

KENDRIYA VIDYALAYA JALIPA CANTT
2nd PRE BOARD EXAMINATION -2009-10

Class-XII

SUBJECT: CHEMISTRY(Theory)

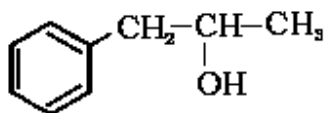
Time: 3 Hours

M.M.70

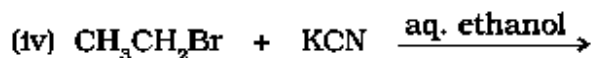
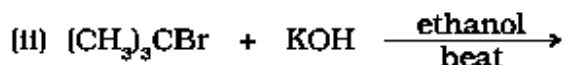
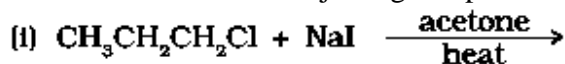
General Instructions:

1. All questions are compulsory.
2. Question nos. 1 to 8 are very short answer questions and carry 1 mark each.
3. Question nos. 9 to 18 are short answer questions and carry 2 marks each.
4. Question nos. 19 to 27 are also short answer questions and carry 3 marks each.
5. Question nos. 28 to 30 are long answer questions and carry 5 marks each.
6. Use log tables if necessary, use of calculators is not allowed.

1. Glass is considered a super cooled liquid. Explain
2. What is Demulsification?
3. Pine oil is used in froth floatation method. Why
4. Which form of Sulphur shows paramagnetic behaviour and why.
5. Write the IUPAC Name of the following compound:



6. Write the structure of the following organic compound :4-Oxopentanal
 7. pK_b of aniline is more than that of methylamine. Give reason.
 8. Explain the difference between Buna-S and Buna-N.
 9. Define Corrosion. How it is prevented.
- Or
- Rusting of iron is said to be an electrochemical phenomenon. Explain using reactions.
10. Write short note on: (i) Pseudounimolecular reaction (ii) Activation energy.
 11. Giving examples differentiate between calcination and roasting.
 12. Write balanced equations for the following:(i) NaCl is heated with sulphuric acid in the presence of MnO_2 . (ii) Chlorine gas is passed into a solution of NaI in water.
 13. (a) Name the members of the lanthanoid series which exhibit +4 oxidation states and those which exhibit +2 oxidation states.(b) Name an important alloy which contains some of the lanthanoid metals. Mention its uses.
 14. Give mechanism of preparation of ethoxyethane from ethanol.
 15. Write the structure of the major organic product in each of the following reactions:



16. Write two main functions of carbohydrates in plants.
17. Differentiate between globular and fibrous proteins.
18. What do you by Biodegradable polymers? Write the structure of monomer and polymer of PHBV.

19. The half-life for radioactive decay of ^{14}C is 5730 years. An archaeological artifact containing wood had only 80% of the ^{14}C found in a living tree. Estimate the age of the sample
20. Analysis shows that nickel oxide has the formula $\text{Ni}_{0.98}\text{O}_{1.00}$. What fractions of nickel exist as Ni^{2+} and Ni^{3+} ions?
21. Three electrolytic cells A,B,C containing solutions ZnSO_4 , AgNO_3 , and CuSO_4 respectively are connected in series. A steady current of 1.5 amperes was respectively are connected in series. A steady current of 1.5 amperes was passed through them until 1.45g of silver deposited at the cathode of cell B. How long did the current flow? What mass of copper and zinc were deposited? (Atomic mass of $\text{Zn}=65$, $\text{Ag}=108$, $\text{Cu}=63.5$)
22. (a) What is the difference between physisorption and chemisorption? (b) why adsorption is always exothermic
23. Write the IUPAC names & Using VBT Predict the Magnetic behaviour, Hybridization, Shape of following: $[\text{Ni}(\text{CN})_4]^{2-}$ $[\text{NiCl}_4]^{2-}$ $[\text{Ni}(\text{CO})_4]$

