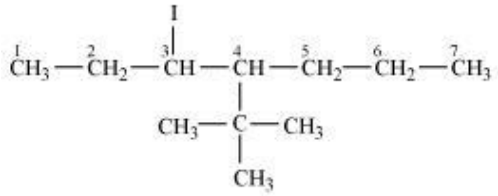
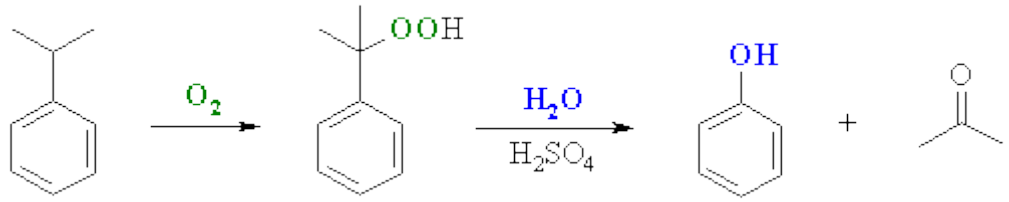
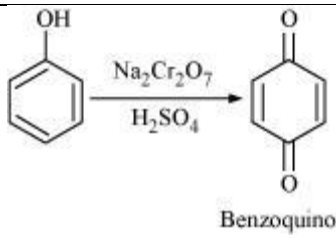
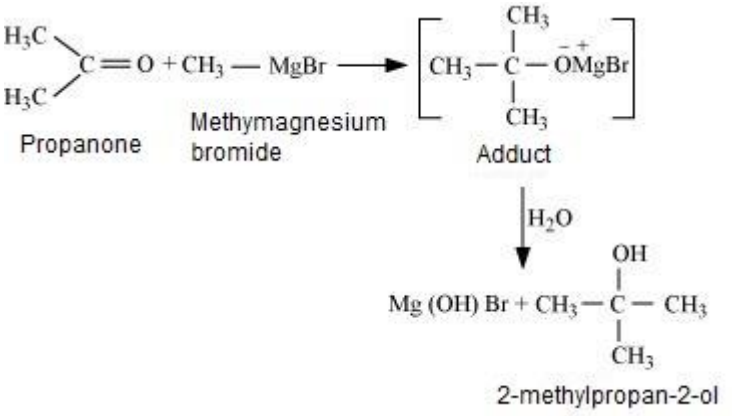
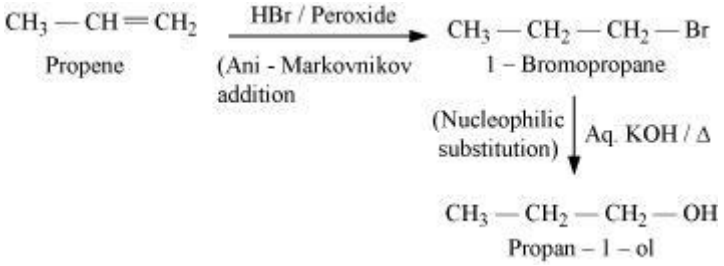
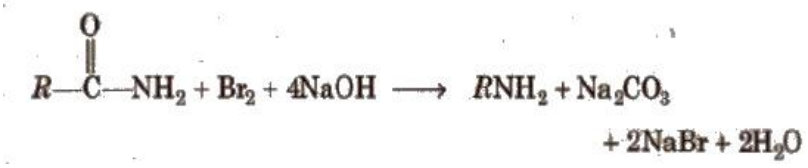
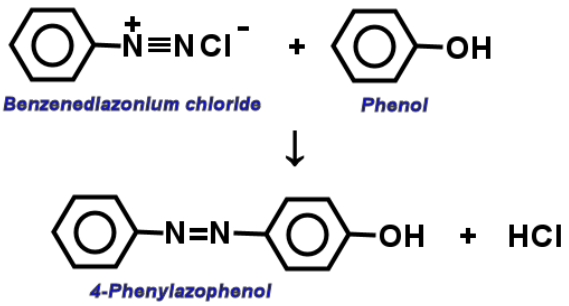
MARKING SCHEME

