

**Answer: A**

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57. An aqueous solution of colourless metal sulphate  $M$ , gives a white precipitate with  $NH_4OH$ . This was soluble in excess of  $NH_4OH$ . On

passing  $H_2S$  through this solution a white precipitate is formed. The metal  $M$  in the salt is:

A.  $Ca$

B.  $Ba$

C.  $Al$

D.  $Zn$

**Answer: D**



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**58.** Which one of the following ions does not give borax bead test :

A.  $Cr^{3+}$

B.  $Cu^{3+}$

C.  $Mn^{2+}$

D.  $Zn^{2+}$

**Answer: D**



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**59.** Which of the following compound is formed in borax bead test ?

A. Orthoborate

B. Metaborate

C. Double oxide

D. Tetraborate

**Answer: B**



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**60.** White precipitate of  $Zn(OH)_2$  dissolves in:

A. sodium hydroxide solution

B. acid solution

C. ammonia solution

D. solution of ammonium salts

**Answer: A,B,C,D**

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61. Aqueous Solution of  $BaBr_2$  gives yellow precipitate with:

A.  $K_2CrO_4$

B.  $AgNO_3$

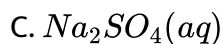
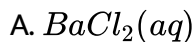
C.  $(CH_3COO)_2Pb$

D. (A) and (B) both.

**Answer: D**

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62. The addition of  $K_2CO_3(aq)$  to the following solution is expected to produce a precipitate in every case but that one which does not produce precipitate is:

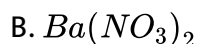
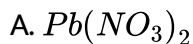


**Answer: C**



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63. An aqueous solution of salt gives salt precipitate with  $AgNO_3$  solution as well as with dilute  $H_2SO_4$ . It may be



C.  $BaCl_2$

D.  $CuCl_2$

**Answer: C**

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**64.** If crimson flame is given when an inorganic mixture is tested by flame test, it may be due to the presence of

A. potassium

B. strontium

C. barium

D. calcium

**Answer: B**

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65. A brick red colour is imparted to Bunsen flame by a :

A. *Ca* salt

B. *Sr* salt

C. *Na* salt

D. *Co* salt

Answer: A



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66. The presence of magnesium is confirmed in the qualitative analysis by:

A. titan yellow solution +  $2MNaOH$  solution

B. disodium hydrogen phosphate +  $NH_4Cl$  +  $NH_3(aq)$

C. magneson (*l*) reagent

D. All of these

**Answer: D**

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67. Which of the following gives a precipitate with  $Pb(NO_3)_2$  but not with  $Ba(NO_3)_2$  ?

- A. Sodium chloride
- B. Sodium sulphate
- C. Disodium hydrogen phosphate
- D. Sodium chromate

**Answer: B,C**

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68.  $Mg$  is not precipitated in  $V$  group because:



A.  $MgCO_3$  is soluble in water.

B.  $K_{sp}$  of  $MgCO_3$  is high.

C.  $MgCO_3$  is soluble in  $NH_4OH$

D. None

**Answer: B**

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69. Statement-1: Baryta water becomes turbid on passing  $CO_2$  gas through it but turbidity becomes clear on passing more  $CO_2$  gas.

Statement-2 : Carbonates give yellowish white precipitate with silver nitrate solution. The precipitate becomes yellow or brown on heating.

A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1

B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2

C. STATEMENT-1 is true, STATEMENT-2 is false

D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**

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**70.** Statement-1: A solution containing  $S^{2-}$  ions gives purple/violet colour with sodium nitroprusside solution in alkaline medium.

Statement-2 : Sodium sulphide gives black precipitate with silver nitrate solution.

A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is

correct explanation for STATEMENT-1

B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not

correct explanation for STATEMENT-2

C. STATEMENT-1 is true, STATEMENT-2 is false

D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**

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71. Statement-1 :Acidified  $K_2Cr_2O_7$  solution becomes green when  $SO_2$  gas is passed through it.

Statement-2 :This is an redox reaction.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**

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72. Statement-1 :White crystalline precipitate of silver sulphite dissolves, if sulphite ions are added in excess

Statement-2 :Sulphite ions decolourise the pink colour of acidified  $KMnO_4$

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**



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73. Statement-1 :Nessler's reagent gives a brown precipitate with aqueous ammonia as well as with ammonium salts.

