



RJ VISION PVT. LTD.

(MOST STABLE & INNOVATIVE INSTITUTE)

**GSEB
BPT – 4C**

**CHEMISTRY
TEST**

COURSE NAME: 12TH

Marks : 100

Topic : FULL SYLLABUS

DATE :

PART – A

Instructions:

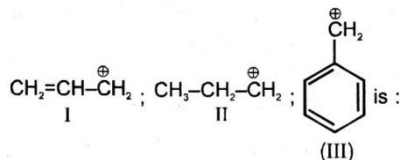
- (1) There are 50 objective type (M.C.Q) questions in **part-A** and all questions are compulsory.
- (2) The questions are serially numbered from 1 to 50 and each carries 1 mark.
- (3) Read each question carefully, select proper alternative and answer in the O.M.R. sheet.
- (4) The OMR sheet is given for answering the questions. The answer of each question is represented by (1) O, (2) O, (3) O, (4)O. Darken the circle of the correct answer with ball-pen.
- (5) Rough work is to be done in the space provided for this purpose in the test booklet only.
- (6) Set No. of question paper printed on the upper-most right side of the Question paper is to be written in the column provided in the OMR sheet.
- (7) Use of simple calculator and log table is allowed, if required.

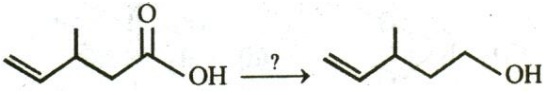
1. The **correct** order of the basic strength of methyl substituted amines in aqueous solution is:
(1) $(CH_3)_3N > CH_3NH_2 > (CH_3)_2NH$ (2) $(CH_3)_3N > (CH_3)_2NH > CH_3NH_2$
(3) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N$ (4) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$
2. Which of the following is the correct decreasing order of acidic strength of
(i) Methanoic acid
(ii) Ethanoic acid
(iii) Propanoic acid
(iv) Butanoic acid
(1) (i) > (ii) > (iii) > (iv) (2) (ii) > (iii) > (iv) > (i)
(3) (i) > (iv) > (iii) > (ii) (4) (iv) > (i) > (iii) > (ii)
3. Benzaldehyde reacts with ethanolic KCN to give
(1) $C_6H_5CHOHCN$ (2) $C_6H_5CHOHCOC_6H_5$ (3) $C_6H_5CHOHCOOH$ (4) $C_6H_5CHOHCHOHC_6H_5$
4. The compound A on treatment with Na gives B, and with PCl_5 C, B and C react together to give diethyl ether. A, B and C are in the order
(1) $C_2H_5OH, C_2H_6, C_2H_5Cl$ (2) $C_2H_5Cl, C_2H_6, C_2H_5OH$
(3) $C_2H_6OH, C_2H_5Cl, C_2H_5ONa$ (4) $C_2H_5OH, C_2H_5ONa, C_2H_5Cl$
5. 2 – Bromopentane is heated with potassium ethoxide in ethanol. The major product obtained is
(1) 2 – ethoxypentane (2) petene – 1 (3) trans – 2- pentene (4) cis – pentene – 2
6. Which one is most reactive towards S_N1 reaction?
(1) $C_6H_5CH(C_6H_5)Br$ (2) $C_6H_5CH(CH_3)Br$ (3) $C_6H_5C(CH_3)(C_6H_5)Br$ (4) $C_6H_5CH_2Br$
7. Benzene reacts with CH_3Cl in the presence of anhydrous $AlCl_3$ to form:
(1) Chlorobenzene (2) Benzylchloride (3) Xylene (4) Toluene