Or

- 23.(a) A coordination compound has the formula $\text{CoCl}_3 \cdot 4\text{NH}_3$. It does not liberate ammonia but forms a precipitate with AgNO_3 . Write the structure and IUPAC name of the complex compound.
- (b) The Values of dissociation constant of $[\text{Cu}(\text{NH}_3)_4]^{2+}$ and $[\text{Co}(\text{NH}_3)_6]^{2+}$ are 1.0×10^{-12} and 6.2×10^{-36} respectively. Which complex is more stable and why?
- (c) What is meant by ambidentate unidentate
24. Give reason for the following:
- (a) The treatment of alkyl chlorides with aq. KOH leads to the formation of alcohols but in the presence of alc. KOH alkenes are major products.
- (b) Haloalkanes react with KCN to form alkyl cyanides as main product while AgCN forms isocyanides as main product.
- (c) Phenol has small dipole moment than methanol.
25. Give Reasons for the following:
- (a) Transition element show variable oxidation state
- (b) Ce^{3+} can be easily oxidized to Ce^{4+} .
- (c) Size of trivalent lanthanoid cations decreases with increase in the atomic number.
26. An aromatic compound A on treatment with aqueous ammonia and heating forms compound B which on heating with Br_2 and KOH forms compound C of molecular formula $\text{C}_6\text{H}_7\text{N}$. Write the structures and IUPAC names of compounds A,B,C.
27. (a) Name the macromolecules that are chosen as drug targets.
- (b) Which tranquilizer is used in controlling depression and hypertension?
- (c) Name a broad spectrum antibiotic and state two diseases for which it is prescribed.
28. (a) Why do gases always tend to be less soluble in liquids as the temperature is raised?
- (b) Two elements A & B form compounds having molecular formula AB_2 & AB_4 . When dissolved in 20g of C_6H_6 , 1g AB_2 lowers the freezing point by 2.3 & 1.0g AB_4 lowers it by 1.3K. The molar depression constant for benzene is 5.1Kg mol^{-1} . Calculate atomic mass A & B.

Or

- (a) What is Van't Hoff's factor? What is value of Van't Hoff's factor when the solute undergoes (a) association (b) dissociation?
- (b) Benzene and naphthalene (C_{10}H_8) form ideal solution over entire range of composition. The vapour pressure of pure benzene and naphthalene at 300K are 50.71mmHg and 32.06 mmHg respectively. Calculate mol fraction of benzene in vapour phase if 80 g of benzene is mixed with 100 g naphthalene.

29. (a) Draw the structure of XeO_3
(b) Describe the manufacture of HNO_3 by Ostwald process?
(c) Why does nitrogen show catenation properties less than phosphorus?
(d) Explain why fluorine forms only one oxoacid, HOF.

Or

- (a) Draw the structure of N_2O_5
(b) Describe the manufacture of H_2SO_4 by contact process?
(c) Explain why NH_3 is basic while BiH_3 is only feebly basic.
(d) Nitrogen exists as diatomic molecule and phosphorus as P_4 . Why?
30. (a) Write chemical reaction to illustrate the following name bearing reaction:
(i) Rosenmund reaction (ii) Cannizzaro reaction
(b) An organic compound A with molecular formula $\text{C}_8\text{H}_{16}\text{O}_2$ was hydrolysed with sulphuric acid to give a carboxylic acid B and an alcohol C. Oxidation of C with chromic acid produced B. C on dehydration gives but-1-ene. Write equations for the reactions involved.

Or

- (a) Write chemical test to distinguish the following compounds:
1. Acetaldehyde and Benzaldehyde
2. Ethanoic acid and Ethanoyl chloride
- (c) An organic compound A which has a characteristic odour on treatment with NaOH forms two compounds B and C. Compound B has a molecular formula $\text{C}_7\text{H}_8\text{O}$ which on oxidation gives back compound A. Compound C is sodium salt of acid. C when heated with sodalime yields an aromatic hydrocarbon D. Deduce structures A-D.