Statement-2 :Aqueous ammonia gives a brown precipitate with a solution of manganese (*II*) chloride and hydrogen peroxide.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**



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74. Statement-1 :  $Cu^{2+}$  and  $Cd^{2+}$  ions form complexes with excess of potassium cyanide solution.

Statement-2 : On passing  $H_2S$  gas, complex  $[Cu(CN)_4]^{3-}$  is not effected but  $[Cd(CN)_4]^{2-}$  gives yellow precipitated.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**



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75. Statement-1 :A solution of  $BiCl_3$  in concentrated  $HCl$  when diluted with water gives white precipitate.

Statement-2 : $BiCl_3$  forms insoluble  $BiO^+ Cl^-$  when diluted with a large quantity of water.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: A**



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76. Statement-1: When  $H_2S$  gas is passed into an aqueous solution of  $ZnCl_2$ ,  $Zn^{2+}$  ions are completely precipitated as zinc sulphide.

Statement-2 : Zinc sulphide is soluble in solutions of caustic alkali as well as in dilute  $HCl$ .

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: E**



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77. Statement -1 :An original solution containing excess of  $Ni^{2+}$  ions gives a yellow coloured solution with potassium cyanide solution.

Statement-2 :A solution of  $Ni^{2+}$  ions gives red precipitate with dimethylglyoxime solution just made alkaline with ammonia.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**



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78. Statement-1 :  $V$  group basic radicals are precipitated as their carbonates by  $(NH_4)_2CO_3$  in presence of ammonia or ammonium chloride.

Statement-2 : Aqueous ammonia maintains the  $pH$  of the solution basic.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**



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79. Statement-1 : In dilute solution of strontium ions, yellow precipitate of  $SrCrO_4$  is formed with  $CrO_4^{2-}$  ions.

Statement-2 :The  $SrCrO_4$  precipitate is appreciably soluble in water, therefore, no precipitation occurs when water is taken in large quantity.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: D**



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80. Statement-1 :White precipitate of  $Mg(OH)_2$  is insoluble in excess of sodium hydroxide but readily soluble in solution of ammonium salts.

Statement-2 : $Mg(OH)_2$  is very sparingly soluble in water.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

**Answer: B**



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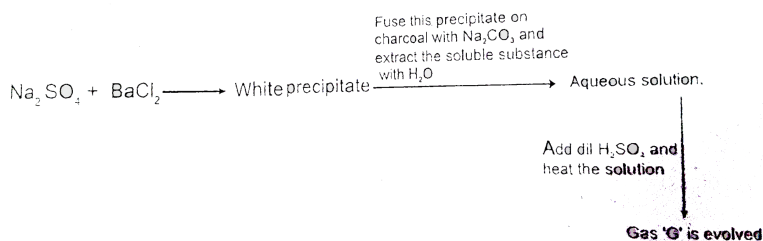
81. Statement-1 :White precipitate of zinc phosphate is soluble in ammonia.

Statement-2 :Zinc phosphate form a soluble complex with ammonia.

- A. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is correct explanation for STATEMENT-1
- B. STATEMENT-1 is true, STATEMENT-2 is true and STATEMENT-2 is not correct explanation for STATEMENT-2
- C. STATEMENT-1 is true, STATEMENT-2 is false
- D. STATEMENT-1 is false, STATEMENT-2 is true

Answer: A

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82.

The gas 'G' will show which of the following property ?

- A. It turns lead acetate filter paper black.
- B. It turns acidified  $K_2Cr_2O_7$  filter paper green.
- C. It produces purple colouration on filter paper moistened with sodium nitroprusside already made alkaline with sodium hydroxide.
- D. All of these

**Answer: D**

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83. Consider the following reaction, Nitrite + Acetic acid + Thiourea  
 $\rightarrow N_2 \uparrow + SCN^- + 2H_2O$  Formation of the product in the above reaction can be identified by:

- A.  $FeCl_3$  / dilute  $HCl$ , when blood red colour appears.
- B.  $FeCl_3$  / dilute  $HCl$ , when blue colour appears.
- C.  $K_2Cr_2O_7$  /  $HCl$ , when green colour appear.
- D.  $KMnO_4$  /  $HCl$ , when colourless solution is formed.

