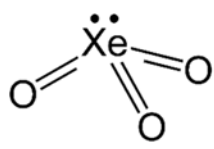
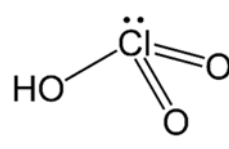
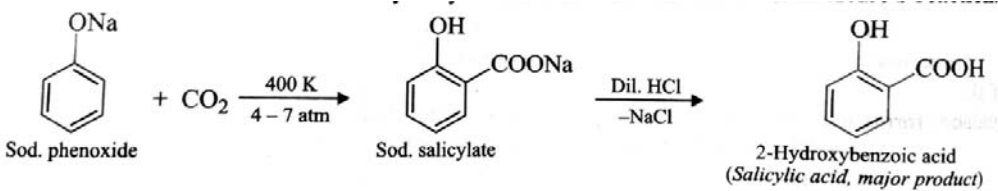


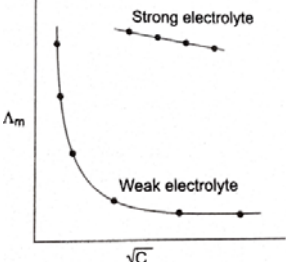
MARKING SCHEME (PRACTICE PAPER 1)

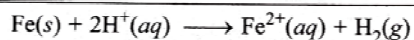
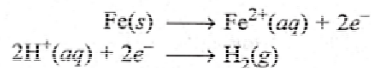
SECTION – A

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	<p>(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.</p> <p>(ii) - NO₂ group is an electron withdrawing group, it stabilises the carbanion formed During nucleophilic substitution of chlorobenzene.</p> <p style="text-align: center;">OR</p> <p>(i) $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[\text{-SO}_2, \text{-HCl}]{\text{SOCl}_2, \text{Pyridine}} \text{CH}_3\text{CH}_2\text{Cl} \xrightarrow[\text{-AgCl}]{\text{AgF}} \text{CH}_3\text{CH}_2\text{F}$</p> <p>(ii) $\text{CH}_3 - \text{CH} = \text{CH}_2 \xrightarrow{\text{HBr, Peroxide}} \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{Br} \xrightarrow{\text{NaI/ Acetone}} \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{I}$</p>	
18	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>XeO₃</p> </div> <div style="text-align: center;">  <p>HClO₃</p> </div> </div>	
19	M ²⁺ = 91.7% , M ³⁺ = 8.3 %	
20	<p>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.</p> <p>The solutions which shows negative deviation from Raoult's law form maximum Boiling azeotropes. Acetone-Chloroform is an example of this type of azeotrope.</p>	
21	<p>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.</p> <div style="text-align: center; margin: 10px 0;"> $\begin{array}{c} \text{CH}_3 \\ \\ \text{C}_2\text{H}_5 - \text{C} - \text{Br} \\ \\ \text{C}_3\text{H}_7 \end{array}$ </div> <p>Mechanism of the reaction (SN1)</p> <div style="text-align: center; margin: 10px 0;"> $\begin{array}{c} \text{CH}_3 \\ \\ \text{C}_2\text{H}_5 - \text{C} - \text{Br} \xrightarrow[\text{-Br}]{\text{Slow}} \begin{array}{c} \text{CH}_3 \\ \\ \text{C}^+ \\ \\ \text{C}_2\text{H}_5 \quad \text{C}_3\text{H}_7 \end{array} \\ \\ \text{C}_3\text{H}_7 \end{array}$ <p style="text-align: center;">Carbocation</p> </div> <div style="display: flex; justify-content: center; align-items: center; margin: 10px 0;"> <div style="text-align: center; margin-right: 20px;"> $\begin{array}{c} \text{CH}_3 \\ \\ \text{HO} - \text{C} - \text{C}_2\text{H}_5 \\ \\ \text{C}_3\text{H}_7 \end{array}$ <p><i>d</i>-form</p> </div> <div style="text-align: center; margin-right: 20px;"> $\begin{array}{c} \text{CH}_3 \\ \\ \text{C}^+ \\ \\ \text{C}_2\text{H}_5 \quad \text{C}_3\text{H}_7 \end{array}$ <p>carbocation</p> </div> <div style="text-align: center;"> $\begin{array}{c} \text{CH}_3 \\ \\ \text{C}_2\text{H}_5 - \text{C} - \text{OH} \\ \\ \text{C}_3\text{H}_7 \end{array}$ <p><i>l</i>-form</p> </div> </div> <p style="text-align: center; margin-top: 10px;"> $\xleftarrow[\text{Rear attack}]{\text{OH}^-}$ $\xrightarrow[\text{Frontal attack}]{\text{OH}^-}$ </p>	

22	<p>Kolbe's reaction</p>  <p>Williamson's ether synthesis</p> $R-X + R'-ONa \longrightarrow R-O-R' + NaX$													
23	<p>(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.</p> <p>(ii) Lyophilic and Lyophobic:</p> <p>'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.</p> <table border="0" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="3" style="text-align: center;">OR</th> </tr> <tr> <th style="text-align: left;">Colloidal system</th> <th style="text-align: left;">Dispersed phase</th> <th style="text-align: left;">Dispersion medium</th> </tr> </thead> <tbody> <tr> <td>(i) Smoke</td> <td>Solid (Carbon)</td> <td>Gas(Air)</td> </tr> <tr> <td>(ii) Milk</td> <td>Liquid (fat)</td> <td>Liquid (water)</td> </tr> </tbody> </table>	OR			Colloidal system	Dispersed phase	Dispersion medium	(i) Smoke	Solid (Carbon)	Gas(Air)	(ii) Milk	Liquid (fat)	Liquid (water)	
OR														
Colloidal system	Dispersed phase	Dispersion medium												
(i) Smoke	Solid (Carbon)	Gas(Air)												
(ii) Milk	Liquid (fat)	Liquid (water)												
24	<p>(i) Diamminedichlorido(ethane-1,2-diamine)chromium(III) chloride</p> <p>(ii) $[Co(NH_3)_5(ONO)]^{2+}$</p> <p style="text-align: center;">OR</p> <p>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.</p>													
25	<p>(i) Electrophoresis takes place</p> <p>(ii) Coagulation of the sol takes place and a precipitate of Fe(OH)₃ is obtained.</p>													
SECTION -C														
26	<p>(a) I -Cl bond is weaker than I-I and Cl - Cl bond.</p> <p>(b) Bi has +5 oxidation state in NaBiO₃. +3 O.S of Bi is more stable than +5 due to inert pair effect</p> <p>(C) Noble gases are monoatomic and their atoms are held together by weak dispersion forces.</p>													

27	<p>(a) Peptide linkage: It is an amide linkage formed between -COOH group and -NH₂ group of alpha aminoacids in proteins.</p> <p>(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.</p> <p>(c) Denaturation: A process in which secondary and tertiary structures of proteins are destroyed but Primary structure remains the same is called denaturation of proteins. It is caused by change in temp, change in pH etc.</p>	
28	<p>(i) Mn, because it has electronic configuration 3d⁵4s², Thus there are 7 electrons that can be shared.</p> <p>(ii) Cr, because Cr has configuration 3d⁵4s¹, 6 unpaired electrons participated in formation of metallic bonds.</p> <p>(iii) Mn. The change from Mn³⁺ to Mn²⁺ results in half filled (d⁵) stable configuration.</p> <p style="text-align: center;">OR</p> <p>(i) Cr²⁺ is stronger reducing agent than Fe²⁺. d⁴ to d³ occur in case of Cr²⁺ to Cr³⁺ and in medium like water d³ is more stable as compared to d₅ (CFSE).</p> <p>(ii) V⁴⁺</p> <p>(iii) because of the presence of unpaired electrons they show d-d transition</p>	
29	<p style="text-align: center;"> $\text{C}_6\text{H}_5\text{COOH} \xrightarrow{\hspace{2cm}} \text{C}_6\text{H}_5\text{CONH}_2 \xrightarrow{\hspace{2cm}} \text{C}_6\text{H}_5\text{NH}_2$ </p> <p style="text-align: center;"> Benzoic acid (A) Benzamide (B) Benzenamine (C) </p> <p style="text-align: center;">OR</p> <p>(i) Higher pK_b 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.</p> <p>(ii) Aniline does not undergo Friedel-Crafts reaction due to salt formation with aluminium chloride.</p> <p>(iii) Gabriel phthalimide reaction gives pure 1° amines.</p>	
30	<p>Density = $(z \times M)/a^3 \times N_A$</p> <p>$11.5 = z \times 93 / [(300 \times 10^{-10})^3 \times 6.022 \times 10^{23}]$</p> <p>Z = 2</p> <p>Body centred cubic</p>	
31	<p>(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 cm³ of the solution, the distance between the electrolytes being 1 cm.</p> <p>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 mobility of ions increase With dilution.</p> <p style="text-align: center;">In case of strong electrolyte, molar conductivity increase slightly on dilution Because number of ions do not increase much whereas mobility of ions increase.</p> <p>(b)</p> <div style="text-align: right;">  </div>	



Here, $n = 2$

$$\begin{aligned} E_{\text{Cell}} &= E^\circ_{\text{Cell}} - \frac{0.0591}{2} \log \frac{[\text{Fe}^{2+}]}{[\text{H}^+]^2} \\ &= (E^\circ_{\text{H}^+/\text{H}_2} - E^\circ_{\text{Fe}^{2+}/\text{Fe}}) - \frac{0.0591}{2} \log \frac{10^{-3}}{[10^{-2}]^2} \\ &= [0 - (-0.44 \text{ V})] - \frac{0.0591}{2} \log 10 \\ &= +0.44 \text{ V} - 0.0295 \\ &= 0.4105 \text{ V} \end{aligned}$$

OR

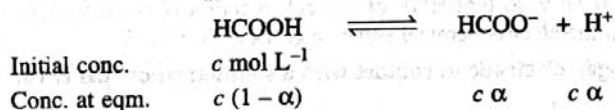
Kohlrausch law states that limiting molar conductivity of an electrolyte can be represented as sum of the individual contributions of the anion and cation of the electrolyte.

$$\Lambda^\circ_m(\text{HCOOH}) = \lambda^\circ_m \text{HCOO}^- + \lambda^\circ_m \text{H}^+$$

$$\Lambda^\circ_m(\text{HCOOH}) = \lambda^\circ(\text{H}^+) + \lambda^\circ(\text{HCOO}^-) = 349.6 + 54.6 \text{ S cm}^2 \text{ mol}^{-1} = 404.2 \text{ S cm}^2 \text{ mol}^{-1}$$

$$\Lambda_m^c = 46.1 \text{ S cm}^2 \text{ mol}^{-1} \text{ (Given)}$$

$$\therefore \alpha = \frac{\Lambda_m^c}{\Lambda_m^0} = \frac{46.1}{404.2} = 0.114$$



$$\therefore K_a = \frac{c\alpha \cdot c\alpha}{c(1-\alpha)} = \frac{c\alpha^2}{1-\alpha} = \frac{0.025 \times (0.114)^2}{1-0.114} = 3.67 \times 10^{-4}$$

32 C₆H₅CHO (A), C₆H₅COONa & C₆H₅CH₂OH (B & C), C₆H₅CH = NNHCONH₂ (D), C₆H₅CH(OH)CH₃ (E)

OR

(i) CH₃CH(CN)OH

(ii) CH₃CH(OH)CH₂CH₃

(iii) CH₃CH₃

(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

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

$$(\text{Rate})_{\text{expt 1}} = 6.0 \times 10^{-3} = k (0.1)^\alpha (0.1)^\beta \quad \dots(\text{i})$$

$$(\text{Rate})_{\text{expt 2}} = 7.2 \times 10^{-2} = k (0.3)^\alpha (0.2)^\beta \quad \dots(\text{ii})$$

$$(\text{Rate})_{\text{expt 3}} = 2.88 \times 10^{-1} = k (0.3)^\alpha (0.4)^\beta \quad \dots(\text{iii})$$

$$(\text{Rate})_{\text{expt 4}} = 2.4 \times 10^{-2} = k (0.4)^\alpha (0.1)^\beta \quad \dots(\text{iv})$$

$$\frac{(\text{Rate})_{\text{expt 1}}}{(\text{Rate})_{\text{expt 4}}} = \frac{6.0 \times 10^{-3}}{2.4 \times 10^{-2}} = \frac{k (0.1)^\alpha (0.1)^\beta}{k (0.4)^\alpha (0.1)^\beta} \quad \text{or} \quad \frac{1}{4} = \frac{(0.1)^\alpha}{(0.4)^\alpha} = \left(\frac{1}{4}\right)^\alpha \quad \text{or} \quad \alpha = 1$$

$$\frac{(\text{Rate})_{\text{expt 2}}}{(\text{Rate})_{\text{expt 3}}} = \frac{7.2 \times 10^{-2}}{2.88 \times 10^{-1}} = \frac{k (0.3)^\alpha (0.2)^\beta}{k (0.3)^\alpha (0.4)^\beta} \quad \text{or} \quad \frac{1}{4} = \frac{(0.2)^\beta}{(0.4)^\beta} = \left(\frac{1}{2}\right)^\beta$$

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

∴ 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

$$2.54 \times 10^{-3} = \frac{2.303}{t} \log 4$$

or $t = \frac{2.303}{2.54} \times 10^3 \times 0.6021 = 5.46 \times 10^2 \text{ s}$

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

(ii) 9 times

(iii) 8 times