WINTER-15 EXAMINATION

Model Answer

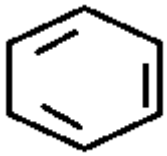
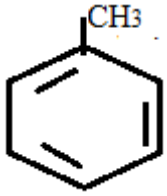
Important Instructions to examiners:

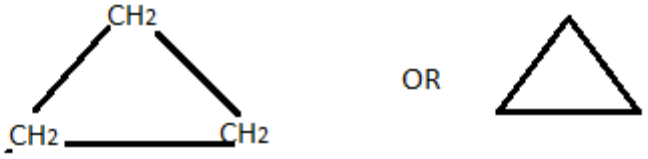
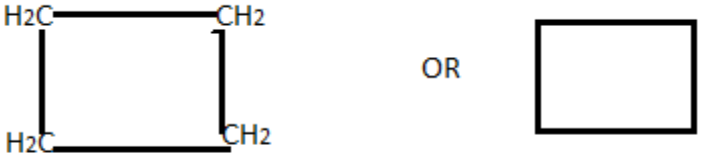
1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills.
4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
7) For programming language papers, credit may be given to any other program based on equivalent concept.

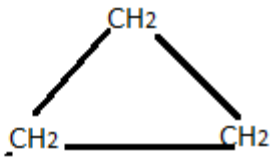
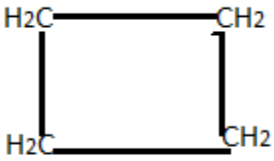
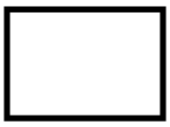
<table>
<tr><th>Q No.</th><th>Answer</th><th>marks</th><th>Total marks</th></tr>
<tr><td>1</td><td>Any 10</td><td></td><td>20</td></tr>
<tr><td>1-a</td><td>Pyrolysis : the decomposition of a compound by heat is called pyrolysis. It requires temperature in the range 500 - 800°C.In the presence of silica-alumina catalyst,the reaction is carried out at less high temp.This is called catalytic cracking
CH_3-CH_3 $\xrightarrow{500°C}$ $CH_2 = CH_2 + CH_4 + H_2$
Ethane Ethylene methane</td><td>1

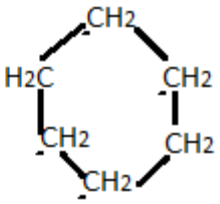
1</td><td>2</td></tr>
<tr><td>1-b</td><td><table><tr><th>PHENOL</th><th>ALCOHOL</th></tr><tr><td>phenol reacts with $FeCl_3$ whereas normal</td><td>alcohol can not</td></tr><tr><td>Phenols are acidic</td><td>Alcohols are not acidic</td></tr><tr><td>Phenols are acidic and dissolve in a basic solution.</td><td>Alcohols are not acidic and will not dissolve in a basic solution</td></tr><tr><td>When phenol react with $FeCl_3$ it changes its colour from green to purple.</td><td>Alcohols produce no color change.</td></tr><tr><td>Phenols produce a brown tarry mass when combined with chromic acid</td><td>Not observe in alcohol</td></tr><tr><td>phenols dissolve in aqueous NaOH,</td><td>Not observe in alcohol</td></tr><tr><td>Aromatic</td><td>Aliphatic</td></tr></table></td><td>Any two points each carry 1 mark</td><td>2</td></tr>
<tr><td>1-c</td><td>Aromaticity – The property of extra stability & inertness shown by unsaturated</td><td>2</td><td>2</td></tr>
</table>

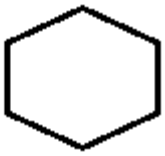
	cyclic organic compounds. Ex-benzene,phenol,tolune		
1-d	**Roult's law:** It has been postulated that Raoult's law is applicable to the solvent. It is very truethatRaoult's law holds good approximation in dilute solution although deviationaccure at higher concentration. These solutions are clearly not ideal. The various equations for rise of boiling point, lowering of freezing point and osmotic pressurewill apply to them in the same region the Raoult's law apply to the solvent. Suchsolutions are called ideal solutions. Ideal solution obey Raoult's law, which is, p= p0 x1 x1= mole fraction of the solvent p0= vapour pressure of pure solvent p= vapour pressure of solution	**2**	**2**
1-e	**Isomerism** occurs when two or more organic compounds have the same molecular formulae, but different structures. These differences tend to give the molecules different chemical and physical properties. There are three types of structural isomerism that you need to be aware of: chain isomerism, positional isomerism and functional isomerism. **Polymerisation:** The process by which simple molecules join together to form large molecules is known as polymerization.These reaction are catalysed by HF,H_2SO_4 or organic peroxides.They require high temp. & pressure.	**1** **1**	**2**

