





- c) Neutral ferric acid  
d) Dimethylglyoxime
20. The kind of isomerism exhibited by  $[\text{Rh}(\text{en})_2\text{Cl}_2][\text{Ir}(\text{en})\text{Cl}_4]$  and  $[\text{Ir}(\text{en})_3][\text{RhCl}_6]$  is: [1]
- a) Ionisation isomerism  
b) Linkage isomerism  
c) Position isomerism  
d) Coordination isomerism

### Section B

21. **Assertion (A):** Linkage isomerism arises in coordination compounds containing ambidentate ligand. [1]  
**Reason (R):** Ambidentate ligand has two different donor atoms.
- a) Assertion and reason both are true, the reason is the correct explanation of assertion.  
b) Assertion and reason both are true but the reason is not the correct explanation of assertion.  
c) The assertion is true, the reason is false.  
d) The assertion is false, the reason is true.
22. **Assertion (A):**  $\text{F}^-$  ion is a weak ligand and forms outer orbital complex. [1]  
**Reason (R):**  $\text{F}^-$  ion cannot force the electrons of  $d_{z^2}$  and  $d_{x^2-y^2}$  orbitals of the inner shell to occupy  $d_{xy}$ ,  $d_{yz}$  and  $d_{zx}$  orbitals of the same shell.
- a) Both A and R are true and R is the correct explanation of A.  
b) Both A and R are true but R is not the correct explanation of A.  
c) A is true but R is false.  
d) A is false but R is true.
23. **Assertion:** The oxidation state of Pt in Zeise salt is +2. [1]  
**Reason:** Zeise salt is non-ionic complex.
- a) Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.  
b) Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.  
c) Assertion is CORRECT but, reason is INCORRECT.  
d) Both assertion and reason are INORRECT.
24. **Assertion (A):** The complex  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$  gives precipitates corresponding to 2 mol of AgCl with  $\text{AgN}_3$  solutions. [1]  
**Reason (R):** It ionises as  $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+ + \text{Cl}^-$ .
- a) Both A and R are true and R is the correct explanation of A.  
b) Both A and R are true but R is not the correct explanation of A.  
c) A is true but R is false.  
d) A is false but R is true.
25. **Assertion (A):**  $[\text{Co}(\text{NH}_3)_5\text{SO}_4]\text{Cl}$  gives a white precipitate with silver nitrate solution. [1]  
**Reason (R):** The complex dissociates to give  $\text{Cl}^-$  and  $\text{SO}_4^{2-}$  ions.
- a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).  
b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).  
c) Assertion (A) is true, but Reason (R) is false.  
d) Assertion (A) is false, but Reason (R) is true.

26. **Assertion (A):**  $\text{NF}_3$  is weaker ligand than  $\text{N}(\text{CH}_3)_3$ . [1]

**Reason (R):**  $\text{NF}_3$  ionises to give  $\text{F}^-$  ions in aqueous solution.

a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.      d) A is false but R is true.

27. **Assertion (A):**  $[\text{Ni}(\text{CN})_4]^{2-}$  has square planar and  $[\text{NiCl}_4]^{2-}$  has tetrahedral shape. [1]

**Reason (R):**  $[\text{Ni}(\text{CN})_4]^{2-}$  is diamagnetic while  $[\text{NiCl}_4]^{2-}$  is paramagnetic.

a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.      d) A is false but R is true.

28. **Assertion (A):**  $[\text{Fe}(\text{CN})_6]^{3-}$  is weakly paramagnetic while  $[\text{Fe}(\text{CN})_6]^{4-}$  is diamagnetic. [1]

**Reason (R):**  $[\text{Fe}(\text{CN})_6]^{3-}$  has +3 oxidation state while  $[\text{Fe}(\text{CN})_6]^{4-}$  has +2 oxidation state.

a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.      d) A is false but R is true.

29. **Assertion (A):** The complex  $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$  does not give precipitate with silver nitrate solution. [1]

**Reason (R):** The given complex is non-ionizable.

a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.      d) A is false but R is true.

30. **Assertion (A):** The  $[\text{Ni}(\text{en})_3]\text{Cl}_2$  (en = ethylenediamine) has lower stability than  $[\text{Ni}(\text{NH}_3)_6]\text{Cl}_2$ . [1]

**Reason (R):** In  $[\text{Ni}(\text{en})_3]\text{Cl}_2$  the geometry of Ni is trigonal bipyramidal.

a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.      d) A is false but R is true.

### Section C

31. State true or false: [1]

A complex ion may be defined as an electrically charged radical which consists of a central metal atom or ion surrounded by a group of ions or neutral molecules or both.

32. State true or false: [1]

The  $\text{dsp}^2$  hybridization form the square planar complex.

33. State true or false: [1]

Carbonyls are organometallic compounds.

34. State true or false: [1]

Valence bond theory explains the geometry and magnetic nature of the coordination compounds.

35. State true or false: [1]

The  $[\text{CuCl}_4]^{2-}$  complex form the tetrahedral complex is diamagnetic in nature.

36. State true or false: [1]  
Coordination number and oxidation state of a metal means the same thing.
37. State true or false: [1]  
Valence bond theory explains the colour of the coordination compounds.
38. State true or false: [1]  
Tetrahedral complexes cannot show geometrical isomerism.
39. State true or false: [1]  
Coordination compounds are mainly known for transition metals.
40. State true or false: [1]  
 $[\text{NiCl}_4]^{2-}$  is diamagnetic in nature.

#### Section D

41. Fill in the blanks: [1]  
 $[\text{Pt}(\text{NH}_3)(\text{NH}_2\text{OH})(\text{py})(\text{NO}_2)] \text{NO}_3$  has \_\_\_\_\_ shape and has \_\_\_\_\_ geometrical isomers.
42. Fill in the blanks: [1]  
The addition compounds which retain their identity in solid state as well as in solution are termed \_\_\_\_\_ or \_\_\_\_\_.
43. Fill in the blanks: [1]  
The outermost electronic configuration of Cr is \_\_\_\_\_.
44. Fill in the blanks: [1]  
A ligand donates at least one \_\_\_\_\_ to the metal atom/ion to form a complex.
45. Fill in the blanks: [1]  
The neutral molecules, anions, or cations which are directly linked with the central metal atom or ion in a complex ion are called \_\_\_\_\_.
46. Fill in the blanks: [1]  
\_\_\_\_\_ type of isomerism give different ions in solution.
47. Fill in the blanks: [1]  
According to Werner's coordination theory, there are two kinds of valency, \_\_\_\_\_ and \_\_\_\_\_.
48. Fill in the blanks: [1]  
In valence bond theory, the geometry of  $\text{Ni}(\text{CO})_4$  is \_\_\_\_\_.
49. Fill in the blanks: [1]  
The primary valency of a central metal ion in a complex is satisfied with \_\_\_\_\_.
50. Fill in the blanks: [1]  
Grignard reagent is a \_\_\_\_\_ organometallic compound.