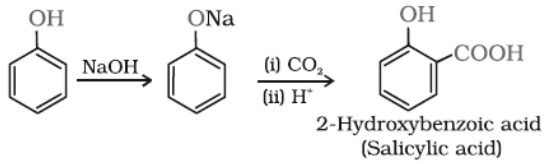
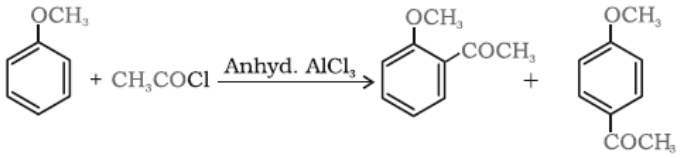
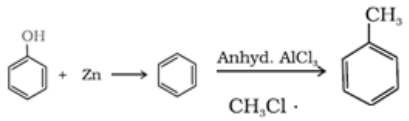
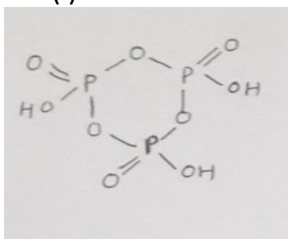
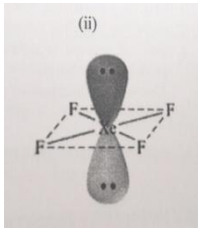
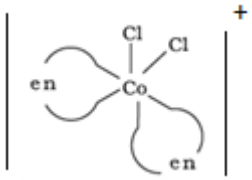
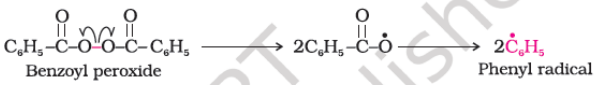
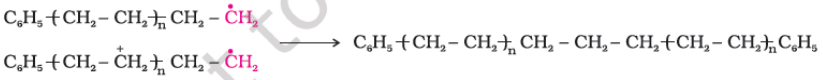
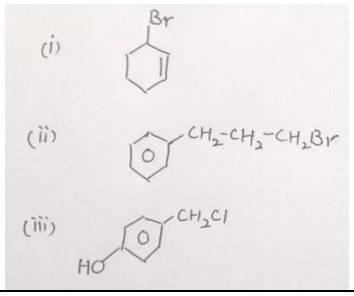
MARKING SCHEME -CHEMISTRY 2016

SET -56/2/N

Q. N.	Value Points	Marks
1	Like Charged particles cause repulsion/ Brownian motion/ solvation	1
2	Due to presence of free electrons at interstitial sites, / metal excess defect	1
3	NO_2	1
4	N-methyl-2-methylpropanamine / 2-methyl-N-methylpropanamine	1
5	(i) , Inversion of configuration	½ + ½
6	(i)  2-Hydroxybenzoic acid (Salicylic acid) (ii) 	1 1
	OR	
6	(i)  (ii) $HCHO+CH_3MgX \longrightarrow CH_3CH_2OMgX \xrightarrow{H_2O/H+} CH_3CH_2OH$	1 1
7	(i) zero order , bimolecular/ unimolecular (II) mol L^{-1} s^{-1}	½+½ 1
8	(i) Osmotic pressure (ii) Positive deviation from Raouls' law/ Positive deviation	1 1

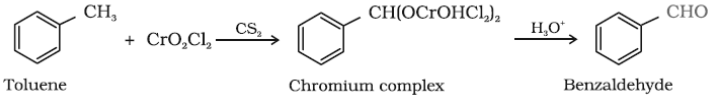
9	(i)  (ii) 	1 +1
10	(i) [$Ni(H_2O)_6$] Cl_2 (ii) Hexaaquanickel(II) chloride	1 1
11	(a) . In phenols lone pair of electron on oxygen are delocalized over benzene ring due to resonance but in alcohol lone pair of electron on oxygen are localized & hence available for protonation / + R- effect in phenol but not in ethanol. (b) Due to intermolecular Hydrogen bonding (c) Weaker (O-CH_3) bond and stronger(O-C_6H_5) bond ,due to resonance / carbon in benzene is sp^2 hybridized due to which partial double bond character.	1 1 1
12	(a) d^2sp^3 , Diamagnetic, low spin (b) 	1 ½ ½ 1
13	log k = log A - E_a/2.303RT E_a / 2.303 RT = 1 ×10^4 k/ T E_a =1.0 x 10^4 x 2.303 x 8.314 =191471.4 J/mol $t_{1/2}$ =0.693/ k k = 0.693/200 = 0.0034 min^{-1} / 3.4 × 10^{-3} min^{-1}	½ 1 ½ 1

14	(i) Oil as dispersed phase and water as dispersion medium (ii) The potential difference between fixed layer and diffused / double layer of opposite charges. (iii) Large number of atoms or smaller molecules of a substance aggregate together to form species having size in colloidal range.	1 1 1
15	Volume of the unit cell = a^3 $= (400\ pm)^3$ $= (4 \times 10^{-8}\ cm)^3$ $= 64 \times 10^{-24}\ cm^3$ Volume of 280 g of the element = mass / density $= 280/7\ cm^3$ $= 40\ cm^3$ Number of unit cells in this volume = $40 / 64 \times 10^{-24} = 6.25 \times 10^{23}$ unit cells. Since z = 4 , Therefore, total no. of atoms in 280g $= 4 \times 6.25 \times 10^{23}$ $= 2.5 \times 10^{24}$ atoms. (or any other correct method)	 1 1 1
16	(i) Sodium Hydrogen Sulphite reaction/ Pentaacetate of glucose does not react with Hydroxylamine/Schiff's test (any one) (ii) Phosphodiester linkage (iii) Fat soluble - Vitamin A/D /E/ K Water soluble - Vitamin B /C	1 1 ½ ½
17	(i) Catalyst / initiator of free radical (ii) Hexamethylene diamine and adipic acid / structure / IUPAC name (iii) Buna-S<Polythene<Nylon 6,6	1 1 1
	OR	

