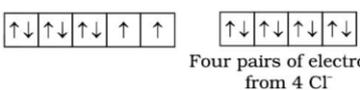
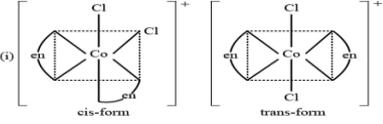
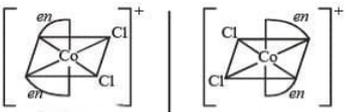


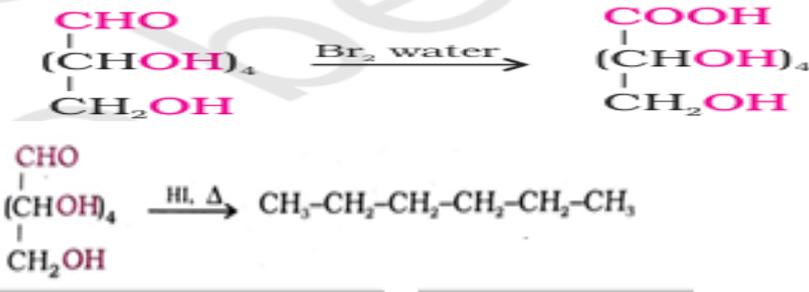
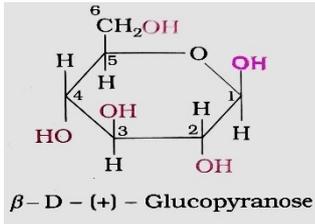
**MARKING SCHEME 2025
CHEMISTRY(Theory)-043**

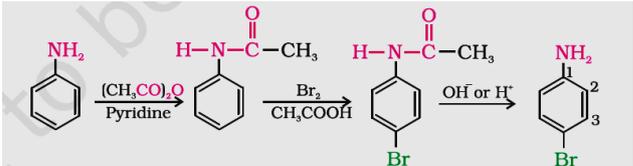
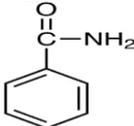
QP Code 56/5/2

MM: 70

Q.No	Value Points	Mark
	SECTION A	
1	(D)	1
2	(D)	1
3	(B)	1
4	(C)	1

SECTION C		
22	<p>Rate=k[A]^x[B]^y</p> <p>Eq.1 Rate₁=k(0.1)^x(0.1)^y=5.0 × 10⁻²</p> <p>Eq.2 Rate₂=k(0.2)^x(0.1)^y=1.0 × 10⁻¹</p> <p>Eq.3 Rate₃=k(0.1)^x(0.2)^y=5.0 × 10⁻²</p> $\frac{0.1}{0.5} = \frac{k \times 0.2^x \times 0.1^y}{k \times 0.1^x \times 0.1^y}$ <p>Hence x=1</p> $\frac{0.05}{0.05} = \frac{k \times 0.1^x \times 0.2^y}{k \times 0.1^x \times 0.1^y}$ <p>Hence y= 0</p> <p>Rate=k[A]¹[B]⁰</p> <p>Overall order=1</p>	<p>1</p> <p>1</p> <p>1</p>
23	<p>(a)</p> <p>(i) The solution is non ideal, shows positive deviation from Raoult's law / A-B interactions are weaker than A-A and B-B interactions</p> <p>(ii) Decrease in temperature</p> <p>(iii) Ethanol and acetone (or any other suitable example)</p>	<p>1</p> <p>1</p> <p>1</p>
OR		
23	<p>(b)</p> <p>(i) Salt lowers the freezing point of water and prevents formation of ice and hence its easy to clean.</p> <p>(ii)-Red blood cells swell up -As the solution is hypotonic, water will flow into the cell/ As the solution is hypotonic, endosmosis occurs.</p> <p>(iii) Desalination of sea water</p>	<p>1</p> <p>½</p> <p>½</p> <p>1</p>
24	<p>(a) Ni²⁺ (3d⁸).</p> <p>Orbitals of Ni²⁺ ion </p> <p>sp³ hybridised orbitals of Ni²⁺ </p> <p>[NiCl₄]²⁻ (high spin complex) </p> <p>Four pairs of electrons from 4 Cl⁻</p> <p>sp³ hybridisation, tetrahedral, Paramagnetic</p> <p>(b) </p> <p>Optical isomer of Cis-form [Co(en)₂Cl₂]⁺</p> <p></p>	<p>1</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p>
25	<p>(a) (i) 1-Chloropropane 1° (Primary) alkyl halide / less sterically hindered carbon</p> <p>(b) (B)/CH₃CH=CHCH₃, as it has greater number of alkyl groups attached to the doubly bonded carbon atom./ the preferred product is that alkene which has greater number of alkyl groups attached to the doubly bonded carbon atom / By Saytzeff rule</p>	<p>½</p> <p>½</p> <p>1,1</p>
26	(a)	

	$R-X + R-ONa \xrightarrow{\text{dry ether}} R-O-R + NaX$ (Or any other correct equation)	1						
	(b) Steam distillation	1						
	o-nitrophenol has intra-molecular H-bonding and p-nitrophenol has inter-molecular H-bonding/	1						
	o-nitrophenol is steam volatile due to intra-molecular H-bonding/p-Nitrophenol is less volatile due to inter-molecular H-bonding resulting in association of its molecules	1						
27	P=CH ₃ COOH Q=CH ₃ CONH ₂ R=CH ₃ COCl	1 1 1						
28	(a) Vitamin B ₁₂	1						
	(b)	1x2						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Globular proteins</th> <th style="width: 50%;">Fibrous proteins</th> </tr> </thead> <tbody> <tr> <td>1. Water soluble</td> <td>1. Insoluble in water</td> </tr> <tr> <td>2. Spherical shape</td> <td>2. Fibre-like structure</td> </tr> </tbody> </table>	Globular proteins	Fibrous proteins	1. Water soluble	1. Insoluble in water	2. Spherical shape	2. Fibre-like structure	
Globular proteins	Fibrous proteins							
1. Water soluble	1. Insoluble in water							
2. Spherical shape	2. Fibre-like structure							
	(Or any other two suitable differences)							
SECTION D								
29	(a)							
	(i) [Cr(H ₂ O) ₄ Cl ₂]Cl	1						
	(ii) 6	1						
	(b) Double salts dissociate into simple ions while complex compounds do not dissociate completely into ions when dissolved in water. (Or any other suitable difference)	1						
	(c)							
	(i) [Cr(NH ₃) ₃ Cl ₃] < [Cr(NH ₃) ₅ Cl]Cl ₂ < [Cr(NH ₃) ₆]Cl ₃	1						
	OR							
	(c)(ii)							
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Primary Valency</th> <th style="width: 50%;">Secondary Valency</th> </tr> </thead> <tbody> <tr> <td>1. Ionisable</td> <td>1. Non-ionisable</td> </tr> <tr> <td>2. Satisfied by negative ions</td> <td>2. Satisfied by negative ions or neutral molecules</td> </tr> </tbody> </table>	Primary Valency	Secondary Valency	1. Ionisable	1. Non-ionisable	2. Satisfied by negative ions	2. Satisfied by negative ions or neutral molecules	½+½
Primary Valency	Secondary Valency							
1. Ionisable	1. Non-ionisable							
2. Satisfied by negative ions	2. Satisfied by negative ions or neutral molecules							
	(or any other two suitable differences)							
30	(a)							
		1 1						
	(b)(i) Cyclic structures of glucose differ only in configuration of -OH group at C ₁ . / Stereoisomers which differ in configuration of -OH group at C ₁ or C ₂	1						
	OR							
	(b)(ii)							
		1						

	(c)Hydrolysis of dextrorotatory sucrose brings a change in the sign of rotation or inverts the optical rotation from dextro to laevo. The product of hydrolysis is invert sugar.	1
SECTION E		
31	<p>(a)(i) Amine 'X' react with $C_6H_5SO_2Cl$ to give a compound, soluble in NaOH so amine 'X' is primary amine, $CH_3CH_2NH_2$/Ethanamine/Ethyl amine</p> <p>(ii) $(CH_3)_2NH < CH_3NH_2 < (CH_3)_3N < NH_3 < C_6H_5NH_2$</p> <p>(iii) In the strongly acidic medium, aniline is protonated to anilinium ion, which is meta-directing.</p> <p>(iv)(I)</p>  <p>(II)</p> $C_6H_5NH_2 + NaNO_2 + 2HCl \xrightarrow{(0-5^\circ C)} C_6H_5N_2^+Cl^- \xrightarrow{H_2O, 283K} C_6H_5OH$	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
OR		
31	<p>(b)(i)</p> $CH_3CH_2NH_2 + CHCl_3 + 3KOH(EtOH) \xrightarrow{\Delta} C_2H_5NC + 3KCl + 3H_2O$ <p>(ii) A =</p>  <p>B =</p>  <p>(iii)</p> $C_6H_5NH_2 + NaNO_2 + 2HCl \xrightarrow{(0-5^\circ C)} C_6H_5N_2^+Cl^- \xrightarrow{CH_3CH_2OH} C_6H_6$ <p>(I)</p> <p>(II)</p> 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
32	<p>(a)(i)</p> <p>(I) A - K_2MnO_4 B- $KMnO_4$</p> <p>(II) $MnO_4^- + 5Fe^{2+} + 8H^+ \longrightarrow Mn^{2+} + 5Fe^{3+} + 4H_2O$</p> <p>(ii) (I) Gets reduced to +3 common oxidation state.</p> <p>(II) Due to poorer shielding offered by 5f electrons than 4f.</p> <p>(III) Due to completely filled d- subshell (d^{10}) in zinc whereas in Cu, due to high enthalpy of atomization and low enthalpy of hydration.</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>
OR		

32	<p>(b)(i) (I) Lanthanoid contraction. The steady decrease in atomic and ionic radii in lanthanoid series.</p> <p>(II) Decrease in basic character from left to right in lanthanoid series. (any other correct consequence)</p> <p>(ii) (I) They have the ability to exhibit variable oxidation states/ tendency to form complex compounds/ large surface area. (II) Due to involvement of (n-1) d and ns electrons which results in strong metallic bond and strong interatomic bonding. (III) Sc has incompletely filled d orbital (3d¹) in its ground state whereas Zn has completely filled d orbital (3d¹⁰) in ground state as well as in its oxidized state.</p>	<p>½ ½ 1 1 1 1</p>
33	<p>(a) (i) (II) will remain as reduction reaction / (II) (I) will be reversed to become an oxidation reaction Due to low reduction potential of Cr (ii) Cell representation Mg(s)/Mg²⁺ (aq,0.100M) Ag⁺(aq,0.001M)/Ag(s)</p> <p>n=2 $E_{\text{cell}} = E^{\circ}_{\text{cell}} - \frac{2.303RT}{nF} \log \frac{[\text{Mg}^{2+}]}{[\text{Ag}^+]^2}$ $= 3.17 - \frac{0.059}{2} \log \frac{0.100}{(0.001)^2}$ $= 3.17 - \frac{0.059}{2} \log 10^5$ $= 3.17 - 0.0295 \times 5$ $= 3.17 - 0.1475$ $= 3.0225 \text{ V or } 3.02 \text{ V}$</p>	<p>½ ½ 1 1 ½ 1 ½</p>
OR		
33	<p>(b)(i) Limiting molar conductivity of an electrolyte can be represented as the sum of the individual contributions of the anion and cation of the electrolyte. To determine -1. Limiting molar conductivity of an electrolyte. 2. Dissociation constant of a weak electrolyte (or any other two suitable applications)</p> <p>(ii) $\Lambda^{\circ}_m \text{NH}_4\text{OH} = \Lambda^{\circ}_m \text{NH}_4\text{Cl} + \Lambda^{\circ}_m \text{NaOH} - \Lambda^{\circ}_m \text{NaCl}$ $= 129.8 + 217.4 - 108.9$ $= 238.3 \text{ Scm}^2\text{mol}^{-1}$ $\alpha = \frac{\Lambda_m^c}{\Lambda_m^{\circ}}$ $= \frac{9.33}{238.3}$ $= 0.039 / 3.9\%$</p>	<p>1 ½ ½ ½ 1 ½ 1</p>