**Answer: A**

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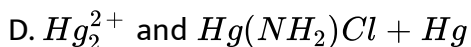
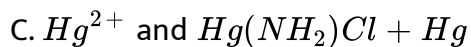
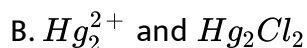
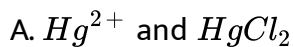
**84.** White precipitate of  $AgCl$  turns to greyish or black when:

- A. reacts with  $Na_3AsO_4$
- B. exposed to sunlight
- C. reacts with  $K_2CrO_4$
- D. reacts with concentrated  $HCl$

**Answer: B**

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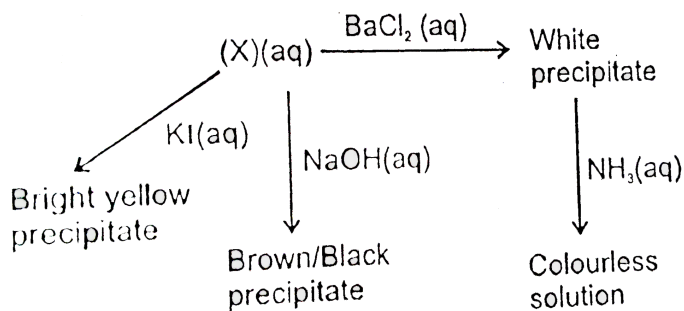
**85.** An aqueous solution of compound ' $A$ ' gives white precipitate with  $2M HCl$ . The precipitate becomes black on addition of aqueous  $NH_3$  due to formation of ' $B$ '. ' $B$ ' dissolves in aquaregia. ' $A$ ' and ' $B$ ' are:



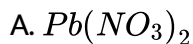
Answer: D

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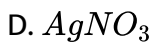
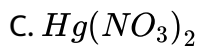
86. A compound ( $X$ ) reacts in the following ways.



The compound ( $X$ ) is likely to be







**Answer: D**



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**87.** To a solution of a substance, gradual addition of ammonium hydroxide results in a brownish black precipitate which does not dissolve in excess of  $NH_4OH$ . However, when  $KI$  (not in excess) is added to the original solution, a green precipitate is formed. The solution contained :

A. Lead salt

B. Silver salt

C. Mercurous salt

D. Copper salt.

**Answer: C**



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88. Black precipitate of copper sulphide dissolves in:

- A.  $KCN$  solution
- B. sodium sulphide solution
- C. sodium hydroxide
- D. boiling dilute ( $M$ ) sulphuric acid.

**Answer: A**



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89. Which of the following metal salts gives a red and opaque borax bead in the reducing flame (in cold)?

- A.  $Ni$
- B.  $Fe$

C.  $Cu$

D.  $Mn$

**Answer: C**



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**90.** Which one among the following pairs of ions cannot be separated by  $H_2S$  in dilute hydrochloric acid ?

A.  $Bi^{3+}$ ,  $Sn^{4+}$

B.  $Al^{3+}$ ,  $Hg^{2+}$

C.  $Zn^{2+}$ ,  $Cu^{2+}$

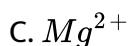
D.  $Ni^{2+}$ ,  $Cu^{2+}$

**Answer: A**



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91. The reagents,  $NH_4Cl$  and aqueous  $NH_3$  will precipitate



**Answer: B**



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92. In the precipitation of the iron group in qualitative analysis, ammonium chloride is added before adding ammonium hydroxide to

A. decrease concentration of  $OH^-$  ions

B. prevent interference by phosphate ions

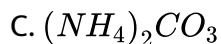
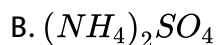
C. increase concentration of  $Cl^-$  ions

D. increase concentration of  $NH_4^+$  ions

**Answer: A**

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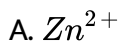
**93.** Which one of the following can be used in place of  $NH_4Cl$  for the identification of the third group radicals ?



**Answer: A**

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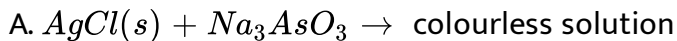
**94.** Which one of the following metal salts produces a blue coloured bead in cobalt nitrate charcoal cavity test ?



**Answer: D**

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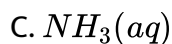
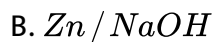
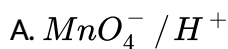
**95.** Which of the following is correct ?



