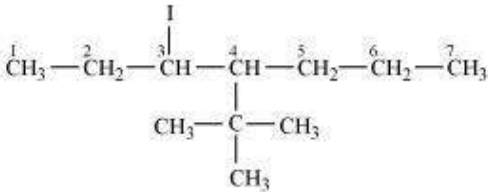
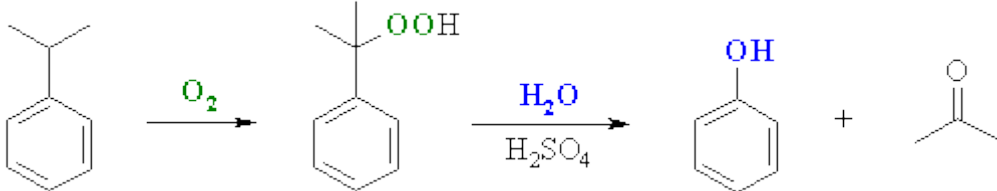
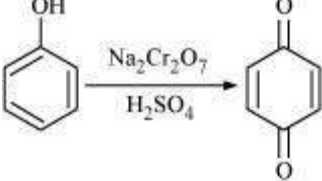
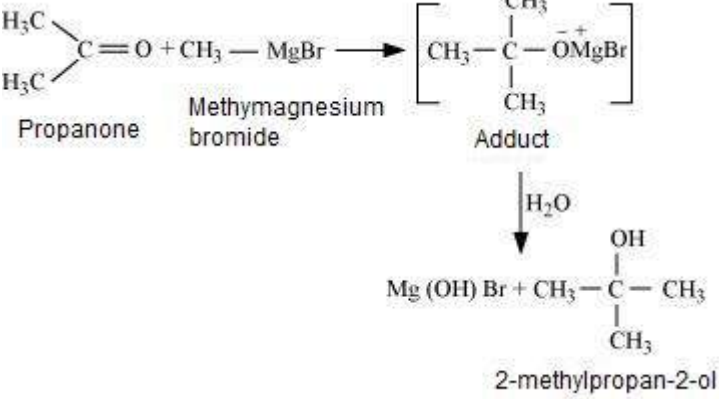
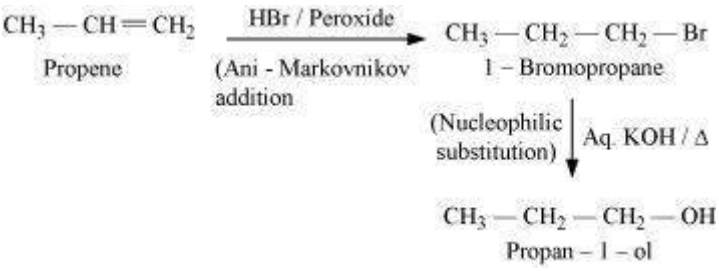