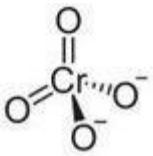
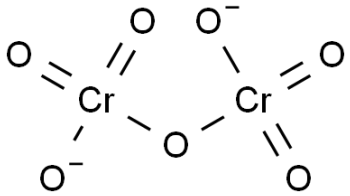
1.	The formation of micelle takes place only above a particular temperature called Kraft temperature.	1
2.	28	1
3.		1
4.		1
5.	P type semiconductor	1
6.	$[Ni(CN)_4]^{2-}$ dsp^2 hybridisation, Ni in +2 state all electrons are paired, so diamagnetic. $[Ni(CO)_4]$ sp^3 hybridisation, Ni in 0 state all electrons are paired so diamagnetic **OR** A=$[Ni(H_2O)_6]^{2+}$ B=$[Ni(H_2O)_4(en)]^{2+}$ C=$[Ni(H_2O)_2(en)_2]^{2+}$ D=$[Ni(en)_3]^{2+}$	½+1/2+ 1/2+1/2
7.	(i) The electron arrangement is trigonal bipyramidal. The shape is linear because the lone pairs prefer the equatorial positions. The moleculeXeF$_2$ has 3lone-pairs and 2bond-pairs. (ii) Low bond dissociation enthalpy and high hydration enthalpy of flourine.	1+1
8.	Let us assume a binary solution in which the mole fraction of the solvent be x1 and that of the solute be x2, p1 be the vapour pressure of the solvent and p1o be the vapour pressure of the solvent in pure state. According to Raoult's Law: $p_1=x_1p_1^o$……(1)	 ½

	The decrease in vapour pressure of the solvent (Δp1) is given by: $\Rightarrow \Delta p_1 = p_1^o - p_1$ $\Rightarrow \Delta p_1 = p_1^o - p_1^o x_1$ [using equation (1)] $\Rightarrow \Delta p_1 = p_1^o (1 - x_1)$ Since we have assumed the solution to be binary solution, **x2=1-x1** $\Rightarrow \Delta p_1 = p_1^o x_2$ $\Rightarrow x_2 = \Delta p_1 / p_1^o$	½ ½ ½
9.	$a=1g,\ a-x=0.125g,\ t=24hours$ $k = \frac{2.303}{t} log \frac{a}{a-x}$ $k = \frac{2.303}{t} log \frac{1}{0.125}$ $=0.0866hr^{-1}.$ $t_{1/2} = \frac{0.693}{k}$ $t_{1/2} = \frac{0.693}{0.0866}$ $=8hours$	½ ½ ½ ½
10.	(i) 1-Phenylmethanamine. (ii) N,N-Dimethylmethanamine.	1 1
11.	$\rho = \frac{Z\ X\ M}{a3\ XNa}$ $Z = \frac{2x(5x10^{-8})^3 x\ 6x10^{23}}{75}$ =2 $r = \sqrt{\frac{3}{4}}a$	½ ½ 1 ½

	$r=\sqrt{\frac{3}{4}}x5$ $=2.165A^0$	½
12.	(i) X is more strongly adsorbed than Y. (ii) Copper matte contains small amount of FeO as impurity which is removed as FeSiO3 slag when reacts with silica. FeO + SiO2 -----> FeSiO3 (slag) (iii) Van Arkel Method	1 ½ ½ 1
13.	(a) NH_4Cl (aq.)+ $NaNO_2$ (aq.) $\rightarrow N_2(g) + 2H_2O(l) + NaCl(aq.)$ (b) $P_4 + 3NaOH + 3H_2O \rightarrow 3NaH_2PO_2 + PH_3$ (iii) H_2SO_4 is a very strong acid in water because of its first ionisation to H_3O^+. and HSO_4^-. The ionization of HSO_4^- to H_3O^+ and SO_4^{2-} is very small (it is difficult to remove a proton from a negatively charged ion).	1 1 1
14.	(i) $[Cr(H_2O)_6]Cl_3$ (ii) $[Cr(H_2O)_5Cl]Cl_2H_2O$ (iii) $[Cr(H_2O)_4(Cl)_2]Cl(H_2O)_2$	1 1 1
15.	(i) It is due to the symmetry of para-isomers that fits in the crystal better as compared to ortho and meta-isomers. (ii) Resonance effect / Difference in hybridization of carbon atom in C-X bond / Instability of phenyl cation / because of the repulsion, it is less likely for the electron rich nucleophile to approach electron rich arenes . (iii) Alkoxide ion present in alcoholic KOH, is not only a strong nucleophile but also a strong base.	1 1 1
16.	(i) Animal hides are colloidal in nature, havig positively charged particles, when soaked in tannin, which contains negatively charged colloidal particles, mutual coagulation occurs. (ii) Greater the valency of flocculating ion added, greater is its power to cause precipitation. (iii) The optimum temperature range for enzymatic activity is 298-310 K i.e enzymes are active beyond this temp. range, thus during fever the activity of enzymes may be affected.	1 1 1
17	if vapour pressure of pure liquid is = P_o 80 % of pure liquid $P_s = 80 \times P_o/100 = 0.8P_o$ $P_s = P_o \times X_{solute}$ mass of solute = x gram And mass of solvent = 114g Molar mass of solute= 40 g/mol Molar mass of solvent (octane C_8H_{18}) = 114g/mol Number of moles of solute = x/40 = 0.025x Number of moles of solvent = 114/114= 1 moles Mole fraction of solvent = 1/(1+0.025x) $0.8P_o = P_o \times 1/(1+0.025x)$ Cross multiply we get $(1+0.025x))0.8P_o = P_o$	1 ½ 1