**Answer: C**

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96.  $Fe^{3+}$  does not give prussian blue colour with  $K_4[Fe(CN)_6]$  but on its reaction with (X), prussian blue colour appears (X) can be:



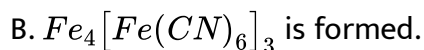
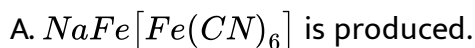
D. all true

**Answer: A**



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97. When  $HNO_3$  is added to sodium ferrocyanide, which of the following observation is observed ?



C.  $Fe_3[Fe(CN)_6]_2$  is formed.

D.  $Na_2[Fe(CN)_5(NO)]^{2-}$  is formed.

**Answer: D**

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98. What product is formed by mixing the solution of  $K_4[Fe(CN)_6]$  with the solution of  $FeCl_2$ ?

- A. Ferro ferricyanide
- B. Ferric ferrocyanide
- C. Ferric ferricyanide
- D. None

**Answer: D**

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99. Select the correct statement with respect to  $Fe^{3+}$  ions.

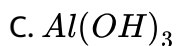
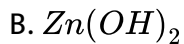
- A. Iron (*III*) ions react with  $H_2S$  in acidic solution to give a black precipitate of  $Fe_2S_3$
- B. Iron (*III*) ions react with ammonium sulphide to give the black precipitate of  $Fe_2S_3$
- C. Iron (*III*) ions react with ammonium thioxanate solution to produce deep red colouration.
- D. All of these

Answer: C

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100. Which one of the following compounds on reaction with  $Na_2O_3$  in alkaline medium gives yellow colour solution?

A.  $Cr(OH)_3$



D. none of these

**Answer: A**

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**101.** A dark green bead in the borax bead test (in oxidising flame) indicates the presence of:



**Answer: A**

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102. Which of the following cation does not give red colour precipitate/solution with dimethylglyoxime (*DMG*) in alkaline solution?



D. both (A) and (C)

**Answer: A**



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103. A suspension containing insoluble substances  $ZnS$ ,  $MnS$ ,  $HgS$ ,  $Ag_2S$  and  $FeS$ , is treated with  $2NHCl$ . On filtering, the filtrate contains appreciable amounts of which one of the following ?

A. Zinc and mercury

B. Silver and iron

C. Manganese and mercury

D. Zinc, manganese and iron

**Answer: D**

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**104.** An aqueous solution contains both  $Al^{3+}$  &  $Zn^{2+}$ . To this solution  $NH_4OH$  is added in excess.

A. Only  $Al(OH)_3$  will be precipitated.

B. Only  $Zn(OH)_2$  will be precipitated.

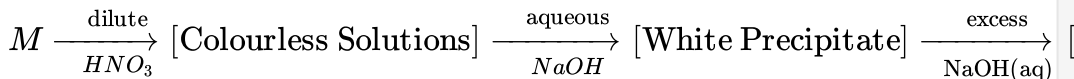
C. Both will be precipitated.

D. No precipitate will appear.

**Answer: A**

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105. A metal M and its compound can give the following observable changes in a consequence of reactions



A. *Mg*

B. *Pb*

C. *Zn*

D. *Sn*

**Answer: C**



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106. In fifth group,  $(\text{NH}_4)_2\text{CO}_3$  is added to precipitate out the carbonates. We do not add  $\text{Na}_2\text{CO}_3$  because:

A.  $\text{CaCO}_3$  is soluble in  $\text{Na}_2\text{CO}_3$

B.  $Na_2CO_3$  increases the solubility of fifth group carbonates

C.  $MgCO_3$  will be precipitated out in fifth group

D. none

**Answer: C**

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**107.** A metal salt solution forms a yellow precipitate with potassium chromate in acetic acid, a white precipitate with dilute  $H_2SO_4$  but gives no precipitate with sodium chloride or iodide, it is

A. lead carbonate

B. basic lead carbonate

C. barium carbonate

D. strontium carbonate

**Answer: C**



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108.  $Na_2SO_4$  and  $Na_2S$  can be distinguished from each other by using:

- A. dilute  $H_2SO_4$
- B. acidified  $KMnO_4$  solution
- C. sodium nitroprusside solution
- D. cadmium acetate solution

Answer: A,B,C,D



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109. Which of the following anion (s) evolve(s) reddish brown gas with concentrated  $H_2SO_4$ ?