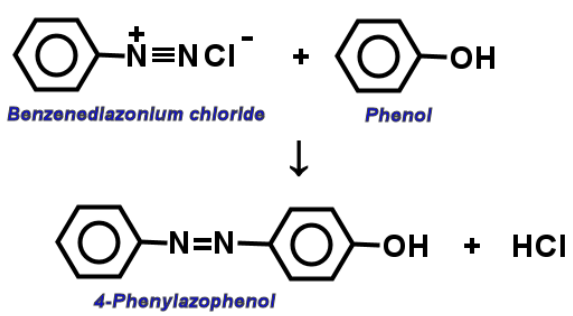
MARKING SCHEME

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.	<p><math>[\text{Ni}(\text{CN})_4]^{2-}</math>  <math>\text{dsp}^2</math> hybridisation, Ni in +2 state                      all electrons are paired, so diamagnetic.</p> <p><math>[\text{Ni}(\text{CO})_4]</math>  <math>\text{sp}^3</math> hybridisation, Ni in 0 state                      all electrons are paired so diamagnetic</p> <p style="text-align: center;"><b>OR</b></p> <p>A=<math>[\text{Ni}(\text{H}_2\text{O})_6]^{2+}</math>                      B=<math>[\text{Ni}(\text{H}_2\text{O})_4(\text{en})]^{2+}</math>                      C=<math>[\text{Ni}(\text{H}_2\text{O})_2(\text{en})_2]^{2+}</math>                      D=<math>[\text{Ni}(\text{en})_3]^{2+}</math></p>	$\frac{1}{2}+1/2+$ $1/2+1/2$
7.	<p>(i) The electron arrangement is trigonal bipyramidal. The shape is linear because the lone pairs prefer the equatorial positions. The molecule <math>\text{XeF}_2</math> has 3 lone-pairs and 2 bond-pairs.</p> <p>(ii) Low bond dissociation enthalpy and high hydration enthalpy of fluorine.</p>	1+1
8.	<p>Let us assume a binary solution in which the mole fraction of the solvent be <math>x_1</math> and that of the solute be <math>x_2</math>, <math>p_1</math> be the vapour pressure of the solvent and <math>p_1^0</math> be the vapour pressure of the solvent in pure state.</p> <p>According to Raoult's Law:</p> <p><math>p_1 = x_1 p_1^0 \dots \dots \dots (1)</math></p>	$\frac{1}{2}$

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

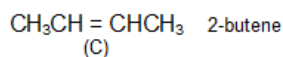
	$r = \sqrt{\frac{3}{4}} \times 5$ $= 2.165A^0$	1/2
12.	(i) X is more strongly adsorbed than Y. (ii) Copper matte contains small amount of FeO as impurity which is removed as FeSiO <sub>3</sub> slag when reacts with silica. $\text{FeO} + \text{SiO}_2 \rightarrow \text{FeSiO}_3 \text{ (slag)}$ (iii) Van Arkel Method	1 1/2 1/2 1
13.	(a) $\text{NH}_4\text{Cl (aq.)} + \text{NaNO}_2 \text{ (aq.)} \rightarrow \text{N}_2\text{(g)} + 2\text{H}_2\text{O(l)} + \text{NaCl(aq.)}$ (b) $\text{P}_4 + 3\text{NaOH} + 3\text{H}_2\text{O} \rightarrow 3\text{NaH}_2\text{PO}_2 + \text{PH}_3$ (iii) H <sub>2</sub> SO <sub>4</sub> is a very strong acid in water because of its first ionisation to H <sub>3</sub> O <sup>+</sup> and HSO <sub>4</sub> <sup>-</sup> . The ionization of HSO <sub>4</sub> <sup>-</sup> to H <sub>3</sub> O <sup>+</sup> and SO <sub>4</sub> <sup>2-</sup> is very small (it is difficult to remove a proton from a negatively charged ion).	1 1 1
14.	(i) [Cr(H <sub>2</sub> O) <sub>6</sub> ]Cl <sub>3</sub> (ii) [Cr(H <sub>2</sub> O) <sub>5</sub> Cl]Cl <sub>2</sub> H <sub>2</sub> O (iii) [Cr(H <sub>2</sub> O) <sub>4</sub> (Cl) <sub>2</sub> ]Cl(H <sub>2</sub> O) <sub>2</sub>	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, having 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 <sub>o</sub> 80 % of pure liquid P <sub>s</sub> = 80 × P <sub>o</sub> / 100 = 0.8P <sub>o</sub> $P_s = P_o \times X_{\text{solute}}$ mass of solute = x gram And mass of solvent = 114g Molar mass of solute = 40 g/mol Molar mass of solvent (octane C <sub>8</sub> H <sub>18</sub> ) = 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 1/2 1

