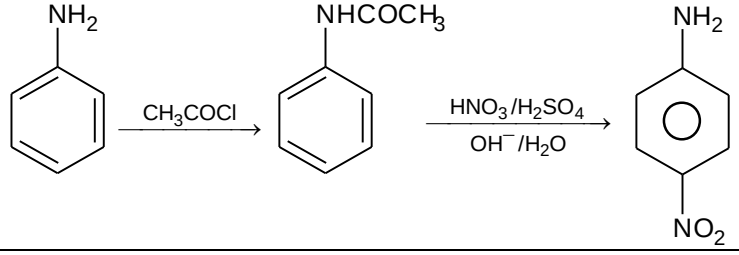
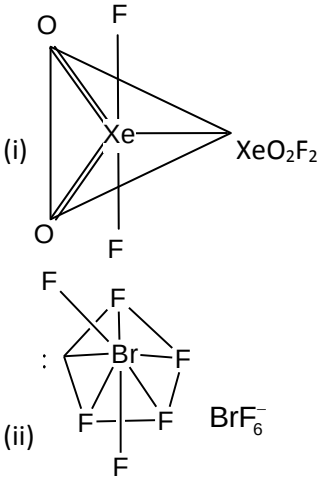
FIITJEE INTERNAL TEST

C.B.S.E. MOCK TEST - I

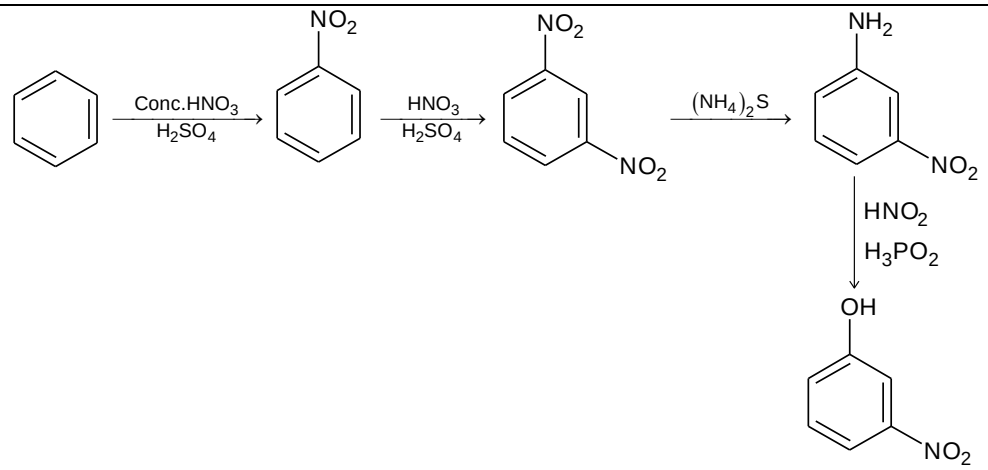
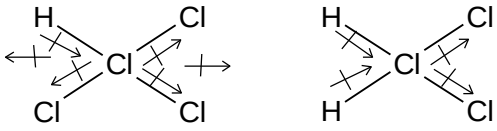
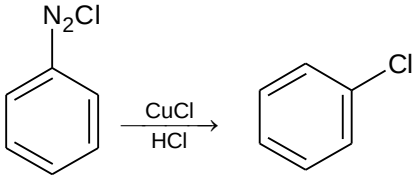
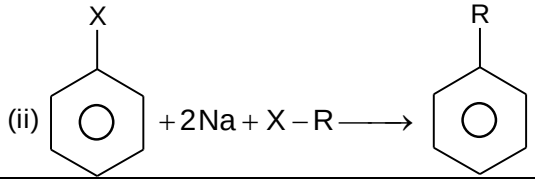
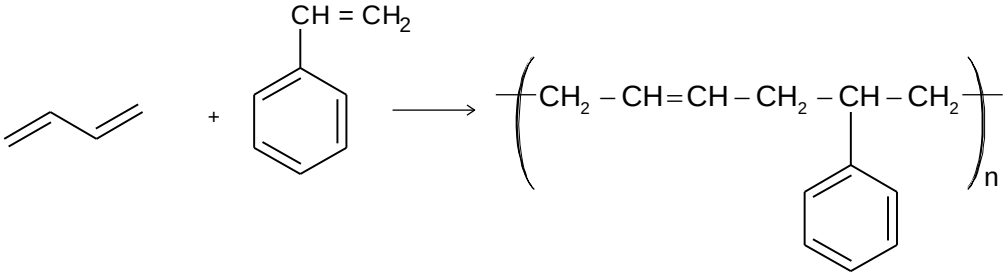
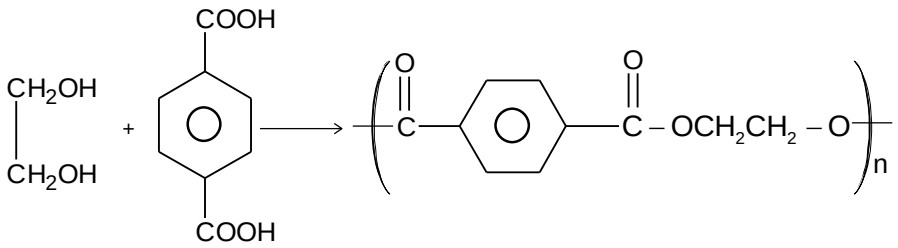
CHEMISTRY

