## **Co-ordination Compounds**

**1. Assertion (A):** The aqueous solution of K<sub>2</sub>SO<sub>4</sub>.Al(SO<sub>4</sub>)<sub>3</sub>.24H<sub>2</sub>O is acidic in nature.

**Reason (R):** It ionizes to give a complex ion.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **2.** Assertion (A): In the complex  $K_2[PtCl_6]$  coordination number of Pt is 6.

**Reason (R):** In the complex six coordination bonds are formed between Pt and chloro ligands.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **3. Assertion (A):** Tetrahedral complex do not exhibit geometrical isomerism.

**Reason (R):** In tetrahedral complex all the four positions are identical.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

**4. Assertion (A):** [Fe(CO)<sub>5</sub>] is inner orbital complex.

**Reason (R):** In the given complex oxidation state of Iron is zero.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 5. Assertion (A):  $[Fe(CN)_6]^{-3}$  is paramagnetic in nature.

**Reason (R):**  $[Fe(CN)_6]^{-3}$  is low spin complex.

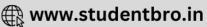
- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **6. Assertion (A):** Hexachloroplatinate is a complex anion.

**Reason (R):** Complex has negatively charged ligands.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false







7. Assertion (A):  $[Ni(CN)_4]^{-2}$  has zero unpaired electron while that of  $[NiCl_4]^{-2}$  has two unpaired e<sup>-</sup>.

**Reason (R):**  $[NiCl_4]^{-2}$  has strong crystal field while  $[NiCl_4]^{-2}$  has weak crystal field.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **8.** Assertion (A): Cis [Fe(en)<sub>2</sub>Cl<sub>2</sub>]<sup>+</sup> can form racemic mixture.

**Reason (R):** Cis –  $[Fe(en)_2Cl_2]^+$  is square planar complex.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- Assertion (A): Square planar complex
  Ma<sub>2</sub>b<sub>2</sub> has two optical isomers.

**Reason (R):** Mirror image of Ma<sub>2</sub>b<sub>2</sub> is nonsuper impossible.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

**10. Assertion (A):** Agl is coloured while AgF is colourless.

**Reason (R):** Unpaired e<sup>-</sup> Present In Agl.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **11. Assertion (A):**  $[CoF_6]^{3-}$  is high spin complex.

**Reason (R):** F<sup>-</sup> is strong field ligand.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **12. Assertion (A):** Ferrocene is  $\pi$  bonded organometallic compound.

**Reason (R):** Ferrocene is a sandwich compound.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false







**13. Assertion (A):** Solution of Na<sub>2</sub>CrO<sub>4</sub> in water is intensely coloured.

**Reason (R):** Ox, state of Cr in  $Na_2CrO_4$  is +6.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **14. Assertion (A):** Potassium ferrocyanide is diamagnetic whereas potassium ferricyanide is paramagnetic.

**Reason (R):** Crystal field splitting in ferrocyanide ion is greater than that of ferricyanide ion.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **15. Assertion (A):** In a mixture of Cd (II) and Cu(II), (Cd<sup>+2</sup>) gets precipitated in presence of KCN by H<sub>2</sub>S.

**Reason (R):** The stability constant of  $[Cu(CN)_4]^{-3}$  is greater than  $[Cd(CN)_4]^{2-}$ .

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

**16. Assertion (A):** aq. Solution of CoCl<sub>2</sub> is pink in colour. It turns blue in presence of conc, HCl.

**Reason (R):** It is due to formation of  $[CoCl_4]^{2-}$ .

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **17. Assertion (A):** Triethylenediamine is a bidentate monoanion

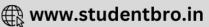
**Reason (R):** Complex containing propylenediamine ligand shows ligand isomerism.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **18.** Assertion (A): [Co<sup>III</sup>(gly)₃] is called innermetallic complex because.

**Reason (R):** Both the coordination number and charge of the cation are satisfied simultaneously by ligands.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false





**19. Assertion (A):** All tetrahedral complexes are mainly high spin and low spin configurations are rarely observed.

**Reason (R):**  $\Delta_t$  is always much smaller even with stronger field ligands and it is never energetically favourable to pair up the electrons.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **20. Assertion (A):** NH<sub>2</sub>NH<sub>2</sub> although possesses two electron pairs for donation but not acts as a chelating agent.

**Reason (R):** The coordination by NH<sub>2</sub>NH<sub>2</sub> leads to a three member highly unstable strained ring

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **21. Assertion (A):** The correct order for the wave length of absorption in the visible region is ;  $[Ni(NO_2)_6]^{4-} < [Ni(NH_3)_6]^{2+} < [Ni(H_2O)_6]^{2+}$

**Reason (R):** The stability of different complexes depends on the strength of the ligand field of the various ligands.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

**22. Assertion (A):** The 'spin only' magnetic moment of a green complex, potassium amminetetracyani donitrosonium chromate(I) is 1.73 BM.

**Reason (R):** To have two d-orbitals empty for d<sup>2</sup>sp<sup>3</sup> hybridisation, the pairing of electrons take place leaving behind one unpaired electron as CN<sup>-</sup> is a stronger ligand.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 23. Assertion (A): Pentaamminethiocyanato-N-chromium (III) tetrachloridozincate (II) is a coloured compound and is an example of ionisation isomerism.

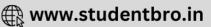
**Reason (R):** The compound is paramagnetic and therefore, d-d transition is possible

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **24.** Assertion (A):  $Cu[Hg(SCN)_4]$  and  $Hg[Co(NCS)_4]$  are isomers.

**Reason (R):** SCN<sup>-</sup> is an ambidentate ligand.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false





**25. Assertion (A):** Coordination number of Pt in Zeise's salt is 5.

**Reason (R):** C<sub>2</sub>H<sub>4</sub> act as bidentate ligand.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **26.** Assertion (A):  $Fe^{+3}$  not used brown ring test of  $NO_3^{-1}$

**Reason (R):**  $NO_3^-$  is first converted into  $NO_2$ .

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 27. Assertion (A):  $[Co(H_2O)_6]^{+3} \rightarrow [Co(H_2O)_6]^{+2}$  changes its colour on reduction.

**Reason (R):** Crystal field stabilization energy increases on reduction

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

**28.** Assertion (A): If in  $[Co(NH_3)_6]^{+3}$ ,  $NH_3$  is replaced by  $H_2O$ , same wavelength will be absorbed by the complex :

Reason (R): It is a high spin species.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **29.** Assertion (A):  $\left[ \text{Co} \left( \text{NH}_3 \right)_5 \text{CI} \right] \text{CI}_2$  reacts with excess of AgNO<sub>3</sub> solution to give 2 moles of AgCl.

**Reason (R):** Primary valencies are ionisable.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

ANSWER KEY																				
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	3	1	1	2	2	2	1	3	4	3	3	2	2	3	1	1	4	2	1	1
Que.	21	22	23	24	25	26	27	28	29											
Ans.	2	1	4	4	2	3	3	4	1											