(MARKING SCHEME)
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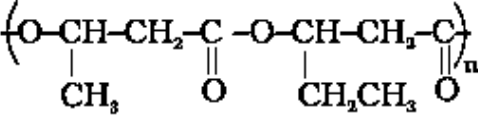
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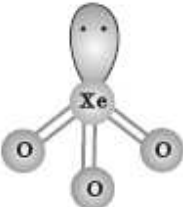
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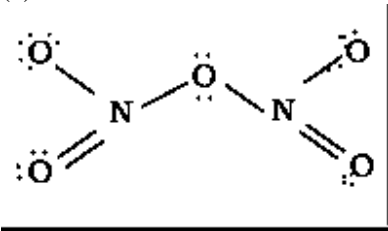
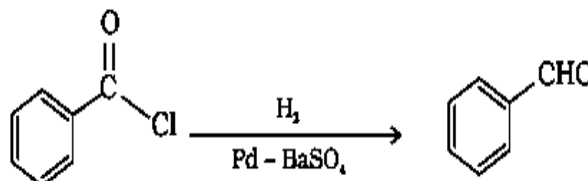
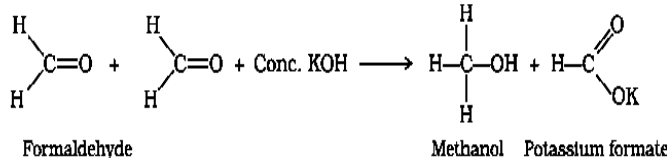
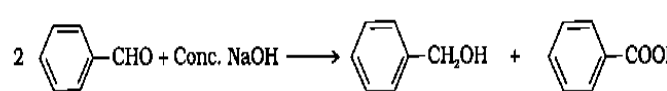
Q.No	Answer	Value Points
1	Glass is an amorphous solid .like liquids it has tendency to flow though very slowly.The proof of this fact is that the Glass panes fixed to windows or doors of old buildings are invariably found to be slightly thicker at the bottom than at the top. This is because the glass flows down very slowly and makes the bottom portion slightly thicker.	1
2.	The process of breaking emulsion is called Demulsification, e.g., freezing, boiling, centrifugation or chemical methods are used to destroy emulsifying agent.	1
3.	Pine oil enhances non-wettability of the mineral particles and froth stabilizers stabilise the froth.	1
4.	S ₂ is the dominant species and is paramagnetic like O ₂ .	1
5.	1-Phenyl Propan-2-ol	1
6	$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3-\text{C}-\text{CH}_2-\text{CH}_2-\text{CHO} \end{array}$	1
7	pK _b of aniline is more than that of methylamine.Since there is +Ve charge on N in some resonating structure therefore it is less basic. Where as in methyl amine, methyl group donate e ⁻ towards N. electron density increases that's why it is more basic.	1
8	Buna-N is a copolymer of 1,3-butadiene and acrylonitrile and Buna-S is a copolymer of 1,3-butadiene and styrene.	1
9.	Corrosion slowly coats the surfaces of metallic objects with oxides or other salts of the metal. The rusting of iron, tarnishing of silver, development of green coating on copper and bronze are some of the examples of corrosion.. One of the simplest methods of preventing corrosion is to prevent the surface of the metallic object to come in contact with atmosphere. This can be done by covering the surface with paint or by some chemicals (e.g. bisphenol). Another simple method is to cover the surface by other metals (Sn, Zn, etc.) that are inert or react to save the object. An electrochemical method is to provide a sacrificial electrode of another metal (like Mg, Zn, etc.) which corrodes itself but saves the object.	1 + 1
	<p>OR</p> <p>Oxidation: Fe (s) → Fe²⁺ (aq) + 2e⁻ Reduction: O₂ (g) + 4H⁺(aq) + 4e⁻ → 2H₂O(l) Atomospheric oxidation : 2Fe²⁺(aq) + 2H₂O(l) + ½O₂(g) → Fe₂O₃(s) + 4H⁺(aq)</p>	½ ½ 1