	Divide by 0.8 Po we get 1+0.025x = 1.25 Subtract 1 both side we get 0.025x = 0.25 Now divide by 0.025 we get x = 10g **OR** πV=CRT 4.98 = 36/180 x R x 300=60 R .....(i) 1.52 = C x R x 300 .....(ii) Divide (ii) by (i) C= 0.061M	½ 1 ½ ½ ½ ½ for unit
18.	(i)  Benzoquinone (ii)  Propanone Methymagnesium bromide Adduct 2-methylpropan-2-ol (iii)  Propene 1 – Bromopropane Propan – 1 – ol	1 1 1
19.	(i)  	1

	(ii) 	1
	(iii) Aniline will give azo dye test whereas methylamine will not	1
20.	(i) α helix-Intramolecular H bonding. β pleated-Intermolecular H bonding. (ii) Amylose is a straight chain polymer of D glucose whereas amylopectin is a branched polymer.	1 1 ½ ½
21.	(i) Slope = $-\frac{k}{2.303}$ k= - 2.303 x - 2.0x10^{-6} sec^{-1} = 4.606 x 10^{-6} sec^{-1}. (ii) $t_{1/2}=\frac{A_0}{2k}$	1 1 1
22.	(i) Addition polymers: Polyvinyl chloride, Polythene. Condensation polymers: Terylene, Bakelite. (ii) Buna- N: 1,3-Butadiene + Acrylonitrile. Buna -S: 1,3-Butadiene + Styrene.	½+1/2 ½+1/2 ½+1/2
23.	(i) Caring, empathetic, awareness, application of knowledge at right place. (ii) Because of production of histamine. Doctor will prescribe antihistamine. (iii)Medicines can be potent poisons. (iv) An agonist is a chemical that binds to a receptor and activates the receptor to produce a biological response. Antagonist is a drug that blocks a receptor.	½+1/2 ½+1/2 1 ½+1/2
24.	(i) $\kappa=\frac{G^*}{R}$ $\Lambda_m=\frac{1000\kappa}{C}$ $E_{Ni^{2+}/Ni}=-0.25-\frac{0.0591}{2}\log\frac{1}{0.50}$ = - 0.259V $E_{Al^{3+}/Al}=-1.66-\frac{0.0591}{3}\log\frac{1}{0.001}$ = - 1.719V E_{cell} = 0.259V –(-1.719V) = 1.46V **OR** (i) $E_{H+/1/2\ H2}=E^0_{H+/1/2\ H2}-\frac{0.0591}{n}\log\frac{1}{[H+]}$	1 1 1 1 1 1

	$E_{H+/1/2\ H2} = 0 - \frac{0.0591}{1}\log\frac{1}{10^{-10}}$ $= -0.591V$	½ ½
	(ii) First law-the chemical deposition due to flow of current through an electrolyte is directly proportional to the quantity of electricity (coulombs) passed through it.	1
	Faraday's second law of electrolysis states that, when the same quantity of electricity is passed through several electrolytes, the mass of the substances deposited are proportional to their respective chemical equivalent or equivalent weight.	1
	3F	1
25.	(i) In transition elements, the oxidation state differ by 1 e.g Cu^{+} and Cu^{2+}. In non-transition elements, the oxidation state differ by 2 e.g Pb^{+2} and Pb^{4+} (ii)	1 +1
	(a) d- block elements exhibit more oxidation states because of comparable energy gap between d and s subshell whereas f-block elements have large energy gap between f and d subshell.	1
	(b) $Cr_2O_7^{2-} + H_2O \rightleftharpoons 2CrO_4^{-} + 2H^{+}$ orange yellow	1
	(c) Lanthanoid contraction.	1
	OR	
	(i) $2\ MnO_2 + 4\ KOH + O_2 \text{ ---------> } 2K_2MnO_4 + 2H_2O$	1
	$3\ MnO_4^{2-} + 4H^{+} \text{ ----------> } 2MnO_4^{-} + MnO_2 + 2H_2O$	1
	$MnO_4^{-} + 5Fe^{2+} + 8H^{+} \rightarrow Mn^{2+} + 5Fe^{3+} + 4H_2O$	1
	 Chromate Ion	1
	(ii) 	1

26.