1-f	i)acetic acid ii)propylalcohol	**1** **1**	**2**
1-g	Organic compounds are Classified into many classes on the basis of functional groups, known as homologous series. Each class is represented by a general formula and the members show similar properties. Ex. methane, ethane.(any one)	**1** **1**	**2**
1-h	a) Benzene  b) Toluene  *(any other aromatic compound should be given marks)*	**1** **1**	**2**
1-i	**Uses of Acetylene :(any two)** 1.it is used for the production of oxy acetylene flame for cutting and welding of metals 2. it is used for manufacture of large number of organic compounds like acetaldehyde,acetic acid, ethanol etc. 3.it is used for artificial ripening of fruits 4. it is used in the preparation of PVC,polyvinylchloride,polyvinylether,orlon etc.	**1 mark each**	**2**
1-j	An indicator is an organic substance which changes colour when a specific pH	**1**	**2**

	value is reached. Ex. Methyl orange,phenopthalene,starch,etc.	 1	
1-k	Alkanes- $C_nH_{2n+2,}$ alkenes- C_nH_{2n}	1 1	2
1-l	a)  OR cyclopropane b)  OR Cyclobutane	1 1	2
2	**Any 4**		16
2-a	**Methods of preparation of alkenes:** **1.By cracking of alkanes**. Alkanes when heated at 500-700^{0}c,in absence of air decompose to give alkenes ,alkanes & hydrogen. 600^0c CH_3-CH_3-----→CH_2=CH_2+H_2 2.**By dehydration of alcohols**. When alcohol is heated in presence of sulphuric acid a molecule of water is eliminated &alkenes is formed. Δ C_2H_5OH----------→ CH_2=CH_2+H_2O	2 2	4

	H_2SO_4 (*any other methods like dehydrogenation of alkyl halides &dehalogenation vicinal dihalides are also considered)*		
2-b	Organic compounds are classified into four categories on the basis of structure. 1. **Aliphatic compounds** : Which consist of open chain of carbon atoms are called aliphatic compounds. Example : (Any 1) a) Propane CH_3-CH_2-CH3 b) Acetic acid CH_3-COOH 2. **Alicyclic compounds**: These are cyclic compounds composed of ring of carbon atoms with properties similar to aliphatic compounds. Example : (Any 1) a)  OR  cyclopropane b)  OR  Cyclobutane	**4**	**4**

c) 

OR 

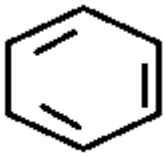
Cyclobexane

3. Aromatic compounds:

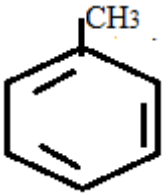
These are cyclic compounds having six membered ring of carbon atoms with alternate single and double bonds

Example :

c) Benzene

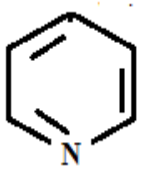
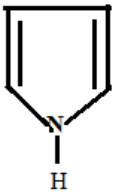
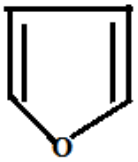
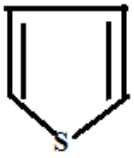


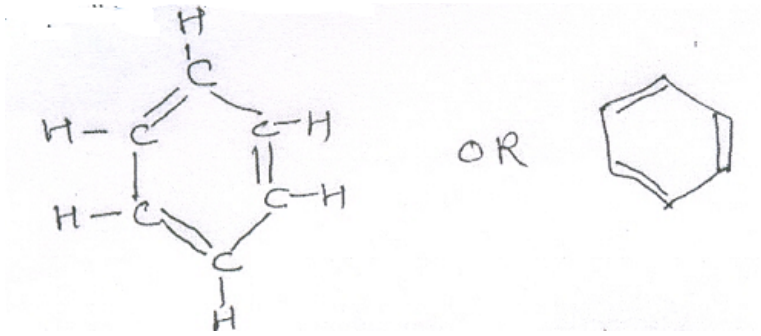
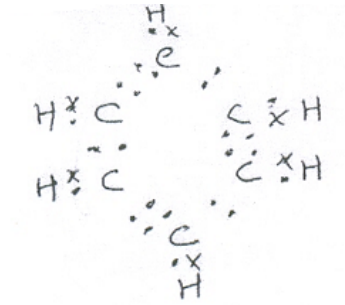
d) Toluene