10	(i) Pseudo first order reaction :The reaction which is bimolecular but order is one is known as Pseudo first order reaction e.g. Hydrolysis of ester. $\text{RCOOR}' + \text{H}_2\text{O} \longrightarrow \text{RCOOH} + \text{R}'\text{OH}$ (ii) Activation Energy : It is extra energy which must be supplied to the reactants so that they form product.	1 1								
11	Calcination : It is a process of heating the ore in limited supply of air below its melting point.Calcination involves removal of volatile impurities,moisture $\text{ZnCO}_3(\text{s}) \rightarrow \text{ZnO}(\text{s}) + \text{CO}_2(\text{g})$ Roasting : In roasting, the ore is heated in a regular supply of air in a furnace at a temperature below the melting point of the metal. $2\text{ZnS} + 3\text{O}_2 \rightarrow 2\text{ZnO} + 2\text{SO}_2$	1 1								
12	(i) $4\text{NaCl} + \text{MnO}_2 + 4\text{H}_2\text{SO}_4 \longrightarrow \text{MnCl}_2 + 4\text{NaHSO}_4 + \text{Cl}_2 + 2\text{H}_2\text{O}$ (ii) $\text{Cl}_2 + \text{NaI} \longrightarrow 2\text{NaCl} + \text{I}_2$	1 1								
13	(a)+4 state : Ce, Pr, Nd, Tb and Dy +2 state:Eu, Yb (b) Mischmetall which consists of a lanthanoid metal (~ 95%) and iron (~ 5%) and traces of S, C, Ca and Al. A good deal of mischmetall is used in Mg-based alloy to produce bullets, shell and lighter flint.	1 1								
14	(i) $\text{CH}_3\text{-CH}_2\text{-}\ddot{\text{O}}\text{-H} + \text{H}^+ \rightarrow \text{CH}_3\text{-CH}_2\text{-}\overset{\text{H}}{\overset{+}{\text{O}}}\text{-H}$ (ii) $\text{CH}_3\text{CH}_2\text{-}\ddot{\text{O}}\text{:} + \text{CH}_3\text{-CH}_2\text{-}\overset{\text{H}}{\overset{+}{\text{O}}}\text{-H} \rightarrow \text{CH}_3\text{CH}_2\text{-}\overset{\text{H}}{\overset{+}{\text{O}}}\text{-CH}_2\text{CH}_3 + \text{H}_2\text{O}$ (iii) $\text{CH}_3\text{CH}_2\text{-}\overset{\text{H}}{\overset{+}{\text{O}}}\text{-CH}_2\text{CH}_3 \rightarrow \text{CH}_3\text{CH}_2\text{-O-CH}_2\text{CH}_3 + \text{H}^+$	$\frac{3}{4}$ $\frac{3}{4}$ $\frac{3}{4}$								
15.	(i) $\text{CH}_3\text{CH}_2\text{CH}_2\text{I}$ 1-Iodopropane (ii) $\text{CH}_3\text{-CH}(\text{CH}_3)=\text{CH}_2$ 2-Methyl propene (iii) $\text{CH}_3\text{CH}(\text{OH})\text{CH}_2\text{CH}_3$ Butan-2-ol (iv) $\text{CH}_3\text{CH}_2\text{CN}$	$\frac{1}{2} + \frac{1}{2} +$ $\frac{1}{2} + \frac{1}{2}$								
16	Two main functions of carbohydrates in plants.(i)Structural material for plants cell wall (ii)Reserve food material	1 + 1								
17	<table border="1"> <thead> <tr> <th>Globular protein</th> <th>Fibrous protein</th> </tr> </thead> <tbody> <tr> <td>1) They are cross linked products</td> <td>They are liner products.</td> </tr> <tr> <td>2) Soluble in water</td> <td>In soluble in common solvents</td> </tr> <tr> <td>3) Three dimensional spheroidal Shape. eg. Albumin in egg, enzymes</td> <td>They are chain like. eg. Myosin in muscles, Certain In hair, silk</td> </tr> </tbody> </table>	Globular protein	Fibrous protein	1) They are cross linked products	They are liner products.	2) Soluble in water	In soluble in common solvents	3) Three dimensional spheroidal Shape. eg. Albumin in egg, enzymes	They are chain like. eg. Myosin in muscles, Certain In hair, silk	1 + 1
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3) Three dimensional spheroidal Shape. eg. Albumin in egg, enzymes	They are chain like. eg. Myosin in muscles, Certain In hair, silk									
18	To minimize the Environmental pollution, a type of synthetic polymers has been synthesized, which are biodegradable in nature.Ex. PHBV (Poly hydroxybutyrate-co- β -hydroxy-valerate) $\begin{array}{c} \text{OH} \\ \\ \text{CH}_2 - \text{COOH} \end{array} + \begin{array}{c} \text{OH} \\ \\ \text{CH}_3 - \text{CH}_2 - \text{CH} - \text{CH}_2 - \text{COOH} \end{array} \rightarrow \text{CH}_3 - \text{CH} -$ β -hydroxybutyric acid β -hydroxy valericacid	1 + 1								