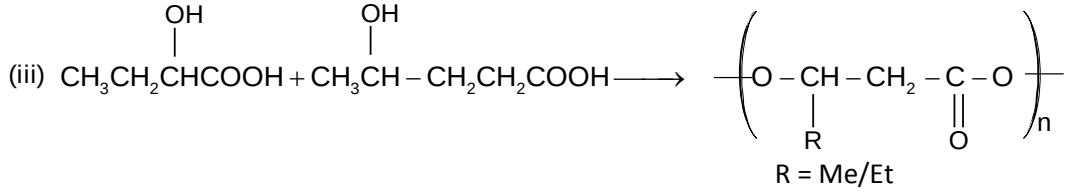
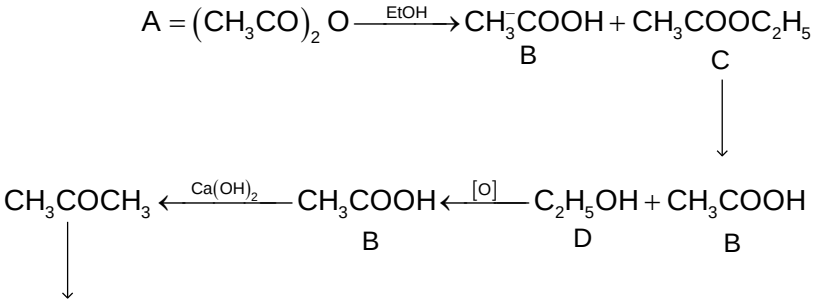
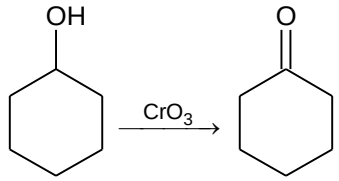
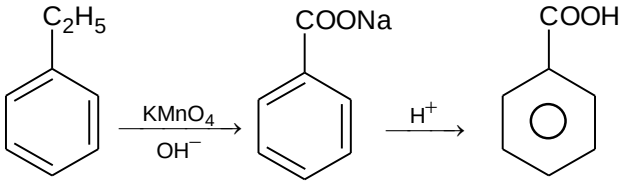
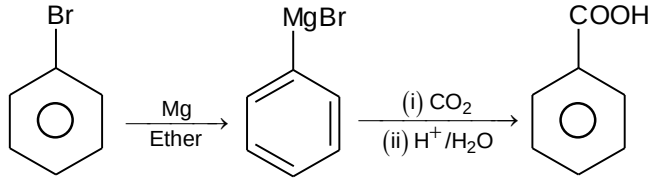
Class – XII

