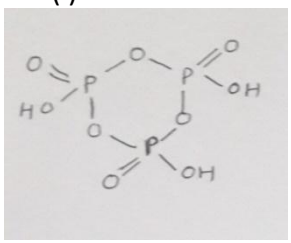
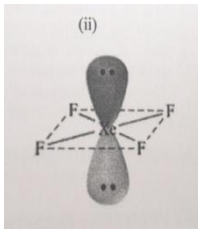
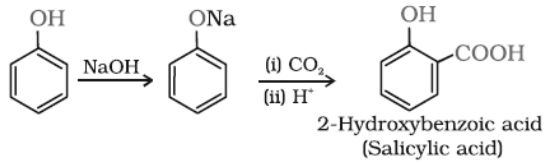
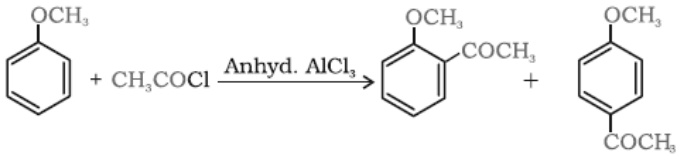
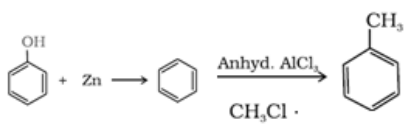
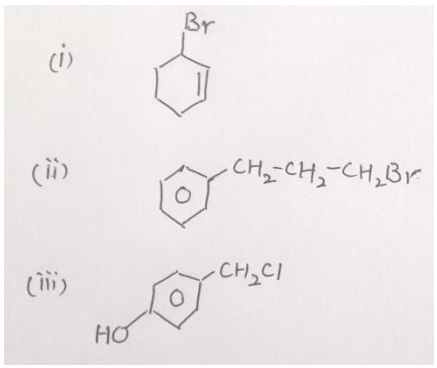
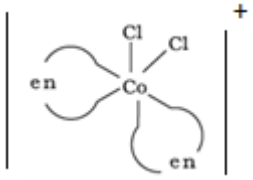
MARKING SCHEME -CHEMISTRY 2016

SET -56/3/N

Q.N.	Value Points	Marks
1	NO_2	1
2	(i) , Inversion of configuration	½ + ½
3	Like Charged particles cause repulsion/ Brownian motion/ solvation	1
4	Due to presence of free electrons at interstitial sites, / metal excess defect	1
5	N-methyl-2-methylpropanamine / 2-methyl-N-methylpropanamine	1
6	(i)  (ii) 	1 +1
7	(i) Osmotic pressure (ii) Positive deviation from Raouls' law/ Positive deviation	1 1
8	(i)  2-Hydroxybenzoic acid (Salicylic acid) (ii) 	1 1
	OR	
8	(i) 	1

	(ii) $HCHO+CH_3MgX \longrightarrow CH_3CH_2OMgX \xrightarrow{H_2O/H^+} CH_3CH_2OH$	1
9	(i) $[Ni(H_2O)_6]Cl_2$ (ii) Hexaaquanickel(II) chloride	1 1
10	(i) zero order , bimolecular/ unimolecular (II) mol L^{-1} s^{-1}	½+½ 1
11		1 1 1
12	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 = $4 \times 6.25 \times 10^{23}$ = 2.5×10^{24} atoms. (or any other correct method)	1 1 1
13	(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	1 1 1

	character.	
14	(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
15	$\Delta T_b = i\ K_b w_b \times 1000 / M_b \times w_a$ $\Delta Tb = \frac{3 \times 0.52 \times 2 \times 1000}{142 \times 50}$ = 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
16	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
17	(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
18	(a) d^2sp^3, Diamagnetic, low spin (b)  	1 ½ ½ 1
19	(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.	1 1