	 <p style="text-align: center;">PHBV</p>					
19	<p>In the First Order Kinetics $K = \frac{0.693}{t_{1/2}} = \frac{0.693}{5730} \text{ year}^{-1}$.</p> $t = \frac{2.303}{K} \log \frac{[A]_0}{[A]} = \frac{2.303}{(0.693)/(5730)\text{year}^{-1}} \log \frac{100}{80} = \frac{2.303 \times 5730}{(0.693)} \times 0.0969 \text{ year}$ $= 1845 \text{ years (approx)}$	<p>1/2</p> <p>1/2+ 1/2</p> <p>1/2</p>				
20	<p>$\text{NiO}_{.98} \text{O}_{1.00}$ Let Ni^{2+} be x and Ni^{3+} be $0.98 - x$ Total charge on compound is equal to zero $[2(\text{Ni}^{2+}) + 3(\text{Ni}^{3+}) - 2(\text{O}^{2-})] = 0$ $2x + 3(0.98 - x) - 2 = 0$ $x = 0.94$ Therefore $\text{Ni}^{2+} \% = \frac{0.94}{0.98} = 96\%$ $\text{Ni}^{3+} = 4\%$</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>				
21	<p>for 108g of Ag one requires=96500C 1g of “ “ “ =96500/108 1.45g of “ “ “ =1.45x96500/108 =1295.6C Then, $t=129.5/1.5=863.7\text{s}=14\text{min } 24\text{s}$ From 2nd law of electrolysis: <u>Mass of Zn deposited</u> = <u>Eq.mass of Zn</u> <u>Mass of Ag deposited</u> = <u>Eq.mass of Ag</u> So, mass of Zn deposited=$65.4/2 /108 \times 1.45=0.539\text{g}$ Mass of Cu deposited=$\frac{\text{Eq.mass of Cu}}{\text{Eq.mass of Ag}} \times \text{Mass Ag deposited}$ mass of Ag deposited=$63.5/2 /108 \times 1.45=0.426\text{g}$</p>	<p>1</p> <p>1</p> <p>1</p>				
22	<p>(a)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: black; color: white; padding: 5px;">Physisorption</th> <th style="background-color: black; color: white; padding: 5px;">Chemisorption</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"> <ol style="list-style-type: none"> 1. It arises because of van der Waals' forces. 2. It is not specific in nature. 3. It is reversible in nature. 4. It depends on the nature of gas. More easily liquefiable gases are adsorbed readily. 5. Enthalpy of adsorption is low (20-40 kJ mol⁻¹) in this case. </td> <td style="padding: 5px;"> <ol style="list-style-type: none"> 1. It is caused by chemical bond formation. 2. It is highly specific in nature. 3. It is irreversible. 4. It also depends on the nature of gas. Gases which can react with the adsorbent show chemisorption. 5. Enthalpy of adsorption is high (80-240 kJ mol⁻¹) in this case. </td> </tr> </tbody> </table> <p>(b) During adsorption, there is always a decrease in residual forces of the surface, i.e., there is decrease in surface energy which appears as heat. Adsorption, therefore, is invariably an exothermic process. In other words, ΔH of adsorption is always negative.</p>	Physisorption	Chemisorption	<ol style="list-style-type: none"> 1. It arises because of van der Waals' forces. 2. It is not specific in nature. 3. It is reversible in nature. 4. It depends on the nature of gas. More easily liquefiable gases are adsorbed readily. 5. Enthalpy of adsorption is low (20-40 kJ mol⁻¹) in this case. 	<ol style="list-style-type: none"> 1. It is caused by chemical bond formation. 2. It is highly specific in nature. 3. It is irreversible. 4. It also depends on the nature of gas. Gases which can react with the adsorbent show chemisorption. 5. Enthalpy of adsorption is high (80-240 kJ mol⁻¹) in this case. 	<p>1/2 + 1/2 + 1/2 + 1/2</p> <p>1</p>
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23	[Ni(CN) ₄] ²⁻ = tetracyanonickelate(II)ion Magnetic behaviour=Dimagnetic, Hybridization = dsp ² , Shape= square planar	1
	[NiCl ₄] ²⁻ = tetrachloridonickelate(II)ion Magnetic behaviour=paramagnetic, Hybridization = sp ³ , Shape= tetrahedral	1
	[Ni(CO) ₄] = tetracarbonylnickel(0) Magnetic behaviour= Dimagnetic, Hybridization = sp ³ , Shape= tetrahedral	1
	OR	
	(a)[Co(NH ₃) ₄]Cl ₃ =tetraamminecobalt(III)chloride	1
(b)Smaller the value of dissociation constant more stable is the complex in the solution .Hence [Co(NH ₃) ₆] ²⁺ is more stable than [Cu(NH ₃) ₄] ²⁺ .	1	
(c) Those unidentate ligands which can form bond through two different atoms, are called ambidentate ligand e.g. – CN & -NC	1	
24	(a) The treatment of alkyl chlorides with aq.KOH leads to the formation of alcohols but in the presence of alc.KOH alkenes are major products.because in presence of aq.KOH(more polar), nucleophilic substitution reaction takes place ,thus alcohols are formed while in presence alc.KOH(less polar),elimination reaction takes place.thus alkenes are major products	1
	(b) Haloalkanes react with KCN to form alkyl cyanides as main product while AgCN forms isocyanides as main product.since KCN is predominantly ionic and provides cyanide ions in solution. Although both carbon and Nitrogen can donate electron pair but carbon donates electron pair instead of Nitrogen to form more stable C-C bond. How ever, AgCN is mainly covalent in nature and Nitrogen is free to donate electron pair forming isocyanide as the main product.	1
	(c) Phenol has small dipole moment than methanol.Due to electron-withdrawing effect of the benzene ring, the C —O bond in phenol is less polar but in case of methanol due to electron-donating effect of CH ₃ group, C —O bond is more polar.	1
25	(a) Because electrons of ns and (n-1) d orbital's take part in bond formation.	1
	(b) Ce(III) having the configuration 4f ¹ 5d ⁰ 6s ⁰ can easily lose an electron to acquire the configuration 4f ⁰ 5d ⁰ 6s and form Ce(IV)	1
	(c) Lanthanoids contraction .It is due to poor shielding effect and high effective nuclear charge.	1
26	Since C is formed by Hoffmann Bromamide reaction, it is a primary amine So Structure is C ₆ H ₅ -NH ₂ (Aniline),B is C ₆ H ₅ -CO NH ₂ (Benzamide) A is carboxylic acid C ₆ H ₅ -COOH(Benzoic acid).	1 + 1 + 1
27	(a) Proteins, nucleic acids, lipids, carbohydrates.	1
	(b) Equanil	1
	(c) Chloramphenicol, is a broad spectrum antibiotic. It is rapidly absorbed from the gastrointestinal tract and hence can be given orally in case of typhoid, dysentery, acute fever, certain form of urinary infections, meningitis and pneumonia	1
28	(a)Dissolution of gas in liquid is an exothermic process .(Gas + solvent ⇌ Solution + Heat).As the temperature is increased equilibrium shifts backward.	2
	(b) M ₂ = (1000 x K _f x W ₂)/W ₁ x ΔT _f	
	M _{AB2} = 110.8g/mol	1
	M _{AB4} = 1000 X 5.1 X 1 / 20 x 1.3	
	= 196.15g/mol	1
	A +2B = 110.87	
	A+4B = 196.15	
2B = 85.28		
B=42.64	½	
A=25.59	½	
OR		