- A.  $Br^-$
- B.  $NO_3^-$

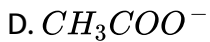
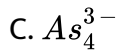
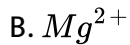


**Answer: A,B**



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**110.** Ammonium molybdate test is used for the estimation of:



**Answer: A,C**



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111.  $Cu^{2+}$  ions give white precipitate with :

- A. potassium iodide solution
- B. potassium thiocyanate and saturated solution of  $SO_2$ .
- C. excess potassium cyanide solution
- D. potassium hydroxide solution

Answer: A,B



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112. Which of the following statements is /are true ?

- A.  $Ag^+$  ions do not give white precipitate with excess of concentrated  $HCl$
- B.  $Cu^{2+}$  ions produce a white precipitate when  $KCN$  solution is added in a small quantity.

C.  $Hg^{2+}$  ions give deep blue precipitate with cobalt acetate and ammonium thiocyanate.

D. Black precipitate of  $BiI_3$  turns orange when heated with water.

**Answer: A,B,C,D**



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113.  $KI$  solution is the reagent for:

A.  $Hg^{2+}$

B.  $Pb^{2+}$

C.  $Ag^+$

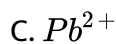
D.  $Cu^{2+}$

**Answer: A,B,C,D**



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114. Which of the following cations form(s) black precipitate(s) with  $H_2S(g)$  ?

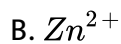


**Answer: A,C,D**



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115. Borax bead test is given by :



Answer: A,C,D

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116. Concentrated aqueous ammonia dissolve(s) which of the following completely ?

A.  $AgCl$

B.  $AgBr$

C.  $Ag_2CrO_4$

D.  $AgI$

Answer: A,B,C

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117.  $Hg_2I_2$   $\downarrow$  (green)  $\xrightarrow[\text{with } H_2O]{\text{boiled}}$  products

Which of the following statement is correct with respect to the products

?

A. Black precipitate of mercury (*I*) oxide is formed.

B. Voilet colour gas is evolved.

C. Red precipitate of  $Hgl_2$  is formed.

D. Mercury is obtained.

**Answer: C,D**



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**118.** Which of the following statement(s) is /are false ?

A.  $Fe^{3+}$  gives red precipitate with dimethyl glyoxime in alkaline solution.

B.  $Cu^{2+}$  ion with potassium iodide solution gives a dirty brownish white precipitate which turns white on adding hypo solution.

C. A filter paper soaked in mercurous nitrate turns black in contact with ammonia gas.

D.  $Ag_2O$  does not dissolve in nitric acid and ammonia solution.

**Answer: A,D**

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**119.** Which of the following statement(s) is/are true?

A. Titan yellow solution gives red colouration with a neutral solution containing  $Mg^{2+}$  ions

B. Solution of nitrile is decomposed by sulphamic acid.

C.  $Fe^{2+}$  ions give brown colour precipitate with  $[Fe(CN)_6]^{3-}$  ions solution.

D. Green precipitate of  $Cr(OH)_3$  is soluble in  $Na_2O_2$

**Answer: B,D**



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120. Which of the following is/are correct for potassium ferrocyanide ?

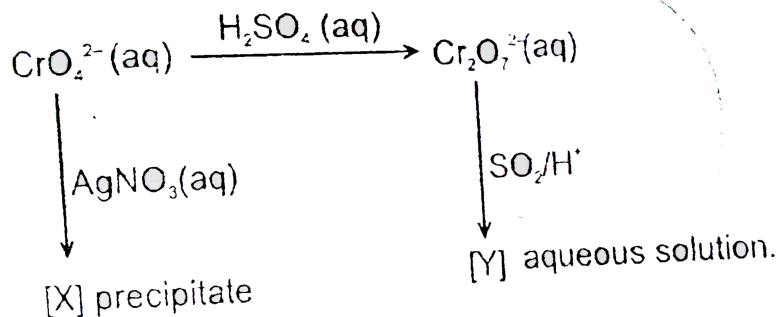
- A. It gives a brown precipitate with  $Cu^{2+}$  ions.
- B. It gives a white precipitate of mixed salt with  $Ca^{2+}$  ions.
- C. It in excess gives a bluish white/white precipitate with  $Zn^{2+}$
- D. It develops a deep red colouration with  $Fe^{3+}$

**Answer: A,B,C**



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121. Consider the reactions shown below:



Which of the following statement (s) is/are correct?

