

JEE CHEMISTRY

Topic: Coordination Compound

Q.1 Which of the following is not a double salt but is a complex salt –

- (A) $\text{KCl} \cdot \text{MgCl}_2 \cdot 6\text{H}_2\text{O}$
- (B) $\text{FeSO}_4 \cdot (\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$
- (C) $\text{K}_2\text{SO}_4 \cdot \text{Al}_2(\text{SO}_4)_3 \cdot 24\text{H}_2\text{O}$
- (D) $4\text{KCN} \cdot \text{Fe}(\text{CN})_2$

Q.2 The solution of the complex $[\text{Cu}(\text{NH}_3)_4] \text{SO}_4$ in water –

- (A) Will give the tests of Cu^{2+} ions
- (B) Will give the tests of NH_3
- (C) Will give the tests of SO_4^{2-} ions
- (D) Will not give the tests of any of the above species

Q.3 The donor atoms in EDTA are –

- (A) Two N and Two O
- (B) Two N and four O
- (C) Four N and Two O
- (D) Three N and three O

Q.4 Which of the following ligands is not a chelating agent –

- (A) EDTA
- (B) en
- (C) Oxalate
- (D) Pyridine

- Q.5** The co-ordination number of Cr in the complex ion $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ is –
- (A) Zero (B) 3
(C) 6 (D) None of these
- Q.6** The oxidation number of platinum in $[\text{Pt}(\text{NH}_3)_5 \text{Cl}]\text{Cl}_3$ is –
- (A) 2 (B) 3
(C) 4 (D) 6
- Q.7** An ambidentate ligand is one which –
- (A) is linked to the metal atom at two points
(B) has two donor atoms but only one of them has the capacity to form a coordinate bond
(C) Has two donor atoms but either of the two can form a co-ordinate bond
(D) forms chelate rings
- Q.8** Coordination number and oxidation number of Cr in $\text{K}_3[\text{Cr}(\text{C}_2\text{O}_4)_3]$ are, respectively –
- (A) 4 and + 2 (B) 6 and + 3
(C) 3 and + 3 (D) 3 and 0
- Q.9** All ligands are –
- (A) Lewis acid (B) Lewis base
(C) Neutral (D) None of these
- Q.10** In SCN ligand if N is attached to central atom, the name of ligand is –
- (A) Thiocyanato-N (B) Cyanato-N
(C) Thiocyanato-S (D) Cyanato-S
- Q.11** In $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ the co-ordination number of cobalt is –
- (A) 4 (B) 6
(C) 2 (D) 7

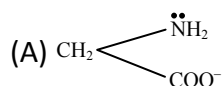
Q.12 Bidentate ligand is –

- (A) CN^- (B) Ethylene diamine
(C) EDTA (D) SCN^-

Q.13 The neutral ligand is –

- (A) Chloro (B) Hydroxo
(C) Ammine (D) Oxalato

Q.14 Glycinato ligand is –



- (B) Bidentate ligand
(C) Two donor sites N and O^-
(D) All of these

Q.15 In the complex $[\text{Co}(\text{NH}_3)_6]^{3+}$ the species acting as Lewis acid and Lewis bases are respectively –

- (A) Co^{2+} , NH_3 (B) NH_3 , Co
(C) Co^{3+} , NH_3 (D) NH_3 , Co^{3+}

Q.16 Triphenyl phosphine is –

- (A) Neutral and monodentate ligand
(B) Neutral and tridentate ligand
(C) Uninegative and unidentate ligand
(D) Trinegative and tridentate ligand

Q.17 The coordination number and oxidation number of the central metal ion in the complex $[\text{Pt}(\text{en})_2]^{+2}$ is–

- (A) C.N. = 2, O.N. = +2
(B) C.N. = 6, O.N. = +4
(C) C.N. = 4, O.N. = +4
(D) C.N. = 4, O.N. = +2

- Q.18** The addition compounds, which retain their identity in solution are called –
- (A) Double salts
 - (B) Complex compounds
 - (C) Coordination compounds
 - (D) (B) and (C) both
- Q.19** The total number of Ligands attached to the central metal ion through coordinate bond is called –
- (A) Valency of the metal ion
 - (B) Oxidation state of the metal ion
 - (C) Coordination number of metal ion
 - (D) None of the above
- Q.20** The co-ordination number of a metal in co-ordination compound is –
- (A) Same as primary valency
 - (B) Sum of primary and secondary valencies
 - (C) Same as secondary valency
 - (D) None of the above
- Q.21** The co-ordination number and oxidation number of X in the compound $[X(SO_4)(NH_3)_5]$ will be –
- (A) 10 and +3
 - (B) 1 and +6
 - (C) 6 and +4
 - (D) 6 and +2
- Q.22** To form a coordination bond, one needs a ligand. Which of the following species cannot be a ligand –
- (i) NH_4^+
 - (ii) NO^+
 - (iii) $C_5H_5\ddot{N}$
- (A) i only
 - (B) i & ii only
 - (C) i & iii only
 - (D) i, ii & iii only