	<p>Divide by 0.8 Po we get  <math>1 + 0.025x = 1.25</math>            Subtract 1 both side we get  <math>0.025x = 0.25</math>            Now divide by 0.025 we get  <math>x = 10g</math></p> <p><b>OR</b>  <math>\pi V = CRT</math>  <math>4.98 = 36/180 \times R \times 300 = 60 R \dots\dots\dots(i)</math>  <math>1.52 = C \times R \times 300 \dots\dots\dots(ii)</math></p> <p>Divide (ii) by (i)  <math>C = 0.061M</math></p>	<p><math>\frac{1}{2}</math></p> <p>1  <math>\frac{1}{2}</math>  <math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math>  <math>\frac{1}{2}</math> for unit</p>
18.	<p>(i)</p>  <p style="text-align: center;">Benzoquinone</p> <p>(ii)</p>  <p style="text-align: center;">2-methylpropan-2-ol</p> <p>(iii)</p>  <p style="text-align: center;">Propan-1-ol</p>	<p>1</p> <p>1</p> <p>1</p>
19.	<p>(i)</p> $R-\overset{\overset{O}{\parallel}}{C}-NH_2 + Br_2 + 4NaOH \longrightarrow RNH_2 + Na_2CO_3 + 2NaBr + 2H_2O$	1

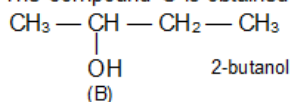
	 <p style="text-align: center;"> <i>Benzenediazonium chloride</i> + <i>Phenol</i>  ↓  <i>4-Phenylazophenol</i> + HCl </p>	1
	(ii)	
	(iii) Aniline will give azo dye test whereas methylamine will not	1
20.	(i) $\alpha$ helix-Intramolecular H bonding. $\beta$ pleated-Intermolecular H bonding. (ii) Amylose is a straight chain polymer of D glucose whereas amylopectin is a branched polymer.	1 1 $\frac{1}{2}$ $\frac{1}{2}$
21.	(i) Slope = $-\frac{k}{2.303}$ $k = -2.303 \times -2.0 \times 10^{-6} \text{ sec}^{-1}$ $= 4.606 \times 10^{-6} \text{ sec}^{-1}$ .  (ii) $t_{\frac{1}{2}} = \frac{A_0}{2k}$	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.	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$  $\frac{1}{2} + \frac{1}{2}$
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.	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$ 1 $\frac{1}{2} + \frac{1}{2}$
24.	(i) $\kappa = \frac{G^*}{R}$ $\Lambda_m = \frac{1000 \kappa}{C}$ $E_{Ni^{2+}/Ni} = -0.25 - \frac{0.0591}{2} \log \frac{1}{0.50}$ $= -0.259V$ $E_{Al^{3+}/Al} = -1.66 - \frac{0.0591}{3} \log \frac{1}{0.001}$ $= -1.719V$ $E_{\text{cell}} = 0.259V - (-1.719V) = 1.46V$  <b>OR</b>  (i) $E_{H^+/1/2 H_2} = E^0_{H^+/1/2 H_2} - \frac{0.0591}{n} \log \frac{1}{[H^+]}$	1 1 1 1 1    1



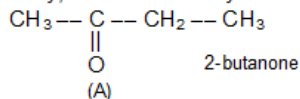
26.



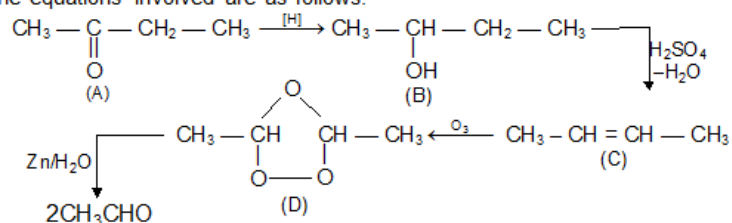
The compound C is obtained by dehydration of B, thus the latter should be