- A. [X] is a yellow coloured precipitate.
- B. [X] is soluble in ammonia solution
- C. [Y] gives green coloured solution with excess of sodium hydroxide solution.
- D. The conversion of  $\text{Cr}_2\text{O}_7^{2-}$  to [Y] is an redox reaction.

Answer: B,C,D

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Aqueous solution of 'A'  $\xrightarrow{H_2S(g)}$  Black precipitate 'B', soluble in 50%  $HNO_3$  forming 'C'.

↓  $NH_4$  solution  
 White precipitate dissolves in hydrochloric acid but on dilution with water again white turbidity appears 'E'.

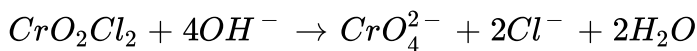
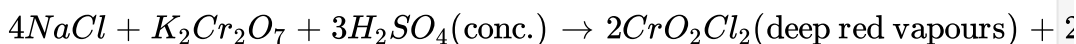
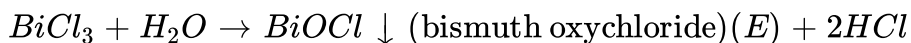
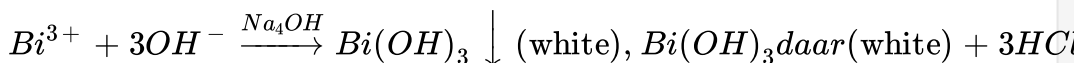
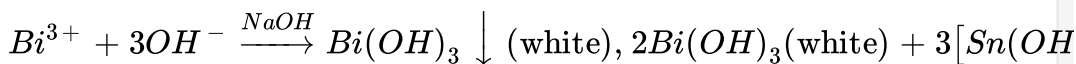
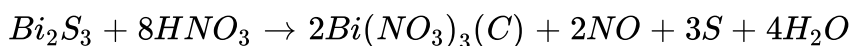
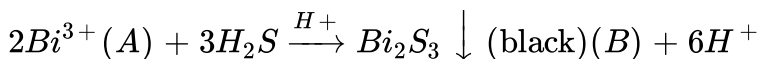
↓ Alkaline  $Na_2SnO_3$   
 Black precipitate 'D'

122.

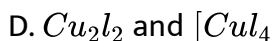
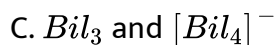
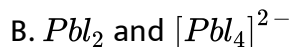
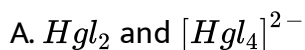
Moreover, the salt 'A' on heating with solid  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$  produces deep red vapours which dissolve in sodium hydroxide solution forming a yellow solution. This yellow solution gives yellow precipitate with  $Ba((NO)_3)_2$  solution.

On the basis of the aforesaid characteristic informations answer the following question :

Reaction involved in comprehension :



Acidified solution of 'A' on treatment with  $KI$  gives black precipitate 'F' which dissolves in excess of reagent forming the coloured compound 'G'. The chemical composition of 'F' and 'G' are respectively:



**Answer: C**

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Aqueous solution of 'A'  $\xrightarrow{H_2S(g)}$  Black precipitate 'B', soluble in 50%  $HNO_3$  forming 'C'.

$\downarrow$   
 $NH_3$  solution

White precipitate dissolves in hydrochloric acid but on dilution with water again white turbidity appears 'E'.

$\downarrow$   
 Alkaline  $Na_2SnO_3$

Black precipitate 'D'

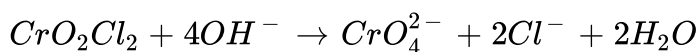
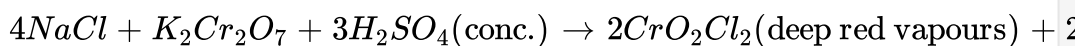
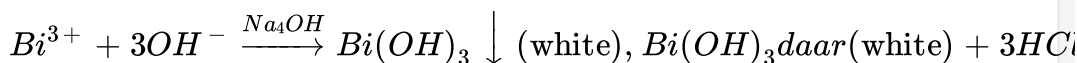
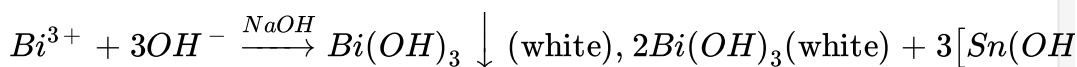
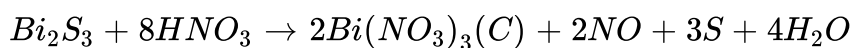
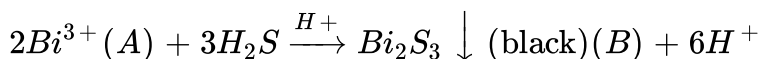
123.