8. Number of isomeric alcohols of molecular formula $C_6H_{14}O$ which give positive iodoform test is
 (1) Two (2) Three (3) Four (4) Five
9. Which of the following may be considered to be an organo metallic compound?
 (1) Nickel tetracarbonyl (2) Chlorophyll
 (3) $K_3[Fe(C_2O_4)_3]$ (4) $[Co(en)_3]Cl_3$
10. IUPAC name of $[Pt(NH_3)_3(Br)(NO_2)Cl]$ Cl is
 (1) Triamminechlorobromonitroplatinum (IV) chloride
 (2) Triamminebromonitroplatinum (IV) chloride
 (3) Triamminebromochloronitroplatinum (IV) chloride
 (4) Triamminenitrochlorobromoplatinum (IV) chloride
11. Crystal field stabilization energy for high spin d^4 octahedral complex is:
 (1) $-1.8 \Delta_0$ (2) $-1.6 \Delta_0 + P$ (3) $-1.2 \Delta_0$ (4) $-0.6 \Delta_0$
12. If P° and P are the vapour pressure of a solvent and its solution respectively and N_1 and N_2 are the mole fractions of the solvent and solute respectively, then correct relation is
 (1) $P = P^\circ N_1$ (2) $P = P^\circ N_2$ (3) $P^\circ = PN_2$ (4) $P = P^\circ (N_1/N_2)$
13. The electronic configuration of Cu (atomic number 29) is
 (1) $1s^2, 2s^2 2p^6, 3s^2 3p^6, 4s^2 3d^9$
 (2) $1s^2, 2s^2 2p^6, 3s^2 3p^6, 3d^{10} 4s^1$
 (3) $1s^2, 2s^2 2p^6, 3p^2 3p^6, 4s^2 4p^6, 5s^2 5p^1$
 (4) $1s^2, 2s^2 2p^6, 3p^2 3p^6, 4s^2 4p^6 3d^3$
14. When $CuSO_4$ is electrolysed using platinum electrodes,
 (1) Copper is liberated at cathode, sulphur at anode
 (2) Copper is liberated at cathode, oxygen at anode
 (3) Sulphur is liberated at cathode, oxygen at anode
 (4) Oxygen is liberated at cathode, copper at anode
15. Which of the following shows maximum number of oxidation states?
 (1) Cr (2) Fe (3) Mn (4) V
16. Consider the Galvanic cell
 $Zn^\ominus | ZnSO_4 || CuSO_4 | Cu^\oplus$
 The reaction at cathode is
 (1) $Zn^{2+} + 2e^- \rightarrow Zn$ (2) $Cu^{2+} + 2e^- \rightarrow Cu$
 (3) $Cu^{2+} + Zn \rightarrow Cu + Zn^{2+}$ (4) $Zn^{2+} + Cu \rightarrow Zn + Cu^{2+}$
17. EMF of cell $Ni | Ni^{2+} (1.0M) || Au^{3+} (1.0M) | Au$ (Where E° for $Ni^{2+} | Ni$ is $-0.25 V$; E° for $Au^{3+} | Au$ is $1.50 V$) is
 (1) $+1.25 V$ (2) $-1.75 V$
 (3) $+1.75 V$ (4) $+4.0 V$
18. In the reaction $2A + B \rightarrow A_2B$, if the Concentration of A is doubled and of B is halved, then the rate of the reaction will
 (1) Increase by four times (2) Decrease by two times
 (3) Increase by two times (4) Remain the same

19. Europium is
 (1) s-block element (2) p-block element (3) d-block element (4) f-block element
20. Which of the following factors tends to increase the stability of metal ion complexes
 (1) Higher ionic radius of the metal ion (2) Higher charge/size ratio of the metal ion
 (3) Lower ionisation potential of the metal ion (4) Lower basicity of the ligand

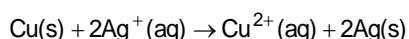
21. The order of stability of the following carbocations:



- (1) III>II>I (2) II>III>I (3) I>II>III (4) III>I>II
22. By passing H₂S gas in acidified KMnO₄ solution, we get
 (1) S (2) K₂S (3) MnO₂ (4) K₂SO₃
23. The following change can be carried out with

- (1) NaBH₄ (2) LiAlH₄ (3) H₂ / Pt (4) PCC / CH₂Cl₂
24. The product (s) obtained via oxymercuration (HgSO₄+H₂SO₄) of 1-butyne would be
 (1) CH₃CH₂COCH₃ (2) CH₃CH₂CH₂CHO
 (3) CH₃CH₂CHO + HCHO (4) CH₃CH₂COOH + HCOOH
25. An organic compound A upon reacting with NH₃ gives B. On heating B gives C. C in presence of KOH reacts with Br₂ to give CH₃CH₂NH₂. A is:
 (1) CH₃COOH (2) CH₃CH₂CH₂COOH
 (3) $\begin{array}{c} \text{CH}_3-\text{CH}-\text{COOH} \\ | \\ \text{CH}_3 \end{array}$ (4) CH₃CH₂COOH