Hints & solutions

S.No	Value points	Marks
1	2-Methoxybut-3-en-1-oic acid	1
2		1
3	Uracil	1
4	$(C_2H_5)_2NH < C_2H_5NH_2 < C_2H_5OH$	1
5	NH_3 because it is easily liquefiable	1
6	(a) Due to F-centre electrons (b) It is because of +ve hole and p-type semiconductor	1 + 1
7	Non-ideal solution definition Aniline + phenol show –ve deviation because H-bonding between phenolic hydrogen proton and lone pair over N in aniline is stronger	1 ½ + ½
8	No. of voids = N + 2N = 3N $= 1.5 \text{ mol} = 9.033 \times 10^{23}$ No. of tetrahedral voids = $1 \text{ mol} = 6.022 \times 10^{23}$	2
9	$CO(s) + 2Ni(OH)_3 \underset{\text{Charging}}{\overset{\text{Discharging}}{\rightleftharpoons}} CdO(s) + 2Ni(OH)_2(s) + H_2O(\ell)$ OR Fuel cells: Definition CH_4, C_2H_6, CH_3OH pollution free working, higher efficiency	2 ½ + ½ 1
10		1 + 1
11	$\Lambda_m = \frac{K \times 1000}{M} = 40 \, S cm^2 / mol$	1(½ + ½) 1

	$\alpha = \frac{\Lambda_m}{\Lambda_m^0} = \frac{40}{390.5} = 0.102$	1
	$K = C\alpha^2 = 10^{-3} \times (0.102)^2 = 1.04 \times 10^{-5}$	½
	OR	1
	$\Delta G^o = -nFE^o_{Cell}$	½
	$= -6 \times 96500 \times (-0.40 + 0.74) = 196860$ J	
	$E^o_{Cell} = \frac{0.0591}{n} \log K$	1
	$\log K = \frac{6 \times 0.34}{0.0591} = 34.517$	
	$K = 3.289 \times 10^{34}$	
12	$\Delta T_b = 0.476$	1
	$K_b = \frac{RT_6^2}{1000 \ell_v} = \frac{2 \times (319.3)^2}{1000 \times 84.1} = 2.425$	
	M = ?	1
	$\Delta T_b = K_b \times \frac{5}{M} \times \frac{1000}{100}$	
	Substitute M = 255	
	Let the formula be S_n	1
	$n = \frac{255}{32} \approx 8$	
13	(a) If particle size < 1 nm it act as crystalloid but when these form aggregates so that size lies in colloidal range, it is called colloid.	1
	(b) Lyophilic colloid have great affinity between dispersed phase and dispersion medium and thus are stable than lyophobic colloid.	1
	(c) Clouds are aerosols having small droplets of water suspended in air. When a solution carrying charge opposite to the one on clouds is sprayed, it causes artificial rain.	1
14	(a) Cresol acts as froth stabliser-stablise the froth	1
	(b) (i) Vapour phase refining – impurities do not form volatile compound while metal does form	1
	(ii) Liquation – It is based on difference in melting point of metal and impurities	1
15	(a) Bleaching action of O_3 is due to oxidising nature while SO_2 is reducing in nature.	1
	(b) Fluorine is more electronegative than oxygen.	1
	(c) ClO_4^- is more stable than SO_4^{-2}	1
16	(i) $ICl_3 + 2H_2O \longrightarrow 3HCl + HIO_2$	1 each
	(ii) $XeF_4 + SbF_5 \longrightarrow \left[XeF_3^+\right]\left[SbF_6^-\right]$	
	(iii) $P_4 + 8SOCl_2 \longrightarrow 4PCl_3 + 4SO_2 + 2S_2Cl_2$	
17	(a) Isomer $[Co(NH_3)_6]$ $[Cr(CN)_6]$	½
	IUPAC name – Hexammine cobalt(III) hexacyano chromate(III)	½
	(b) In presence of ligand field, degenerate d-orbitals split into 2 sets – t_{2g} and eq. the difference in energy between these two sets is called crystal field splitting energy.	1
	Configuration in strong ligand field $t_{2g}^4 e_g^0$	½
	Configuration in weak ligand field $t_{2g}^3 e_g^1$	½