Moreover, the salt 'A' on heating with solid  $K_2Cr_2O_7$  and concentrated

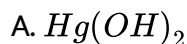
$H_2SO_4$  produces deep red vapours which dissolve in sodium hydroxide solution forming a yellow solution. This yellow solution gives yellow precipitate with  $Ba((NO)_3)_2$  solution.

On the basis of the aforesaid characteristic informations answer the following question :

Reaction involved in comprehension :

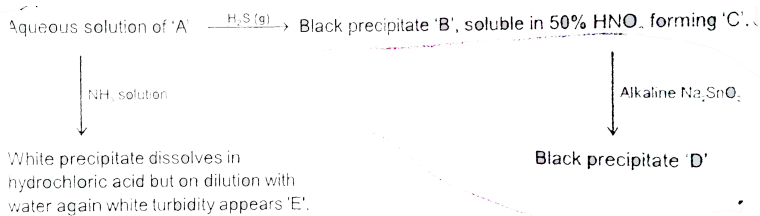


The black precipitate 'F' on heating with water produces :



Answer: B

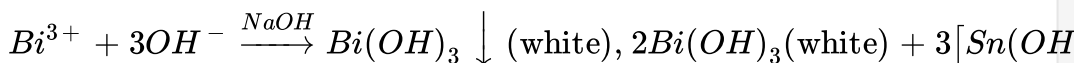
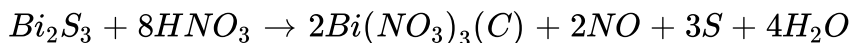
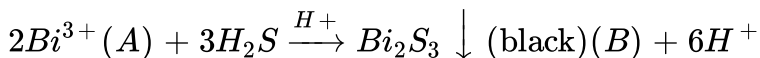
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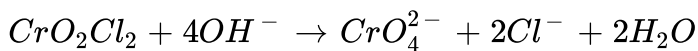
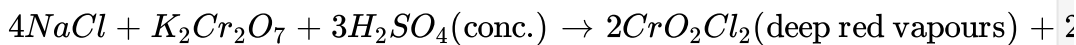
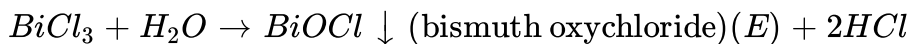
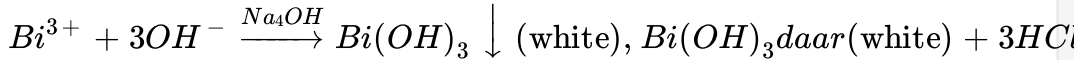


Moreover, the salt 'A' on heating with solid  $K_2Cr_2O_7$  and concentrated  $H_2SO_4$  produces deep red vapours which dissolve in sodium hydroxide solution forming a yellow solution. This yellow solution gives yellow precipitate with  $Ba((NO)_3)_2$  solution.

On the basis of the aforesaid characteristic informations answer the following question :

Reaction involved in comprehension :





Which of the following statements is incorrect ?

- A. The black precipitate 'D' is of bismuth.
- B. The black precipitate 'D' is of  $Hg + Hg(NH_2)NO_3$
- C. Aqueous solution of 'A' gives yellow precipitate with freshly prepared 10% solution of pyrogallol.
- D. Aqueous solution of 'A' gives red precipitate with 8-hydroxyquinoline (5%) and potassium iodide (6M) in acidic medium.

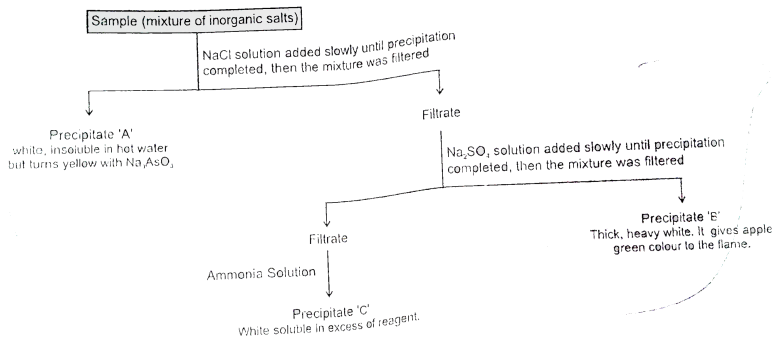
**Answer: B**



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125. A student was given a sample of colourless solution containing three cations and was asked to identify the cations. Student carried out a series of reactions as given below.

Precipitates 'A', 'B' and 'C' are respectively:



- A.  $\text{Al}(\text{OH})_3$ ,  $\text{BaSO}_4$  and  $\text{AgCl}$
- B.  $\text{AgCl}$ ,  $\text{BaSO}_4$  and  $\text{Zn}(\text{OH})_2$
- C.  $\text{AgCl}$ ,  $\text{Ca}(\text{OH})_2$  and  $\text{ZnSO}_4$
- D.  $\text{ZnCl}_2$ ,  $\text{BaSO}_4$  and  $\text{Al}(\text{OH})_3$

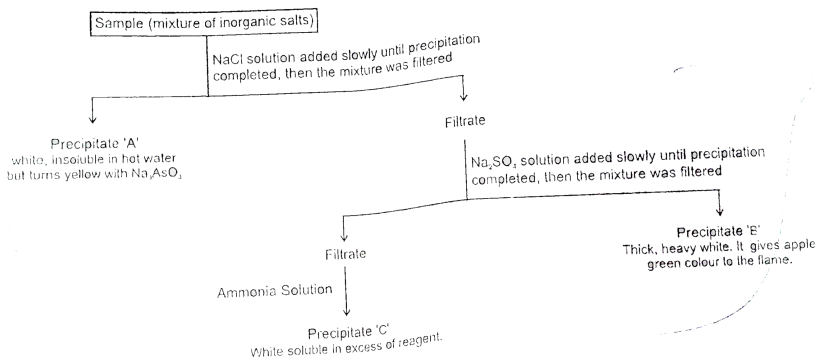
**Answer: B**



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126. A student was given a sample of colourless solution containing three cations and was asked to identify the cations. Student carried out a series of reactions as given below.

White precipitate 'A' is not soluble in:



A.  $\text{NH}_3$

B.  $2\text{M HCl}$

C.  $\text{KCN}$

D.  $\text{Na}_2\text{S}_2\text{O}_3$

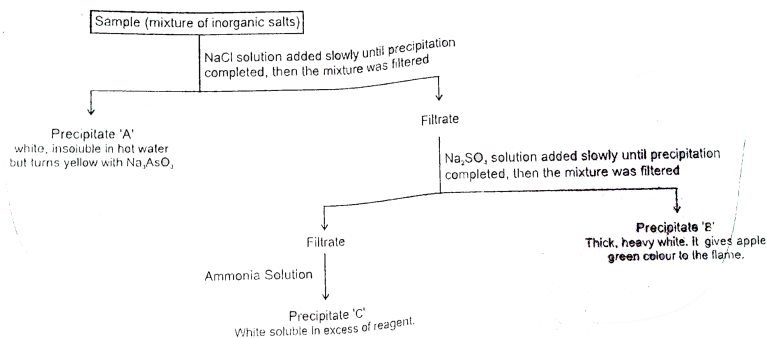
Answer: B



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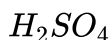
127. A student was given a sample of colourless solution containing three cations and was asked to identify the cations. Student carried out a series of reactions as given below.

Which of the following statements is correct ?



A. Precipitate 'C' gives Rinmann's green test.

B. Precipitate 'B' is appreciably soluble in boiling concentrated



C. Precipitate (A) on exposure to sunlight or ultraviolet radiations turns black.

D. All of these

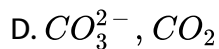
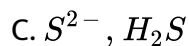
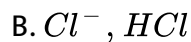
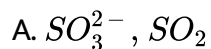
**Answer: D**



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128.  $[X] + H_2SO_4 \rightarrow [Y]$  a colourless gas with irritating smell,  
 $[Y] + K_2Cr_2O_7 + H_2SO_4 \rightarrow$  green solution.

$[X]$  and  $[Y]$  are respectively :



**Answer: A**

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