26. The pyrimidine bases present in DNA are-
 (1) Cytosine and Uracil (2) Cytosine and adenine
 (3) Cytosine and guanine (4) Cytosine and thymine
27. When W_B gm solute (molecular mass M_B) dissolves in W_A gm solvent. The molality M of the solution is
 (1) $\frac{W_B}{W_A} \times \frac{M_B}{1000}$ (2) $\frac{W_B}{M_B} \times \frac{1000}{W_A}$ (3) $\frac{W_A}{W_B} \times \frac{1000}{M_B}$ (4) $\frac{W_A \times M_B}{W_B \times 1000}$
28. "The relative lowering of the vapour pressure is equal to the mole fraction of the solute." This law is called
 (1) Henry's law (2) Raoult's law (3) Ostwald's law (4) Arrhenius's law

29. In the reaction



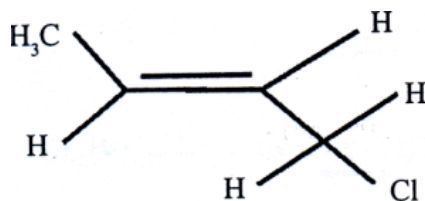
The reduction half-cell reaction is

- (1) $\text{Cu} + 2\text{e}^- \rightarrow \text{Cu}^{2-}$ (2) $\text{Cu} - 2\text{e}^- \rightarrow \text{Cu}^{2+}$ (3) $\text{Ag}^+ + \text{e}^- \rightarrow \text{Ag}$ (4) $\text{Ag} - \text{e}^- \rightarrow \text{Ag}^+$
30. The rate of disappearance of SO₂ in the reaction
 2SO₂ + O₂ → 2SO₃ is 1.28 × 10⁻³ g/sec then the rate of formation of SO₃ is
 (1) 0.64 × 10⁻³ g/sec (2) 0.80 × 10⁻³ g/sec
 (3) 1.28 × 10⁻³ g/sec (4) 1.60 × 10⁻³ g/sec

31. Decomposition of nitrogen pentoxide is known to be a first order reaction 75 percent of the oxide had decomposed in the first 24 minutes. At the end of an hour, after the start of the reaction, the amount of oxide left will be
 (1) Nil (2) About 1% (3) About 2% (4) About 3%
32. Which of the following pairs involves isoelectronic ions
 (1) Mn^{3+} and Fe^{2+} (2) Mn^{2+} and Fe^{3+}
 (3) Cr^{3+} and Mn^{2+} (4) Fe^{2+} and Co^{2+}
33. The correct structural formula of zeise's salt is
 (1) $K^+[PtCl_3 - \eta^2 - (C_2H_4)]^-$ (2) $K_2[PtCl_3 - \eta^2 - C_2H_4]$
 (3) $K^+[PtCl_2 - \eta^2 - (C_2H_4)]Cl^-$ (4) $K^+[PtCl_3(C_2H_4)]^-$
34. Which of the following complexes has the highest stability constant at 298 K
 (1) $[CdCl_4]^{2-}$ (2) $[CdBr_4]^{2-}$
 (3) $[CdI_4]^{2-}$ (4) $[Cd(CN)_4]^{2-}$
35. The rate of reaction depends upon the
 (1) Volume (2) Force (3) Pressure (4) Conc. of reactants
36. If the rate of the reaction is equal to the rate constant, the order of the reaction is
 (1) 3 (2) 0 (3) 1 (4) 2
37. Standard potentials (E°) for some half-reactions are given below:
 (i) $Sn^{4+} + 2e^- \rightarrow Sn^{2+}$; $E^\circ = +0.15$ V
 (ii) $2Hg^{2+} + 2e^- \rightarrow Hg_2^{2+}$; $E^\circ = +0.92$ V
 (iii) $PbO_2 + 4H^+ + 2e^- \rightarrow Pb^{2+} + 2H_2O$; $E^\circ = +1.45$ V
 Based on the above, which one of the following statements is correct?
 (1) Sn^{4+} is a stronger oxidising agent than Pb^{4+}
 (2) Sn^{2+} is a stronger reducing agent than Hg^{2+}
 (3) Hg^{2+} is a stronger oxidising agent than Pb^{4+}
 (4) Pb^{2+} is a stronger reducing agent than Sn^{2+}
38. When the concentration of alkyl halide is tripled and the concentration of $\overset{\ominus}{O}H$ ion is reduced to half, the rate of S_N^2 reaction increases by :
 (1) 3 times (2) 2 times (3) 1.5 times (4) 6 times
39. Limiting molar conductivity of NH_4OH (i.e., $\overset{0}{\Lambda}_m(NH_4OH)$) is equal to:
 (1) $\overset{0}{\Lambda}_m(NH_4Cl) + \overset{0}{\Lambda}_m(NaCl) - \overset{0}{\Lambda}_m(NaOH)$
 (2) $\overset{0}{\Lambda}_m(NHOH) + \overset{0}{\Lambda}_m(NaCl) - \overset{0}{\Lambda}_m(NH_4Cl)$
 (3) $\overset{0}{\Lambda}_m(NH_4OH) + \overset{0}{\Lambda}_m(NH_4Cl) - \overset{0}{\Lambda}_m(HCl)$
 (4) $\overset{0}{\Lambda}_m(NH_4Cl) + \overset{0}{\Lambda}_m(NaOH) - \overset{0}{\Lambda}_m(NaCl)$
40. Blood cells retain their normal shape in solution which is
 (1) Hypotonic to blood (2) Isotonic to blood
 (3) Hypertonic to blood (4) Equinormal to blood

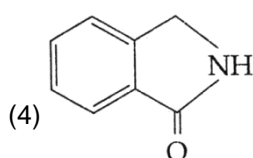
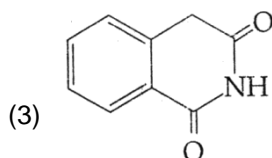
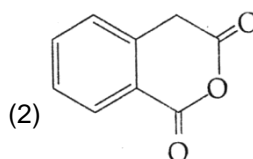
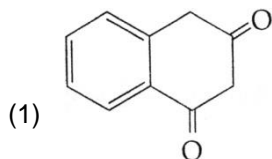
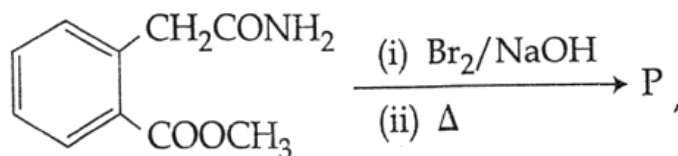
41. According to Raoult's law, relative lowering of vapour pressure for a solution is equal to
- (1) Moles of solute (2) Moles of solvent
 (3) Mole fraction of solute (4) Mole fraction of solvent
42. Which of the following colligative property can provide molar mass of proteins (or polymers or colloids) with greatest precision?
- (1) Osmotic pressure (2) Elevation of boiling point
 (3) Depression of freezing point (4) Relative of freezing point
43. During osmosis, flow of water through a semipermeable membrane is
- (1) From both sides of semipermeable membrane with equal flow rates
 (2) From both sides of semipermeable membrane with unequal flow rates
 (3) From solution having lower concentration only
 (4) From solution having higher concentration only

44. Which is the IUPAC name for the compound given below?



- (1) 4 - chloro pent - 2 - ene (2) 1 - chloro but - 3 - ene
 (3) 3 - chloro - 2 methyl but - 1 ene (4) 1 - chloro but - 2 - ene
45. Among the following four compounds the order of acidity is
- (i) Phenol (ii) Methyl phenol
 (iii) Meta-nitrophenol (iv) Para-nitrophenol
- (1) (iv) > (iii) > (i) > (ii) (2) (iii) > (iv) > (i) > (ii)
 (3) (i) > (iv) > (iii) > (ii) (4) (ii) > (i) > (iii) > (iv)
46. The term invert sugar to an equimolar mixture :
- (1) D-Glucose and D-glactose (2) D-Glucose and D-fructose
 (3) D-Glucose and D-mannose (4) D-Glucose and D-ribose
47. During depression of freezing point in a solution the following are in equilibrium:
- (1) liquid solvent, solid solvent
 (2) liquid solvent, solid solute
 (3) liquid solute, solid solute
 (4) liquid solute, solid solvent
48. The desired amount of charge for obtaining one mole of Al from Al^{3+}
- (1) $3 \times 96500 C$ (2) $96500 C$ (3) $\frac{96500}{3} C$ (4) $\frac{96500}{2} C$
49. The rate law for the reaction
- Sucrose + Water $\xrightarrow{[H^+]}$ Glucose + Fructose is given by
- (1) Rate = K [sucrose] [water]
 (2) Rate = K [sucrose] [water]⁰
 (3) Rate = K [sucrose]⁰ [water]
 (4) Rate = K [sucrose]^{1/2} [water]^{1/2}