	<p>(a) vant of introduced a factor i known as vant Hoff factor to account for the extent of dissociation or association.</p> $i = \frac{\text{normal molar mass}}{\text{Observed molar mass}} \quad i = \frac{\text{Observed colligative property}}{\text{Calculated colligative property}}$ <p>The value of Van't Hoff's factor when the solute undergoes (a) association is less than 1 (b) dissociation is more than 1</p>	
	<p>(b) Molar mass of benzene (C₆H₆) = 78 g/mol Molar mass of naphthalene (C₁₀H₈) = 128 g/mol n_{benzene} = 80g/ 78g/mol = 1.026 mole. n_{naphthalene} = 100g/ 128g per mol = 0.781 mole $\chi_{\text{benzene}} = 1.026 / 1.026 + 0.781 = 1.026 / 1.807 = 0.57$. $\chi_{\text{naphthalene}} = 1 - 0.57 = 0.43$ P^o_{benzene} = 50.71mm , P^o_{naphthalene} = 32.06 mm .applying raolts law P_{benzene} = $\chi_{\text{benzene}} \times P^{\circ}_{\text{benzene}} = 0.57 \times 50.71 \text{ mm}$ = 28.90mm P_{naphthalene} = $\chi_{\text{naphthalene}} \times P^{\circ}_{\text{naphthalene}} = 0.43 \times 32.06 \text{ mm}$ = 13.78 mm</p> <p>mole fraction of benzene in vapour phase = $\frac{P_{\text{benzene}}}{P_{\text{benzene}} + P_{\text{naphthalene}}}$</p> $\frac{28.90}{24.65 + 13.78} = 0.752 \text{ Answer}$	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>
29	<p>(a)</p>  <p>(e) Pyramidal</p> <p>(b)</p> <p>On a large scale it is prepared mainly by Ostwald's process. This method is based upon catalytic oxidation of NH₃ by atmospheric oxygen.</p> $4\text{NH}_3(\text{g}) + 5\text{O}_2(\text{g}) \xrightarrow[500\text{K, 9 bar}]{\text{Pt / Rh gauze catalyst}} 4\text{NO}(\text{g}) + 6\text{H}_2\text{O}(\text{g})$ <p>(from air)</p> <p>Nitric oxide thus formed combines with oxygen giving NO₂.</p> $2\text{NO}(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$ <p>Nitrogen dioxide so formed, dissolves in water to give HNO₃.</p> $3\text{NO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) \rightarrow 2\text{HNO}_3(\text{aq}) + \text{NO}(\text{g})$ <p>(c) Because N-N bond is weaker than the single P-P bond.& strong pπ-pπ overlap in Nitrogen.</p> <p>(d) Due to high electronegativity and small size F does not form HOFO,HOFO₂&HOFO₃ in which oxdn.no.will be +3,+5 &+7</p> <p style="text-align: center;">Or</p>	<p>1</p> <p>2</p> <p>1</p> <p>1</p>