	(iii) Size of halogen increases / bond length increases /bond dissociation enthalpy decreases (any one)	1
20	(i) A : $C_6H_5CONH_2$ B : $C_6H_5NH_2$ C : $C_6H_5NHCOCH_3$ (ii) A: $C_6H_5NO_2$ B : $C_6H_5NH_2$ C : C_6H_5NC	½ ½ ½ ½ ½ ½
21	$\log k = \log A - E_a/2.303RT$ $E_a / 2.303\ RT = 1 \times 10^4\ k/T$ $E_a = 1.0 \times 10^4 \times 2.303 \times 8.314$ $= 191471.4$ J/mol $t_{1/2} = 0.693/k$ $k = 0.693/200$ $= 0.0034\ min^{-1} / 3.4 \times 10^{-3}\ min^{-1}$	½ 1 ½ 1
22	(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	
22	*Chain initiation steps* $C_6H_5-C(=O)-O-O-C(=O)-C_6H_5 \rightarrow 2C_6H_5-C(=O)-O^{\bullet} \rightarrow 2C_6H_5^{\bullet}$ Benzoyl peroxide — Phenyl radical $C_6H_5^{\bullet} + CH_2=CH_2 \rightarrow C_6H_5-CH_2-CH_2^{\bullet}$ *Chain propagating step* $C_6H_5-CH_2-CH_2^{\bullet} + CH_2=CH_2 \rightarrow C_6H_5-CH_2-CH_2-CH_2-CH_2^{\bullet}$ $C_6H_5-(CH_2-CH_2)_n-CH_2-CH_2^{\bullet}$ *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: $C_6H_5-(CH_2-CH_2)_n-CH_2-CH_2^{\bullet}$ $C_6H_5-(CH_2-\overset{+}{C}H_2)_n-CH_2-CH_2^{\bullet} \rightarrow C_6H_5-(CH_2-CH_2)_n-CH_2-CH_2-CH_2-(CH_2-CH_2)_n-C_6H_5$	1 1 1
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

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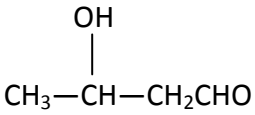
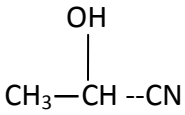
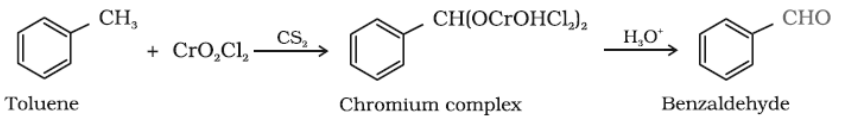
24	a). A : CH_3CHO B :  C : $CH_3—CH=CH—CHO$ D :  b) i)Heat both the compounds with NaOH and I_2, C_6H_5-CH=CH-$COCH_3$ gives yellow ppt of iodoform while C_6H_5-CH=CH-CO CH_2CH_3 does not. ii)Add ammonical silver nitrate solution (Tollens' reagent) , HCOOH gives silver mirror while CH_3CH_2COOH does not. c) CH_3COCH_3 <CH_3CH_2OH <CH_3COOH	½ ×4=2 1 1 1
	OR	
24	**a.)**  Toluene Chromium complex Benzaldehyde b) $C_6H_5COCH_3$ <CH_3CHO< HCHO c) stronger -I effect of Cl , stronger acid less pk_a / strong electron withdrawing power of Cl. d)$CH_3CH_2CH=CH—CH_2CHO$ e) A: CH_3COCH_3 B: CH_3CH_2CHO	 1 1 1 1 ½ ½

25	(a) $E_{cell} = E^0_{cell} - \frac{0.059}{n} \log \frac{[Cr^{3+}]^2}{[Fe^{2+}]^3}$ $0.261\ V = E^0_{cell} - \frac{0.059}{6} \log \frac{[0.01]^2}{[0.01]^3}$ $0.261\ V = E^0_{cell} - \frac{0.059}{6} \log 100$ $E^0_{cell} = 0.261 + 0.0197$ $= 0.2807V$ (b) A , due to its more negative E^0 value.	½ 1 ½ 1 1+1
	OR	
25	(a).	

	Λ^c_m $= \kappa \times 1000/C$ $= 3.905 \times 10^{-5} \times 1000/ 0.001$ $= 39.05\ S\ cm^2/mole$ $CH_3COOH \rightarrow CH_3COO^- + H^+$ $\Lambda^0 CH_3COOH = \lambda^0 CH_3COO^- + \lambda^0 H^+$ $= 40.9 + 349.6$ $\Lambda^0 CH_3COOH = 390.5\ S\ cm^2/mol$ $\alpha = \frac{\Lambda_m}{\Lambda_m^0}$ $= 39.05/ 390.5$ $= 0.1$ (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. The reaction gets reversed / It starts acting as an electrolytic cell & vice – versa.	½ 1 ½ 1 1 1

26	(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	
26	(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