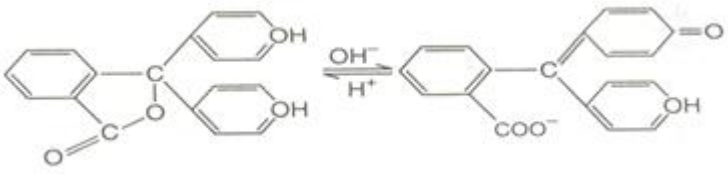


4. Heterocyclic compounds:

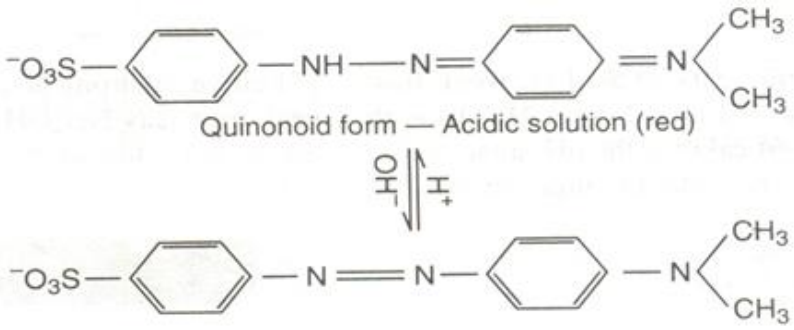
These are cyclic compounds in which ring consist of atoms and some other element such as oxygen, nitrogen, sulphur.

	Example : (Any 1) a) pyridine  b) pyrrole  c) furan  d) Thiopheno 		
2-c	Combustion reaction of alkanes: when alkanes are ignited in the presence of excess oxygen , they burn to form carbon dioxide and water with evolution of large quantity of heat. $C_nH_{2n+2} + (3n+1/2)O_2 \longrightarrow nCO_2 + (n+1)H_2O + \Delta$ $CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O + 212.8$ kacl/mole methane	**4**	**4**
2-d	**Structure of Benzene** : Benzene was isolated by Michael faraday in 1825. The molecular formula of benzene C_6H_6 indicates high degree of unsaturation. It has unique properties and unusual stability. So, after several years Fredrich August Kekute proposed the structure for benzene having cyclic arrangement of six carbon atoms with alternate single and double bonds and one hydrogen attached to each carbon	**4**	**4**

	atom.  Electronic structure of benzene may be represented as :- 		
2-e	**Reaction of alcohol with PCl_3 & PCl_5 :** The hydroxyl group is replaced by the corresponding halogen atom and alkyl halide is formed. $ROH + PCl_5 \longrightarrow RCl + POCl_3 + HCl$ Alcohol alkyl halide $3C_2H_5OH + PCl_3 \longrightarrow 3C_2H_5Cl + H_3PO_3$ Ethyl alcohol ethyl chloride	**2** **2**	**4**

2-f	**(Any one theory explanation)** **Quinonoid theory:** According to this theory: (a) The **acid-base indicators** exist in two tautomeric forms having different structures. Two forms are in equilibrium. One form is termed benzenoid form and the other quinonoid form.  (b) The two forms have different colors. The color change in due to the interconversation of one tautomeric form into other. (c) One form mainly exists in acidic medium and the other in alkaline medium. Thus, during **titration** the medium changes from acidic to alkaline or vice-versa. The change in pH converts one tautomeric form into other and thus, the colour change occurs. **Phenolphthalein** has benziod form in acidic medium and thus, it is colourless while it has quinonoid form in alkaline medium which has pink colour.  	**4**	**4**

Methyl orange has quinonoid form in acidic solution andbenzenoid form in alkaline solution. The color of benzenoid form is yellow while that of quinoniod form is red.