18	(a) 	1
	(b) (i) Nitrous acid test – Aniline forms diazonium, which with phenol forms red dye.	½
	(ii) Carbyl amine test – 1^o amine give offensive smell	½
	Chemical equation	½ + ½
19	(a) 	1
	CH_2Cl_2 has higher dipole because net bond dipoles add	
	(b) (i) 	1
	(ii) 	1
20	(a) Sugars which reduce Fehling/Tollen's reagent are called reducing sugar.	1
	(b) H-bonding	1
	(c) Ribosomes	1
21	(i) Buna – S	1
		
	(ii) 	1

	(iii) 	1
22	(i) Anionic detergents: These are alkyl benzene sulphonic acid derivatives and have large anionc group. (ii) Tranquiliser: Anti-depressant drugs., eg., Equanil (iii)Anti-oxidant : Added to retard action of oxygen in food. eg., BHA, BHT etc.	1 each
23	(a) It is because adulterated liquor has methanol and is used for industry purpose not for drinking. (b) Sugar are converted to glucose & fructose by invertase and then to ethanol by enzyme zymase in yeast. $C_6H_{12}O_6 \xrightarrow{\text{Zymax}} 2C_2H_5OH + 2CO_2$ (c) Awareness and concern for society	1 2 1
24	 Does not give Fehling/Tollens's test OR (a) (i) $R-CHO \xrightarrow[HCl]{Zn-Hg} RCH_3$ (ii) $HCHO \xrightarrow{Conc.NaOH} HCOONa + CH_3OH$ (b) (i)  (ii)  (iii) 	Identification 2½ Chemical Equ^m 2½ 1 1 1 1 1
25	(a) Rate of reaction – Definition (b) rate $\alpha\ (conc)^n$ $\frac{R_1}{R_2} = \left(\frac{Conc_1}{Conc_2}\right)^n$ $\frac{1}{2} = \left(\frac{1}{27}\right)^n \Rightarrow n = \frac{1}{3}$	1 2

	(c) $K = 10^{-3}\ s^{-1}$	½
	$K = \frac{2.303}{t}\log\frac{a_0}{a}$	
	$t = \frac{2.303}{10^{-3}}\log\frac{100}{25} = \frac{2.303\times0.602}{10^{-3}} = 1.38\times10^{3}\,s$	1½
	OR	
	(a) (i) Molecularity of reaction - Definition	1 mark
	(ii) Collision frequency - Definition	
	(b) $\log K = 14.34 - 1.25\times10^{4}\ K/T$	
	Comparing with Arrhenius equation	½
	$\log K = \log A - \frac{E_a}{2.303RT} \quad ----(1)$	
	$\frac{E_a}{2.303R} = 1.25\times10^{4}$	
	$E_a = 2.303\times8.314\times1.25\times10^{4} = 23.9\times10^{4}$ J/mol	1
	$K = \frac{0.693}{t_{1/2}} = \frac{0.693}{256\times60}\,s^{-1}$	
	Substituting in equation(1) and solving	
	T = 668.8	
26	(a) (i) Higher o.s more tendency to gain electron	1
	(ii) no unpaired d-electron	1
	(b) ***Lanthanoid*** — ***Actinoids***	1 mark
	Oxidation state mainly +3 — Variable	
	Atomic & ionic size	
	Decreases gradually due to Lanthanoid contraction — Actinoid contraction is greater	
	Chemical reactivity	
	Less reactive — More reactive	
	OR	
	(a) (i) Cu^{2+} is more stable due to greater hydration	1 mark each
	(ii) Cr^{2+} changes to Cr^{3+} $\left(t_{2p}^{3}\right)$ stable while Mn^{3+} changes to $Mn^{2+}(d^5)$ configuration	
	(iii) Sc^{3+} does not have unpaired e^- $Ti^{3+}(d^1)$	
	(b) Misch metal 95% Ln 5% Fe traces of S, Ca etc.,	½ + 1 + ½
	Uses: bullet shells	