- Q.23** The co-ordination number of cobalt in $[\text{Co}(\text{en})_2\text{Br}_2]\text{Cl}_2$ is –
- (A) 2 (B) 4
(C) 6 (D) 8
- Q.24** In which of the following complexes Ni metal is in highest oxidation state –
- (A) $\text{Ni}(\text{CO})_4$
(B) K_2NiF_6
(C) $[\text{Ni}(\text{NH}_3)_6](\text{BF}_4)_2$
(D) $\text{K}_4[\text{Ni}(\text{CN})_6]$
- Q.25** When AgNO_3 is added to a solution of $\text{Co}(\text{NH}_3)_5\text{Cl}_3$, the precipitate of AgCl shows two ionisable chloride ions. This means –
- (A) Two chlorine atoms satisfy primary valency and one secondary valency
(B) One chlorine atom satisfies primary as well as secondary valency
(C) Three chlorine atoms satisfy primary valency
(D) Three chlorine atoms satisfy secondary valency
- Q.26** A co-ordination complex of cobalt has molecular formula containing five ammonia molecules, one nitro group and two chlorine atoms for one cobalt atom. One mole of this compound produces three moles of ions in an aqueous solution. In reacting this solution with excess of silver nitrate solution, two moles of AgCl get precipitated. The ionic formula of this complex would be –
- (A) $[(\text{Co}(\text{NH}_3)_4.\text{NO}_2\text{Cl}).(\text{NH}_3)\text{Cl}]$
(B) $[(\text{Co}(\text{NH}_3)_5\text{Cl}).(\text{Cl}(\text{NO}_2))]$
(C) $[(\text{Co}(\text{NH}_3)_5(\text{NO}_2)]\text{Cl}_2$
(D) $[(\text{Co}(\text{NH}_3)_5).(\text{NO}_2)_2\text{Cl}_2]$
- Q.27** Which of the following complex will give white precipitate with barium chloride solution –
- (A) $[\text{Cr}(\text{NH}_3)_5\text{Cl}]\text{SO}_4$ (B) $[\text{Cr}(\text{NH}_3)\text{SO}_4]\text{Cl}$
(C) $[\text{Co}(\text{NH}_3)_6]\text{Br}_3$ (D) None of these

- Q.28** Which isomer of $\text{CrCl}_3 \cdot 6\text{H}_2\text{O}$ is dark green in colour and forms one mole of AgCl with excess of AgNO_3 solution –
- (A) $[\text{Cr}(\text{H}_2\text{O})_6]\text{Cl}_3$
(B) $[\text{Cr}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2 \cdot \text{H}_2\text{O}$
(C) $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]\text{Cl} \cdot 2\text{H}_2\text{O}$
(D) $[\text{Cr}(\text{H}_2\text{O})_3\text{Cl}_3] \cdot 3\text{H}_2\text{O}$
- Q.29** Give the correct increasing order of electrical conductivity of aqueous solutions of following complex entities –
- I. $[\text{Pt}(\text{NH}_3)_6]\text{Cl}_4$ II. $[\text{Cr}(\text{NH}_3)_6]\text{Cl}_3$
III. $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$ IV. $\text{K}_2[\text{PtCl}_6]$
- (A) III < IV < II < I (B) IV < II < III < I
(C) II < I < IV < III (D) I < II < IV < III
- Q.30** The complex $[\text{Cr}(\text{H}_2\text{O})_4\text{Br}_2]\text{Cl}$ in its aqueous solution gives test for –
- (A) Cl^- ion
(B) Br^- ion
(C) Both Cl^- and Br^- ions
(D) Neither Cl^- nor Br^- ions

ANSWER KEY

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|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Que. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Ans. | D | C | B | D | C | C | C | B | B | A |
| Que. | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Ans. | B | B | C | D | C | A | D | D | C | C |
| Que. | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Ans. | D | A | C | B | A | C | A | C | A | A |