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

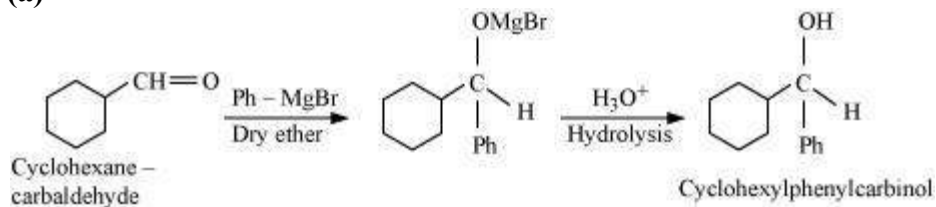


The equations involved are as follows:

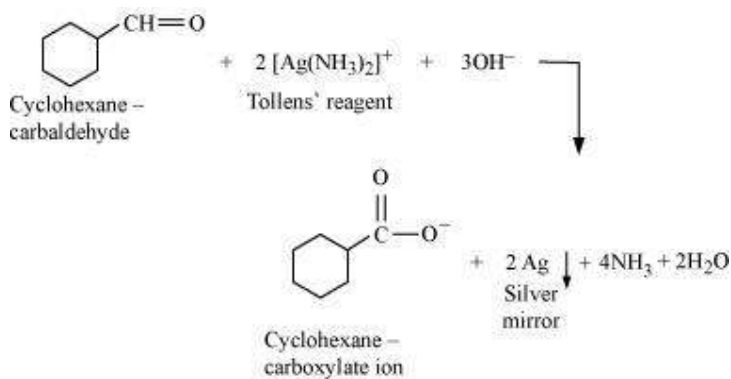


(ii)

(a)

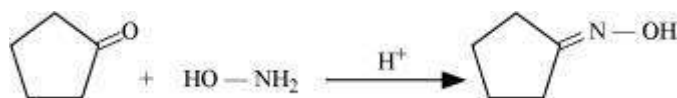


(b)

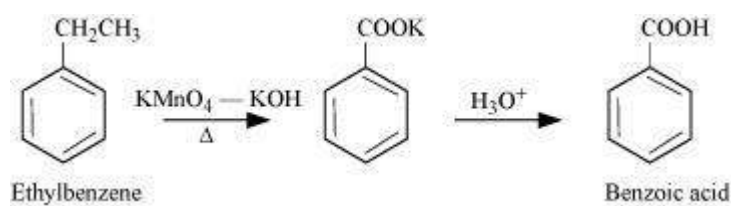


OR

(a)

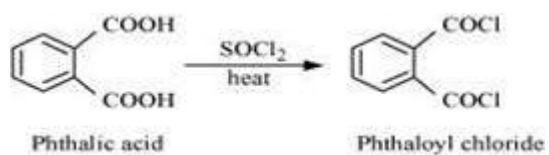


(b)



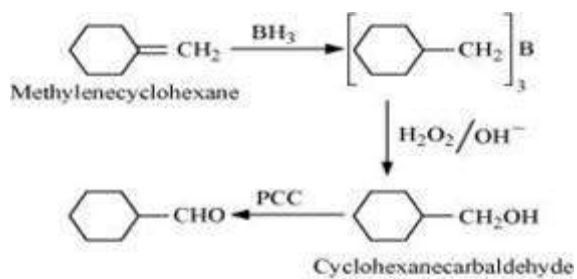
1

(c)

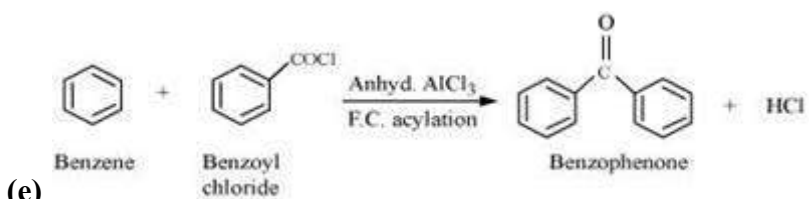


1

(d)



1



1

(e)