Ostwald's theory:

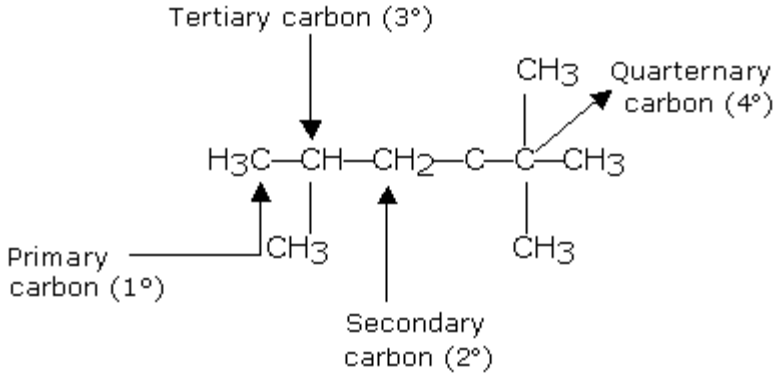
Different theories have been put forward to explain the role of indicators in the acid-base titrations's like Ostwald's ionic theory, Quinonoid theory etc.
Ostwald's theory considers indicator to be a weak acid or base whose unionised forms differently coloured. In presence of acid or base, ie pH change, there is ionization of indicator and hence the colour change appears.
For example
phenolphthalein
phenolphthalein is a weak acid (PhH)

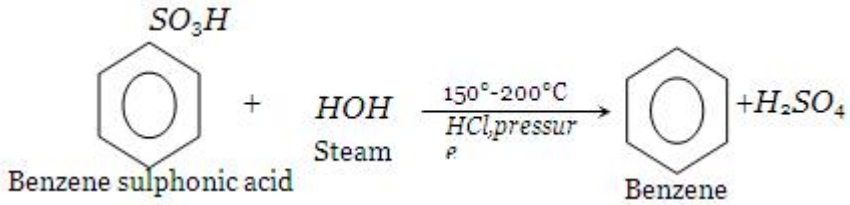
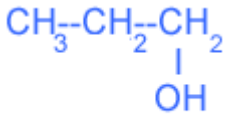
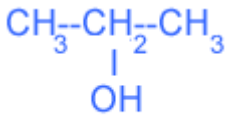
PhH<_-_-_-_-_-_->Ph- + H+ .....(1)
(colourless (Pink in base)
in acid)

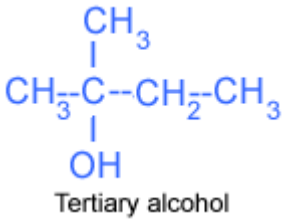
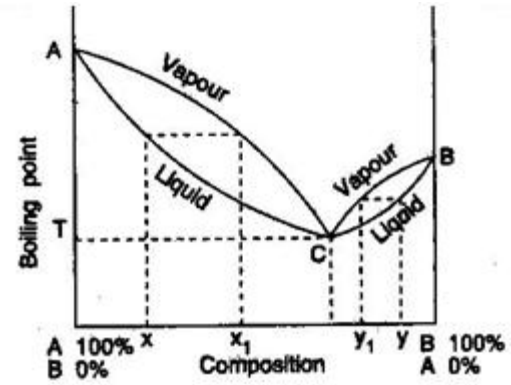
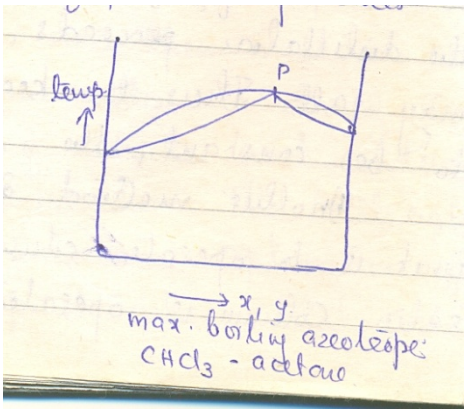
H+ + OH- <-_-_-_-_-_-_> H2O

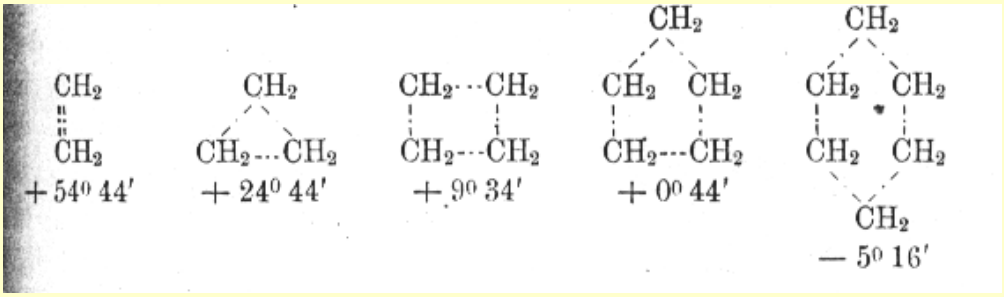
In presence of an acid (H+) equilibrium (1) is displaced towards the left hand

