

Answer Key

1. (D)	2. (C)	3. (D)	4. (C)	5. (ABD)
6. (ABCD)	7. (C)	8. (B)	9. (C)	10. (D)
11. (C)	12. (D)	13. (B)	14. (B)	15. (C)
16. (D)	17. (A)	18. (A) - (p,q,s) ; (B) - (s) ; (C) - (r) ; (D) - (p,q,t)		

Solution

- In presence of NH_4OH and H_2S , S^{2-} concentration is more. Both II and IV group cations are precipitated.
- $$\text{Zn} \xrightarrow{\text{dil. HNO}_3} \text{Zn(NO}_3)_2 \xrightarrow{\text{dil. NaOH}} \text{Zn(OH)}_2 \xrightarrow{\text{Excess NaOH}} (\text{Zn(OH)}_4)_2 \xrightarrow{\text{H}_2\text{S}} \text{ZnS (White)}$$
- (A) As KSP of hydroxides of Al^{3+} , Fe^{3+} & Cr^{3+} are low and NH_4Cl suppresses the ionisation of NH_4OH .

(B) $(\text{NH}_4)_2\text{SO}_4 + \text{Ba}^{2+} \rightarrow \text{BaSO}_4 \downarrow (\text{white}) + 2\text{NH}_4^+$.

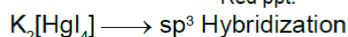
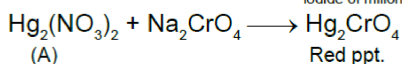
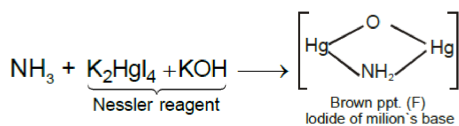
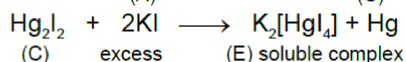
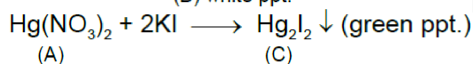
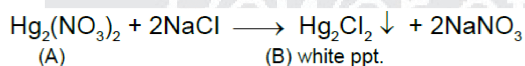
(C) $\text{SO}_4^{2-} + \text{Ba}^{2+} \rightarrow \text{BaSO}_4 \downarrow (\text{white})$ as it contains SO_4^{2-} as anion.
- $$\text{S}_2\text{O}_3^{2-} + 2\text{H}^+ \xrightarrow{\Delta} \underset{\text{gas pungent odour}}{\text{SO}_2} + \underset{\text{pale yellow ppt.}}{\text{S}} + \text{H}_2\text{O}$$
- When a solid mixture of NaCl , $\text{K}_2\text{Cr}_2\text{O}_7$ and conc. H_2SO_4 is heated, the products obtained are :

$$4\text{KCl} + \text{K}_2\text{Cr}_2\text{O}_7 + 6\text{H}_2\text{SO}_4 \longrightarrow \underset{\text{red vapour}}{2\text{CrO}_2\text{Cl}_2} + 6\text{KHSO}_4 + 3\text{H}_2\text{O}$$

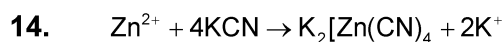
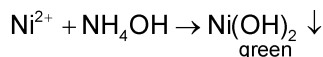
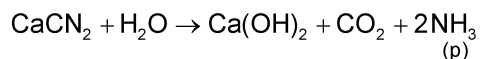
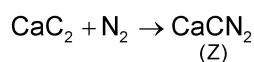
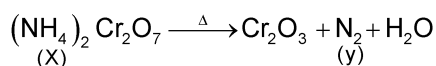
$$\text{CrO}_2\text{Cl}_2 + 4\text{NaOH} \longrightarrow \text{Na}_2\text{CrO}_4 + 2\text{NaCl} + 2\text{H}_2\text{O}$$

red vapour
- A, B and C form beryllate, aluminate and zincate. D is acidic oxide and reacts with NaOH forming chromate.

