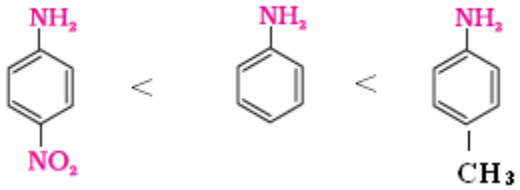
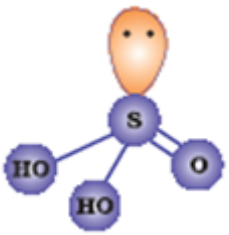
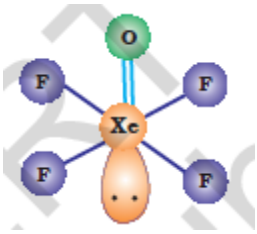
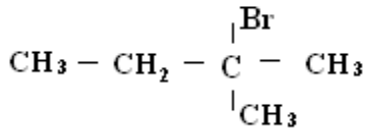
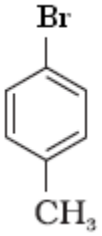
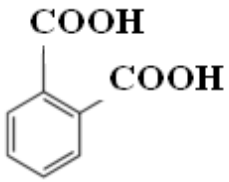
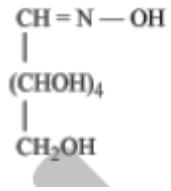
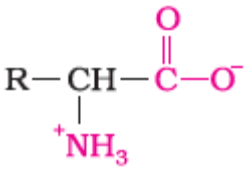
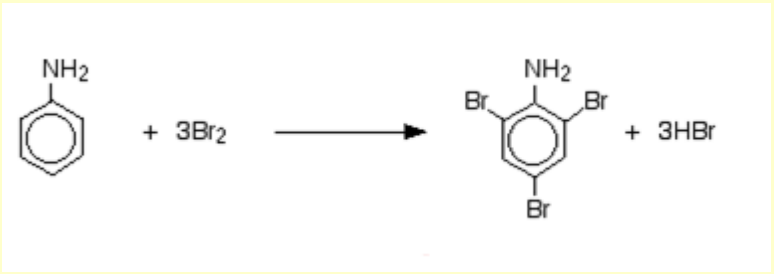
CHEMISTRY MARKING SCHEME 2015
PATNA
SET -56/3/P

Ques.	Answers	Marks
1	2-Methyl prop-2-en-1-ol	1
2	Because of no unpaired electron in **Zn^{2+}** Copper salts are coloured due to the presence of unpaired electrons in **Cu^{2+}**	½ +½
3	**$(CH_3)_3C$-Br**	1
4	2F or 2x 96500C	1
5	Dispersed phase-liquid Dispersion medium- solid	½ +½
6 6	Dichloridobis-(ethane-1,2-diamine)platinum(IV) Geometrical or optical isomerism OR **(i)$[Co(NH_3)_6]Cl_3$** **(ii)$K_2[NiCl_4]$**	1 1 1 1
7	**(i) $C_6H_5NH_2$< $C_6H_5NHCH_3$< $C_6H_5CH_2NH_2$** **(ii)** 	1 1
8	Because on addition of a non volatile solute, vapour pressure of solution lowers down and therefore in order to boil solution, temperature has to be increased, thus boiling point gets higher Because it depends on molality/ number of solute particles / $\Delta T_b \propto m$	1 1
9	(i)  (ii) 	1,1
10	Decrease in concentration of reactant or increase in concentration of product per unit time Factors: 1)concentration of reactant2)catalyst 3) temperature 4)Nature of reactant 5)pressure 6)surface area (any two)	1 ½ +½

11	i)  ii) $CH_3 - CH_2 - CH = CH - CH_3$ iii) 	1 1 1
12	(i)Because phenoxide ion is more stable than $CH_3CH_2O^-$ ion / due to resonance in phenol, oxygen acquires positive charge and releases H^+ ion easily whereas there is no resonance in CH_3CH_2OH (ii)Because of hydrogen bonding in ethanol (iii)Because it follows SN_1 path way which results in the formation of stable $(CH_3)_3C^+$.	1 1 1
13	$\Delta T_f = K_f m$ $T_f^0 - T_f = \frac{K_f W_B \times 1000}{M_B \times W_A}$ $273K - T_f = 1.86K\ kg\ mol^{-1} \times \frac{31g}{62g mol^{-1}} \times \frac{1000}{500kg}$ $T_f = (273-1.86)\ K$ $T_f = 271.14K$ Or -1.86^0C	1 1 1 1
14	(i)Unit cells having constituent particles at the corner positions. (ii) The defect occurs due to missing of equal no of cations and anions in a lattice. (iii) The permanent magnetism which arises when magnetic moments of substance are aligned in same direction.	1 1 1
15	$log\frac{K_2}{K_1} = \frac{E_a}{2.303R}[\frac{1}{T1} - \frac{1}{T2}]$ $log\frac{4 \times 10^{-2}}{2 \times 10^{-2}} = \frac{E_a}{2.303 \times 8.314 J/K/mol}[\frac{1}{300} - \frac{1}{310}]$ $log2 = \frac{E_a}{19.147 J/mol}[\frac{10}{300 \times 310}]$ $E_a = \frac{0.3010 \times 19.147 \times 300 \times 310}{10}$ $E_a = 53598\ J/mol$ or $53.598\ kJ/mol$	1 1 1

16	(i)$[CoF_6]^{3-}$ sp^3d^2octahedral (ii) $[Ni(CN)_4]^{2-}$ dsp^2square planar (b) CO , because of synergic /back bonding with metal	½ ½ ½ ½ ½ ½
17	(i) The zig-zag motion of the colloidal particles due to unbalanced bombardment by the particles of dispersion medium. (ii) The conversion of precipitate into colloidal sol by adding small amount of an electrolyte. (iii) On dissolution a large number of atoms or smaller molecules of a substance aggregate together to form species having size in the colloidal range.	1 1 1
18	(i)Greater solubility of impurities in molten state. (ii)Silica reacts with impurity FeO to form slag ($FeSiO_3$) / acts as a flux to remove impurities. (iii)Cast iron is harder than pigiron / has lesser content of carbon.	1 1 1
19	i)Buna –S Butadiene **CH_2=CH–CH=CH_2** Styrene $C_6H_5CH=CH_2$. ii)Glyptal Ethylene Glycol **HO–CH_2CH_2–OH** Pthalic acid  iii)Polyvinyl chloride Vinyl Chloride**CH_2=CH-Cl** (Note: half mark for name/s and half mark for structure/s)	½ ½ ½ ½ ½ ½
20	i)  (ii)Because of zwitter ion nature of amino acid /  (iii)Because vitamin C is soluble in water.	1 1 1

21	(i) $C_6H_5CONH_2 \xrightarrow{Br_2 + KOH} C_6H_5NH_2$	1
	(ii) $C_6H_5NH_2 \xrightarrow[0-5\,C^0]{NaNO_2 + HCl} C_6H_5N^+{}_2Cl^- \xrightarrow{H_2O} C_6H_5OH$	1
	(iii) $CH_3CN \xrightarrow{LiAlH_4} CH_3CH_2NH_2$	1
	OR	
21	**(i)** 	1
	(ii) $R{-}NH_2 + CHCl_3 + 3KOH \xrightarrow{Heat} R{-}NC + 3KCl + 3H_2O$ (R= $-C_6H_5$)	1
	(iii) $C_6H_5NH_2 + HCl \longrightarrow C_6H_5NH_3^+ Cl^-$	1
22	(i)Because of the presence of triple bond between two N atoms / high bond dissociation enthalpy	1
	(ii)Because of the lowest bond dissociation enthalpy /least thermal stability.	1
	(iii)Because of low solubility in blood.	1
23	i) Caring ,concerned, helping,empathy(any two)	½ ½
	ii) By organizing competitions like slogan writing, poster making and talk in the morning assembly (any other correct answer)	1
	iii) Used to treatdepression, Iproniazid/phenelzine (any other correct example)	½ ½
	iv) Saccharin/ sucralose/aspartame/alitame (any other correct example)	1

24	a) i) Due to lanthanoid contraction. ii) Due to incomplete filling of d- orbitals/ comparable energies of (n-1)d & ns electrons. iii)Because it undergoes disproportionation reaction in aqueous solution/ oxidation of a metal in a solvent depends on the nature of the solvent. Cu^{+} is unstable in water thats why it undergoes oxidation. b) i) $2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$ ii) $2Na_2CrO_4 + 2H^{+} \rightarrow Na_2Cr_2O_7 + H_2O + 2Na^{+}$ **OR** a) (i) Because of high $\Delta_a H^o$ &low Δ_{hyd} H^o. (ii)Because of more stability of Mn^{2+} ($3d^5$) (iii)Cr^{2+} ,because in +3 oxidation state Cr is more stable (t^3_{2g}orbital) b) Due to comparable energies of 5f ,6d,7s orbitals. Both show contraction in size/ both show main oxidation state +3/both are electro positive and very reactive/ both exhibit magnetic and spectral properties. **(any one)**	1 1 1 1 1 **OR** 1 1 ½ , ½ 1 1
25	a) $CH_3CO\,Cl$ (A) $CH_3\,CHO$ (B) $CH_3CH(OH)\text{-}CH_2\text{-}CHO$ (C) $CH_3CH{=}CH\text{-}CHO$ (D) b) i)On adding Tollen's reagent C_6H_5CHO forms silver mirror whereas $C_6H_5COCH_3$does not. ii)On adding $NaHCO_3$solution benzoic acid gives brisk effervescence but methyl benzoate does not. (or any other distinguishing test) c) $CH_3CH_2\text{-}CH(CH_3)\text{-}CHO$ **OR** a)i) $CH_3CH_2CH_3$ ii) $CH_3\text{–}C{=}N\text{-}NHCONH_2$	½ ,½ ½, ½ 1 1 1 1

	CH_3	1
	iii) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-OH$	1
	b) **$CH_3CHO < CH_3CH_2OH < CH_3COOH$**	1
	c)On adding Tollen's reagent CH_3CH_2CHO forms silver mirror whereas $CH_3CH_2COCH_3$ does not (or any other distinguishing test).	1
26	Mg ⎜ Mg^{2+} **(0.001)** ⎜⎜ Cu^{2+} **(0.0001M)** ⎜Cu	
	$E^0_{Cell} = E^0_R - E^0_L$	
	=[0.34-(-2.37)]V	
	=2.71V	
	$E_{cell} = E^o_{Cell} - \frac{0.059}{n} V \log\frac{[Mg2+]}{[Cu2+]}$	1
	$=2.71V - \frac{0.059}{2}V \log 10^{-3}/10^{-4}$	1
	=2.71-0.0295 V log 10	
	=2.71-0.0295	
	=2.6805 V	1
	$\Delta G = -nFE_{cell}$	½
	$= -2x96500\ C\ mol^{-1}\ x2.68\ V$	½
	$= -517240 Jmol^{-1}$	
	= -517.240 kJ/mol	1
	OR	
26	**a) M=0.20M K = $2.48X10^{-2}$S/cm**	
	$\Lambda_m = \frac{K}{M}$ x 1000 Scm^2/mol	½
	$\Lambda_m = \frac{2.48x10^{-2}}{0.20}$ x 1000 Scm^2/mol	
	$= 124$ Scm^2/mol	1
	$\alpha = \frac{\Lambda_m}{\Lambda_m{}^0}$	½

	$\Lambda_m{}^0 = \lambda^0 K^+ + \lambda Cl^-$ = 73.5 + 76.5 = 150 $\alpha = \frac{124}{150}$ = 0.82 Or 82% Primary battery or cell, potential remains constant throughout its life.	1 1,1