17	*Chain initiation steps*  Benzoyl peroxide Phenyl radical  *Chain propagating step*  *Chain terminating step* For termination of the long chain, these free radicals can combine in different ways to form polythene. One mode of termination of chain is shown as under: 	1 1 1
18	$\Delta T_b = i \ K_b w_b \times 1000 / M_b \times w_a$ $\Delta Tb = \frac{3 \times 0.52 \times 2 \times 1000}{142 \times 50}$ = 0.439 K $\Delta Tb = T_b - T_b^0$ T_b = 0.439 +373 = 373.439K (OR 373.589 K)	½ 1 ½ 1
19	 	1 1 1
20	(i) Due to presence of two P-H bonds in H_3PO_2 / In H_3PO_2 O.S of P = +1 which can increase but in H_3PO_4 O.S of P =+5 (max.) (ii) Due to stronger S-S bond than O-O bond. (iii) Size of halogen increases / bond length increases /bond dissociation enthalpy decreases (any one)	1 1 1
21	1. Chromatography 2. To Separate two sulphide ores 3. It decomposes to CaO which removes impurity (silica) as slag/ Acts as flux.	1 1 1
22	(i) A : $C_6H_5CONH_2$ B : $C_6H_5NH_2$ C : $C_6H_5NHCOCH_3$	½ ½ ½

	(ii) A: $C_6H_5NO_2$ B : $C_6H_5NH_2$ C : C_6H_5NC	½ ½ ½
23	(i) Aware, concerned or any other two correct values (ii) Side effects/ health problems (iii) Neurologically active drugs/ stress relievers/drugs used to treat mental diseases example- valium, equanil (or any other two correct example)	½ +½ 1 1 ½ +½
24	(a) (i) Ability of oxygen to form multiple bond . (ii)Due to lanthanoid contraction. (iii)Due to variable oxidation state/unpaired electrons (b) (i) $2MnO_2 + 4KOH + O_2 \rightarrow 2K_2MnO_4 + 2H_2O$ (ii) $Cr_2O_7^{2-} + 14\ H^+ + 6I^- \rightarrow 2Cr^{3+} + 7H_2O + 3I_2$	1 1 1 1 1
	OR	
24	(i) Zn , because of not having partially filled d-orbital in its ground state or ionic state. (ii) Cr (iii) Cu (iv) Mn , because Mn^{+2} has extra stability due to half filled d-orbital	½+1 1 1 ½+1

25	a). A : CH_3CHO B : $CH_3—CH(OH)—CH_2CHO$ C : $CH_3—CH=CH—CHO$ D : $CH_3—CH(OH)—CN$ b) i)Heat both the compounds with NaOH and I_2, C_6H_5-CH=CH-$COCH_3$ gives yellow ppt of iodoform while C_6H_5-CH=CH-CO CH_2CH_3 does not. ii)Add ammonical silver nitrate solution (Tollens' reagent) , HCOOH gives silver mirror while CH_3CH_2COOH does not. c) $CH_3COCH_3 < CH_3CH_2OH < CH_3COOH$	½ ×4=2 1 1 1
	OR	

25	**a.)**  Toluene Chromium complex Benzaldehyde	1
	b) $C_6H_5COCH_3$ <CH_3CHO< HCHO	1
	c) stronger -I effect of Cl , stronger acid less pk_a / strong electron withdrawing power of Cl.	1
	d)$CH_3CH_2CH=CH—CH_2CHO$	1
	e) A: CH_3COCH_3	½
	B: CH_3CH_2CHO	½

26	(a) $E_{cell} = E^0_{cell} - \frac{0.059}{n} \log \frac{[Cr^{3+}]^2}{[Fe^{2+}]^3}$	½
	$0.261\ V = E^0_{cell} - \frac{0.059}{6} \log \frac{[0.01]^2}{[0.01]^3}$	1
	$0.261\ V = E^0_{cell} - \frac{0.059}{6} \log 100$	½
	$E^0_{cell} = 0.261 + 0.0197$ $= 0.2807V$	1
	(b) A , due to its more negative E^0 value.	1+1
	OR	
26	(a).	
	$\Lambda^c_m = \kappa \times 1000/C$	½
	$= 3.905 \times 10^{-5} \times 1000/ 0.001$ $= 39.05\ S\ cm^2/mole$	1
	$CH_3COOH \rightarrow CH_3COO^- + H^+$	
	$\Lambda^0 CH_3COOH = \lambda^0 CH_3COO^- + \lambda^0 H^+$	
	$= 40.9 + 349.6$	
	$\Lambda^0 CH_3COOH = 390.5\ S\ cm^2/mol$	
	$\alpha = \frac{\Lambda_m}{\Lambda^0_m}$	½
	$= 39.05/ 390.5$ $= 0.1$	1
	(b). Device used for the production of electricity from energy released during spontaneous chemical reaction and the use of electrical energy to bring about a chemical change.	1
	The reaction gets reversed / It starts acting as an electrolytic cell & vice – versa.	1