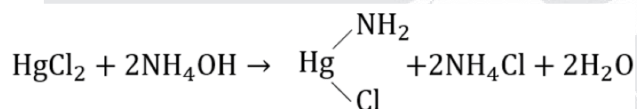
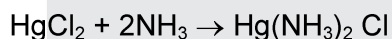
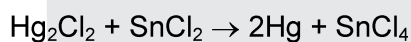
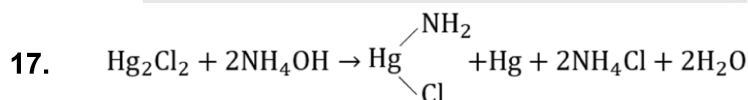
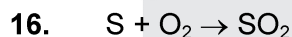
Sol. 7 to 10



Sol. 11 – (c), 12 – (d), 13 – (b)



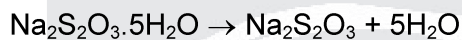
15. C is ZnSO_4 which crystallizes as $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$



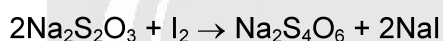
18. (A) - (p,q,s) ; (B) - (s) ; (C) - (r) ; (D) - (p,q,t)

19. (I) Step (ii) suggest that X may be hypo as it decolorizes solution of I_2 and also loses water of crystallization.

(II) X is $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$, i.e., hypo



(X) Turbidity



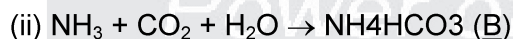
(X)



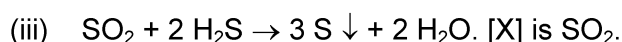
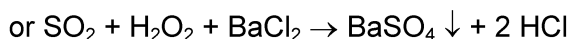
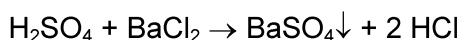
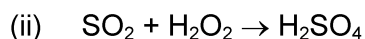
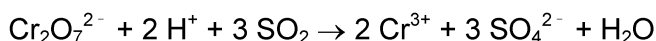
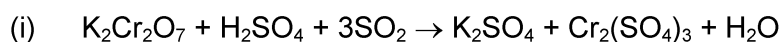
White

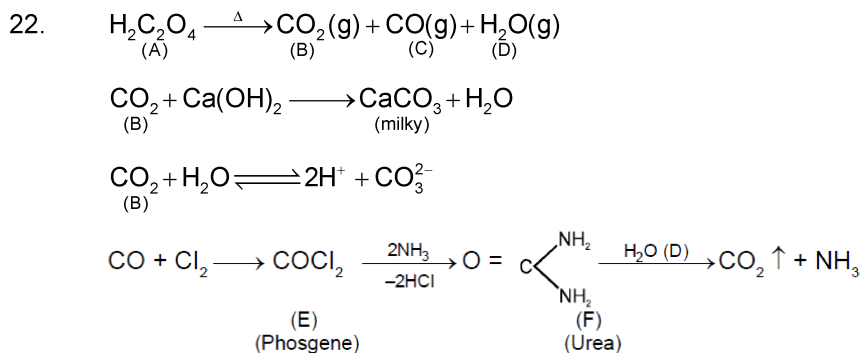


(A)



21. (X) decolourizes $\text{K}_2\text{Cr}_2\text{O}_7$ solution hence it should be reducing agent.

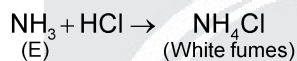
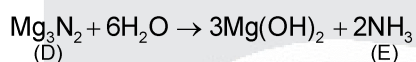
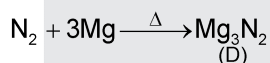
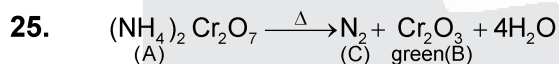




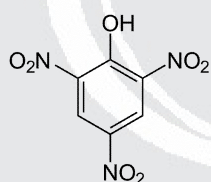
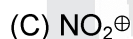
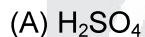
23. X is anhydrous $AlCl_3$, a Lewis acid

- (i) $AlCl_3 + 3H_2O \rightarrow Al(OH)_3 + 3HCl$ (fumes)
- (ii) $HCl + NH_4OH \rightarrow NH_4Cl + H_2O$
white fumes
- (iii) $AlCl_3 + 3NaOH \rightarrow 3NaH_2AlO_2 + 3H_2$ (white ppt.)
 $Al(OH)_3 + NaOH \rightarrow NaAlO_2 + 2H_2O$
(soluble)
- (iv) $AlCl_3 + H_2S \rightarrow$ No ppt. in acidic medium.

24. (4)



26.



(D)

Reactions involved are:

