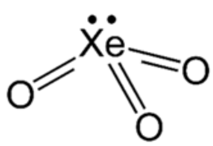
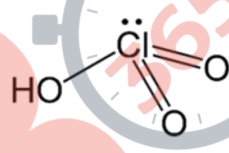
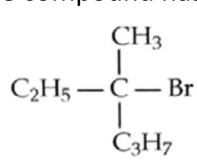
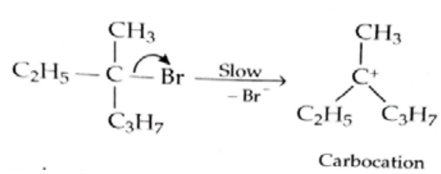
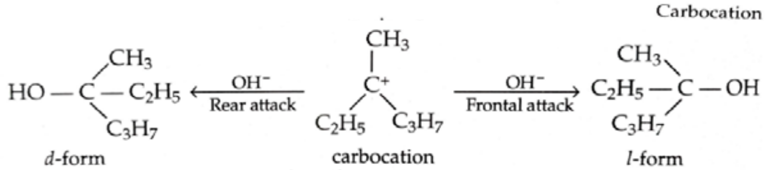
12th Standard Chemistry

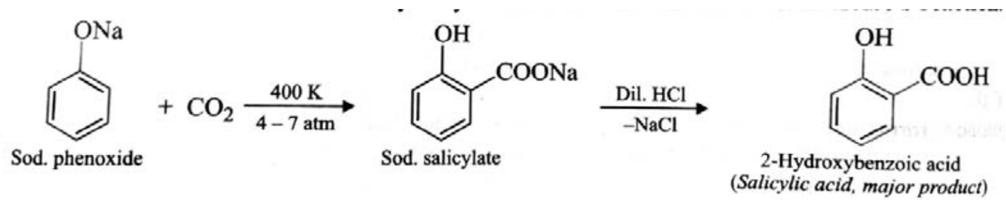
MARKING SCHEME (PRACTICE PAPER 1)

SECTION – A

Q.No	Value point	Marks
1(i)	b	1
(ii)	d	1
(iii)	B	1
(iv)	D	1
2(i)	B	1
(ii)	A	1
(iii)	A	1
(iv)	A	1
3	C	1
4	A OR C	1
5	D	1
6	B	1
7	A	1
8	D OR B	1
9	A OR C	1
10	C	1
11	C OR A	1
12	B	1
13	A OR A	1
14	A	1
15	A	1
16	B	1

Q.No		
	SECTION - B	
17	(i) It is due to double bond character in chlorobenzene due to resonance which is difficult to break as compared to single bond (C – Cl) in CH3Cl. (ii) - NO_2 group is an electron withdrawing group, it stablises the carbanion formed During nucleophilic substitution of chlorobenzene. OR (i) $CH_3CH_2OH \xrightarrow[-SO_2,\ -HCl]{SOCl_2,\ Pyridine} CH_3CH_2Cl \xrightarrow[-AgCl]{AgF} CH_3CH_2F$ (ii) $CH_3 - CH = CH_2 \xrightarrow{HBr,\ Peroxide} CH_3 - CH_2 - CH_2 - Br \xrightarrow{NaI/\ Acetone} CH_3\ CH_2\ CH_2 - I$	
18	 XeO_3  $HClO_3$	
19	$M^{2+} = 91.7\%$, $M^{3+} = 8.3\ \%$	
20	Mixtures of liquids having the same composition in liquid and vapour phase and Boiling at a constant temperature are called azeotropes.It is not possible to separate the components of an azeotrope by fractional distillation. The solutions which shows negative deviation from Raoult's law form maximum Boiling azeotropes. Acetone-Chloroform is an example of this type of azeotrope.	
21	Since this is an optically active compound, the three alkyl groups attached to central C -atom have to be different.Thus, the compound has the structure.  Mechanism of the reaction (SN1)   	

22 Kolbe's reaction



Williamson's ether synthesis

R -X + R' – ONa → R – O – R' + NaX

23 (i) Coagulation and Peotisation: The process of setting of colloidal particles is called Coagulation. Peptization is the process of conversion of precipitate into colloidal sol.

(ii) Lyophilic and Lyophobic:

'Lyophilic' means liquid loving, lyophilic sols are prepared directly by mixing Substances like gum, gelatine, starch,rubber, etc with the liquid dispersion medium. Lyophobic means liquid hating, They cannot be prepared directly, they are prepared By special methods only.

OR

Colloidal system	Dispersed phase	Dispersion medium
(i) Smoke	Solid (Carbon)	Gas(Air)
(ii) Milk	Liquid (fat)	Liquid (water)

24 (i) Diamminedichlorido(ethane-1,2-diamine)chromium(III) chloride

(ii) $[Co(NH_3)_5(ONO)]^{2+}$

OR

Since the coordination number of Mn2+ ion in the complex ion is 4, it will be either tetrahedral (sp3 hybridisation) or square planar (dsp2 hybridisation). But the fact that the magnetic moment of the complex ion is 5.9 BM, it should be tetrahedral in shape rather than square planar because of the presence of five unpaired electrons in the d orbitals.

25 (i) Electrophoresis takes place

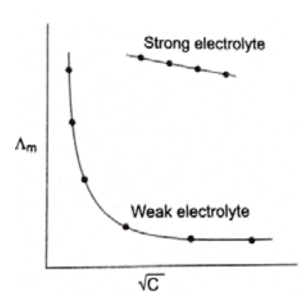
(ii) Coagulation of the sol takes place and a precipitate of Fe(OH)3 is obtained.

SECTION -C

26 (a) I -Cl bond is weaker than I-I and Cl – Cl bond.

(b) Bi has +5 oxidation state in NaBiO3. +3 O.S of Bi is more stable than +5 due to inert pair effect

(C) Noble gases are monoatomic and their atoms are held together by weak dispersion forces.

27	**(a) Peptide linkage:** It is an amide linkage formed between -COOH group and -NH2 group of alpha aminoacids in proteins. **(b) Primary structure:** The specific sequence in which various amino acids are linked to one another in a Protein molecule is called its primary structure. **(c) Denaturation:** A process in which secondary and tertiary structures of proteins are destroyed but Primary structure remains the same is called denaturation of protiens.It is caused by change in temp, change in pH etc.	
28	(i) Mn, because it has electronic configuration 3d54s2, Thus there are 7 electrons that can be shared. (ii) Cr, because Cr has configuration 3d54s1, 6 unpaired electrons participated in formation of metallic bonds. (iii) Mn. The change from Mn^{3+} to Mn^{2+} results in half filled (d^5) stable configuration. OR (i) Cr^{2+} is stronger reducing agent than Fe^{2+}. d^4 to d^3 occur in case of Cr^{2+} to Cr^{3+} and in medium like water d^3 is more stable as compared to d_5 (CFSE). (ii) V^{4+} (iii) because of the presence of unpaired electrons they show d -d transition	
29	$C_6H_5COOH \longrightarrow C_6H_5CONH_2 \longrightarrow C_6H_5NH_2$ Benzoicacid (A) Benzamide (B) Benzenamine (C) OR (i) Higher pkb means, lower is the basic character i.e aniline is weaker base than methyl amine. In aniline lone pair of electron on nitrogen atom is delocalized over the benzene ring due to the resonance effect. As a result electron density on nitrogen atom decrease.In methylamine due to +I effect electron density on nitrogen atom increase. (ii) Aniline does not undergo Friedel-Crafts reaction due to salt formation with aluminium chloride. (iii) Gabriel phthalimide reaction gives pure 1° amines.	
30	Density = (z x M)/a^3 x Na 11.5 = z x 93/ [(300 x 10^{-10})^3 x 6.022 x10^{23}] Z = 2 Body centred cubic	
31	(a) Molar conductivity may be defined as the conductance Of all the ions at dilution V produced when one mole of the electrolyte is dissolved in V cm^3 of the solution, the distance between the electrolytes being 1 cm.  **Change of molar conductivity with concentration** Molar conductivity increase sharply for weak electrolytes With decrease in concentration as shown in the figure Because number of ions as well as mobilty of ions increase With dilution. In case of strong electrolyte, molar conductivity increase slightly on dilution Because number of ions do not increase much whereas mobilty of ions increase. (b)	

	$Fe(s) \longrightarrow Fe^{2+}(aq) + 2e^-$ $2H^+(aq) + 2e^- \longrightarrow H_2(g)$ $Fe(s) + 2H^+(aq) \longrightarrow Fe^{2+}(aq) + H_2(g)$ Here, $n = 2$ $E_{Cell} = E^\circ_{Cell} - \frac{0.0591}{2}\log\frac{[Fe^{2+}]}{[H^+]^2}$ $= (E^\circ_{H^+/H_2} - E^\circ_{Fe^{2+}/Fe}) - \frac{0.0591}{2}\log\frac{10^{-3}}{[10^{-2}]^2}$ $= [0-(-0.44\ V)] - \frac{0.0591}{2}\log 10$ $= +0.44\ V - 0.0295$ $= 0.4105\ V.$ OR Kohlrausch law states that limiting molar conductivity of an electrolyte can be represented as sum of the individual contributions of the anion and cation of the electrolyte. $\Lambda^\circ_m(HCOOH) = \lambda^\circ_m\ HCOO^- + \lambda^\circ_m\ H^+$ $\Lambda^\circ_m(HCOOH) = \lambda^\circ(H^+) + \lambda^\circ(HCOO^-) = 349.6 + 54.6\ S\ cm^2\ mol^{-1} = 404.2\ S\ cm^2\ mol^{-1}$ $\Lambda^c_m = 46.1\ S\ cm^2\ mol^{-1}$ *(Given)* $\therefore \quad \alpha = \frac{\Lambda^c_m}{\Lambda^0_m} = \frac{46.1}{404.2} = 0.114$ $HCOOH \rightleftharpoons HCOO^- + H^+$ Initial conc. $c\ mol\ L^{-1}$ Conc. at eqm. $c(1-\alpha)$ $\quad c\alpha \quad c\alpha$ $\therefore \quad K_a = \frac{c\alpha.c\alpha}{c(1-\alpha)} = \frac{c\alpha^2}{1-\alpha} = \frac{0.025\times(0.114)^2}{1-0.114} = 3.67\times10^{-4}$	
32	C_6H_5CHO (A), C_6H_5COONa & $C_6H_5CH_2OH$ (B & C), $C_6H_5CH = NNHCONH_2$ (D), $C_6H_5CH(OH)CH_3$ (E) OR (i) $CH_3CH(CN)OH$ (ii) $CH_3CH(OH)CH_2CH_3$ (iii) CH_3CH_3 (b) Ethanal > Propanal > Propanone > Butanone (c) Propanal gives red -brown ppt with Fehling's reagent / Propanal gives silver mirror test but propanone does not react both of these reagents.	

33. (a)

$$k = \frac{2.303}{t}\log\frac{[A]_0}{[A]}$$

Substituting the values, we have

$$k = \frac{2.303}{40}\log\frac{100}{70}$$

or $$k = \frac{2.303}{40}\times 0.1549 = 0.0089 \text{ min}^{-1}$$

$$t_{1/2} = \frac{0.693}{k} = \frac{0.693}{0.0089} = 77.86 \text{ minutes}$$

(b) Suppose order w.r.t A is α and w.r.t B is β

Rate = $k[A]^{\alpha}[B]^{\beta}$

$(\text{Rate})_{\text{expt }1} = 6.0\times10^{-3} = k(0.1)^{\alpha}(0.1)^{\beta}$ ...(i)

$(\text{Rate})_{\text{expt }2} = 7.2\times10^{-2} = k(0.3)^{\alpha}(0.2)^{\beta}$ ...(ii)

$(\text{Rate})_{\text{expt }3} = 2.88\times10^{-1} = k(0.3)^{\alpha}(0.4)^{\beta}$ ...(iii)

$(\text{Rate})_{\text{expt }4} = 2.4\times10^{-2} = k(0.4)^{\alpha}(0.1)^{\beta}$ ...(iv)

$$\frac{(\text{Rate})_{\text{expt }1}}{(\text{Rate})_{\text{expt }4}} = \frac{6.0\times10^{-3}}{2.4\times10^{-2}} = \frac{k(0.1)^{\alpha}(0.1)^{\beta}}{k(0.4)^{\alpha}(0.1)^{\beta}} \quad \text{or} \quad \frac{1}{4} = \frac{(0.1)^{\alpha}}{(0.4)^{\alpha}} = \left(\frac{1}{4}\right)^{\alpha} \quad \text{or} \quad \alpha = 1$$

$$\frac{(\text{Rate})_{\text{expt }2}}{(\text{Rate})_{\text{expt }3}} = \frac{7.2\times10^{-2}}{2.88\times10^{-1}} = \frac{k(0.3)^{\alpha}(0.2)^{\beta}}{k(0.3)^{\alpha}(0.4)^{\beta}} \quad \text{or} \quad \frac{1}{4} = \frac{(0.2)^{\beta}}{(0.4)^{\beta}} = \left(\frac{1}{2}\right)^{\beta}$$

$$\text{or} \quad \left(\frac{1}{2}\right)^{2} = \left(\frac{1}{2}\right)^{\beta} \quad \text{or} \quad \beta = 2$$

∴ Rate law expression is : **Rate = $k[A][B]^2$.** k can be calculated as in the first method.

OR

$$k = \frac{2.303}{t}\log\frac{[R]_0}{[R]}$$

For three-fourth of the reaction to take place, $[R] = \frac{[R]_0}{4}$ or $\frac{[R]_0}{[R]} = 4$

Substituting the values in the rate equation, we have

$$2.54\times10^{-3} = \frac{2.303}{t}\log 4$$

or $$t = \frac{2.303}{2.54}\times10^{3}\times 0.6021 = 5.46\times10^{2} \text{ s}$$

(b) (i) dx/dt = k [A][B]2

(ii) 9 times

(iii) 8 times