50. The product (P) of the following reaction



PART- B

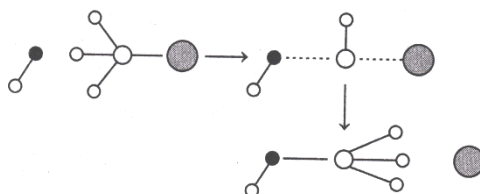
Instructions:

- (1) Write in a clear legible handwriting.
- (2) There are three sections in part- B of the question paper and total 1 to 27 questions are there.
- (3) All the questions are compulsory. Internal options are given.
- (4) The numbers at right side represent the marks of the question.
- (5) Start new section on new page.
- (6) Maintain sequence.
- (7) Use of simple calculator and log table is allowed, if required.

SECTION – A [2 M]

- Question No. 1 to 12 do as directed. Each question carries 2 marks. (Attempt any 8 out of 12) [16]

1. Why ethanol is used to remove stains of paints from any material. Also, give its uses?
2. The S_N2 mechanism for the reaction between CH_3Cl and hydroxide ion to yield methanol and chloride ion is diagrammatically represented as:



Black dot represents the incoming hydroxide ion and grey dot represents the outgoing halide ion. Suggest the mechanism for the given reaction using information given below.

3. The cell in which the following reactions occurs:
 $2\text{Fe}^{3+}_{(\text{aq})} + 2\text{I}^{-}_{(\text{aq})} \rightarrow 2\text{Fe}^{2+}_{(\text{aq})} + \text{I}_{2(\text{s})}$
 Has $E_{\text{cell}}^{\theta} = 0.236 \text{ V}$ at 298 K.
 Calculate the standard Gibbs energy and the equilibrium constant of the cell reaction.
4. Why does the conductivity of a solution decrease with dilution?
5. Derive the equation of rate constant K for zero order reaction.
6. A first order reaction has a rate constant value of 0.005 min^{-1} . If we begin with 0.10 M concentration of the reactant, how much of the reactant will remain after 3.0 hrs?

7. Give the equations of reactions for the preparation of phenol from cumene.
8. (i) Arrange the following complexes in the increasing order of conducting nature of their solution.
 $[\text{Co}(\text{NH}_3)_3\text{Cl}_3]$, $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$, $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$, $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
- (ii) Explain why $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ has magnetic moment value of 5.92 BM whereas $[\text{Fe}(\text{CN})_6]^{3-}$ has a value of only 1.73 BM?
9. Write short notes on the following:
- (i) Carbylamine reaction
(ii) Hofmann's bromamide reaction
10. Give preparation of haloalkanes from hydrocarbons.
11. (i) Draw the structures of all isomeric alcohols of molecular formula $\text{C}_5\text{H}_{12}\text{O}$ and give their IUPAC names.
(ii) Classify the isomers of alcohols in the above question as primary, secondary and tertiary alcohols.
12. The vapour pressure of pure liquids A and B are 450 and 700 mm Hg respectively, at 350 K. Find out the composition of the liquid mixture if total vapour pressure is 600 mm Hg. Also find the composition of the vapour phase.