	<p>(a)</p>  <p>(b) Sulphuric acid is manufactured by the contact process which involves three steps:</p> <p>(i) Burning of sulphur or sulphide ores in air to generate SO₂.</p> $S_8 + 8O_2 \xrightarrow{\Delta} 8SO_2$ <p>(ii) Conversion of SO₂ to SO₃ by the reaction with oxygen in the presence of a catalyst (V₂O₅),</p> $2SO_2 + O_2 \xrightarrow{V_2O_5} 2SO_3$ <p>(iii) Absorption of SO₃ in H₂SO₄ to give Oleum (H₂S₂O₇) SO₃ + H₂SO₄ → H₂S₂O₇</p> <p>(iv) Dilution of oleum with water gives H₂SO₄ of the desired concentration.</p> $H_2S_2O_7 + H_2O \longrightarrow 2H_2SO_4$ <p>(c) NH₃ is basic due to smaller size & high electro negativity of Nitrogen atom</p> <p>(d) Nitrogen atom being small in size forms multiple bonds with another nitrogen atom but phosphorous being large in size forms single bonds with other P atoms .</p>	<p>1</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p>
30	<p>(a)(i) Rosenmund reaction</p>  <p style="text-align: center;">Benzoyl chloride Benzaldehyde</p> <p>(ii) Cannizzaro reaction:</p>  <p style="text-align: center;">Formaldehyde Methanol Potassium formate</p>  <p>(b) Compound is an ester.</p> <p>(A) ester is CH₃CH₂CH₂COOCH₂CH₂CH₂CH₃ Alcohol formed is a primary alcohol (C)CH₃CH₂CH₂CH₂OH B is CH₃CH₂CH₂COOH Or</p> <p>(a)</p> <ol style="list-style-type: none"> Acetaldehyde gives iodoform test (Yellow ppt of CHI₃ is formed on reaction with NaOH + I₂) & Tollens test (silver mirror is formed due to deposition of Ag on warming with amm. AgNO₃) whereas Benzaldehyde does not give iodoform test & Tollens test Ethanoic acid gives sodium bicarbonate test (Effervescence due to evolution of CO₂ gas on reaction with NaHCO₃) and Ethnonyl chloride does not give sodium bicarbonate <p>(b) A is C₆H₅CHO ; B is C₆H₅CH₂OH; C is C₆H₅COONa ; D is C₆H₆</p>	<p>1</p> <p>1</p> <p>1+1+1</p> <p>1</p> <p>1</p> <p>3</p>