$CH_3CH = CHCH_3$ 2-butene (C) **1**

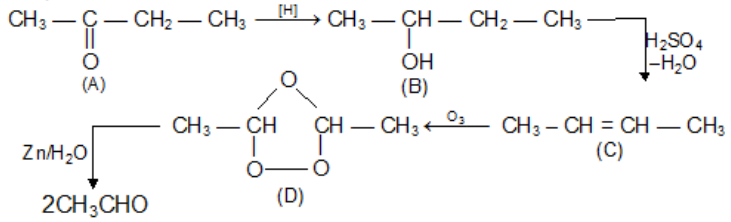
The compound C is obtained by dehydration of B, thus the latter should be

$CH_3 — \underset{\underset{OH}{|}}{CH} — CH_2 — CH_3$ 2-butanol (B) **1**

Finally, B is obtained by the reduction of A. Hence, the compound A should be

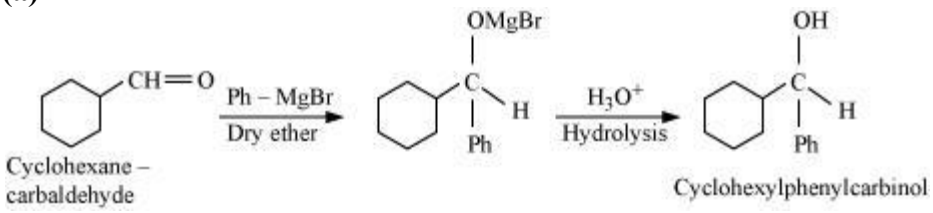
$CH_3 — \underset{\underset{O}{||}}{C} — CH_2 — CH_3$ 2-butanone (A) **1**

The equations involved are as follows:



(ii)

(a)



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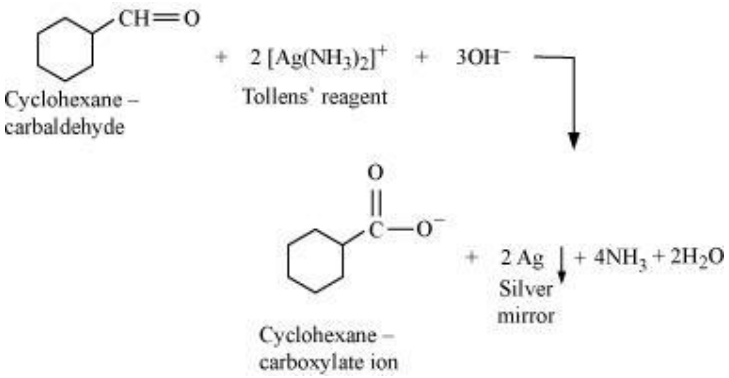
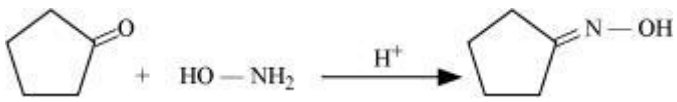
(b)



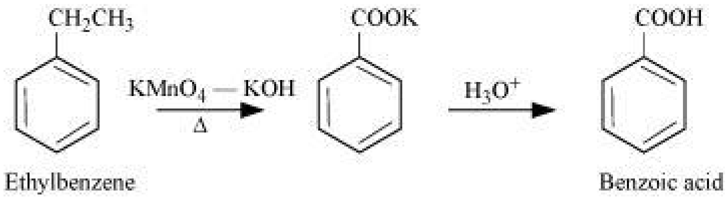
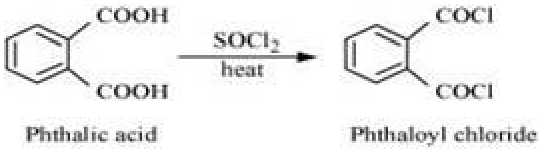
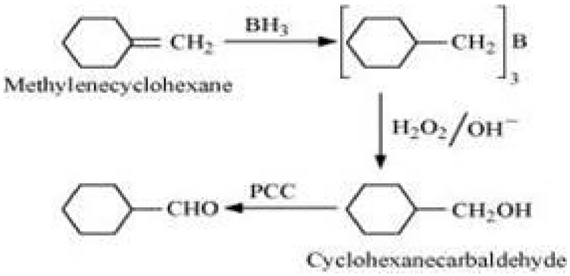
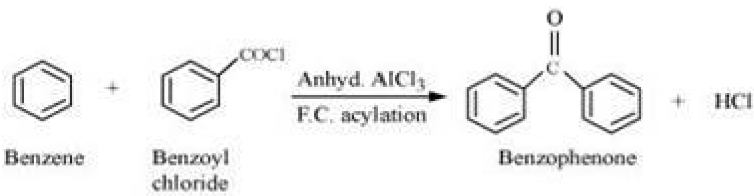
1

OR

(a)



1

	(b) 	**1**
	(c) 	**1**
	(d) 	**1**
	 **(e)**	**1**