SECTION – B [3 M]

- **Question No. 13 to 21 do as directed. Each question carries 3 marks. (Attempt any 6 out of 9)** **[18]**
13. Answer the following questions:
- (i) What is ammonolysis? Write the reaction involved.
(ii) Give a good method for the synthesis of primary amine as a product? Also, give the reaction.
14. What mass of ethylene glycol (molar mass 62.0 g mol^{-1}) must be added to 5.50 kg of water to lower the freezing point of water from 0°C to -10.0°C ? [K_f for water = $1.86 \text{ K kg mol}^{-1}$]
15. For the reaction: $2\text{A} + \text{B} \rightarrow \text{A}_2\text{B}$ the rate = $k[\text{A}][\text{B}]^2$ with $k = 2.0 \times 10^{-6} \text{ mol}^{-2} \text{ L}^2 \text{ s}^{-1}$. Calculate the initial rate of the reaction. When $[\text{A}] = 0.1 \text{ mol L}^{-1}$, $[\text{B}] = 0.2 \text{ mol L}^{-1}$. Calculate the rate of reaction after $[\text{A}]$ is reduced to 0.06 mol L^{-1} .
16. Write the equations for the preparation of 1-iodobutane from
- (i) 1-butanol
(ii) 1-chlorobutane
(iii) but-1-ene.
17. Write the mechanism of hydration of ethene to yield ethanol.
18. Two elements A and B form compounds having formula AB_2 and AB_4 . When dissolved in 20g of benzene (C_6H_6), 1g of AB_2 lowers the freezing point by 2.3 K, whereas 1.0g of AB_4 lowers it by 1.3 K. The molal depression constant for benzene is $5.1 \text{ K kg mol}^{-1}$.
Calculate the atomic masses of A and B.
19. If one percent of the reactant decomposes in 1 minute in a first order reaction. Calculate how much reactant would remain undecomposed after 1h?
20. Arrange the following in increasing order of their basic strength:
- (i) $\text{C}_2\text{H}_5\text{NH}_2$, $\text{C}_6\text{H}_5\text{NH}_2$, NH_3 , $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$ and $(\text{C}_2\text{H}_5)_2\text{NH}$
(ii) $\text{C}_2\text{H}_5\text{NH}_2$, $(\text{C}_2\text{H}_5)_2\text{NH}$, $(\text{C}_2\text{H}_5)_3\text{N}$, $\text{C}_6\text{H}_5\text{NH}_2$
(iii) CH_3NH_2 , $(\text{CH}_3)_2\text{NH}$, $(\text{CH}_3)_3\text{N}$, $\text{C}_6\text{H}_5\text{NH}_2$, $\text{C}_6\text{H}_5\text{CH}_2\text{NH}_2$.
21. Give equations of the following reactions:
- (i) Oxidation of propan-1-ol with alkaline KMnO_4 solution.
(ii) Bromine in CS_2 with phenol.
(iii) Dilute HNO_3 with phenol.

SECTION – C [4 M]

- **Question No. 22 to 27 do as directed. Each question carries 4 marks.(Attempt any 4 out of 6)** **[16]**
- 22.** Calculate following quantity:
- (i) Number of coulombs needed for reduction of 8 moles of MnO_4^- .
 - (ii) Number of coulombs needed for reduction of 0.2 moles of $\text{Cr}_2\text{O}_7^{2-}$
 - (iii) Number of Faradays needed to obtain 40g of Al from molten Al_2O_3 (Al = 27g/mol)
 - (iv) Number of coulombs needed to obtain 10 moles of FeO from Fe_2O_3
- 23.** Vapour pressure of pure water at 298 K is 23.8 mm Hg. 50g of urea (NH_2CONH_2) is dissolved in 850g of water. Calculate the vapour pressure of water for this solution and its relative lowering.
- 24.** An organic compound A on treatment with acetic acid in the presence of sulphuric acid produces an ester B. A on mild oxidation gives C. C with 50% KOH followed by acidification with dil. HCl generates A and D. D with PCl_5 followed by reaction with NH_3 gives E, which on dehydration produces HCN. Identify A to E.
- 25.** A Solution containing 30g of a non-volatile solute exactly in 90g of water has vapour pressure of 2.8k Pa at 298 K. Further, 18g of water is then added to the solution and the new vapour pressure becomes 2.9k Pa at 298K. Calculate
- (i) molar mass of the solute
 - (ii) vapour pressure of water at 298K.
- 26.** Explain the following name reactions:
- (i) Wolff-Kishner reaction
 - (ii) Hell-Volhard- Zelinsky reaction
- 27.** Discuss the nature of bonding in the following coordination entities on the basis of valence bond theory:
- (i) $[\text{Fe}(\text{CN})_6]^{4-}$
 - (ii) $[\text{FeF}_6]^{3-}$