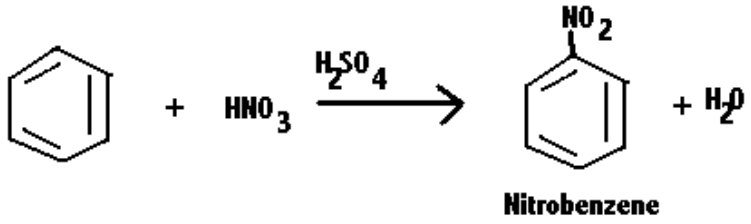
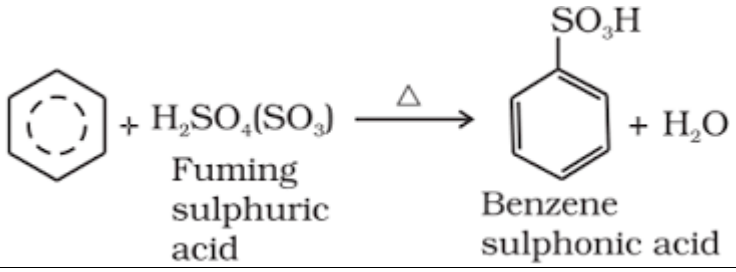
	side (a case of LeChatelier's principle); when strong base like NaOH is added, this equilibrium is displaced towards right hand side and there is colour change from colourless to pink when pH changes. This indicator is not suitable for titrating weak base since weak base can't furnish enough OH- that can react with H+ of the phenolphthalein and can impart pink colour only after excess of weak base is added.		
3	**Any 4**		**16**
3-a	**Classification of carbon atom:**		**4**
	Primary carbon atom (1^o)The terminal carbon atoms that attaches to one carbon atom only, in the carbon skeleton of an organic compound, is called a primary (or 1°) carbon atom.	1	
	Secondary carbon atom (2^o)The middle carbon atom that attaches to two other carbon atoms in the carbon chain of an organic compound, is called a secondary (2) carbon atom.	1	
	Tertiary carbon atom (3^o)The middle carbon atom that attaches to three other carbon atoms in the carbon chain of an organic compound is called a tertiary carbon atom.	1	
	Quaternary carbon atom (4^o)The middle carbon atom that attaches to four carbon atoms in the carbon chain of an organic compound, is called a quaternary carbon atom.	1	
	These carbon atoms are illustrated below.		

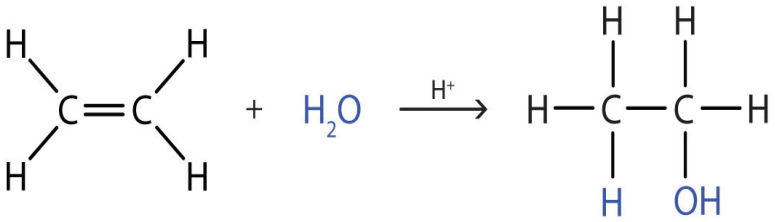
	 The hydrogen atoms attached to the primary (1^o), secondary (2^o) and tertiary (3^o) carbon atoms are referred to as primary, secondary and tertiary hydrogens respectively.		
3-b	**Chlorination of methane:** Methane on chlorination in presence of UV light or at a temperature of 300 -400 ^{0}C yields a mixture of products. $CH_4 + Cl_2 \xrightarrow{h\nu} CH_3Cl + HCl$ Chloromethane $CH_3Cl + Cl_2 \xrightarrow{h\nu} CH_2Cl_2 + HCl$ Dichloromethane $CH_2Cl_2 + Cl_2 \xrightarrow{h\nu} CHCl_3 + HCl$ Trichloromethane $CHCl_3 + Cl_2 \xrightarrow{h\nu} CCl_4 + HCl$ Tetrachloromethane	1 1 1 1	**4**
3-c	**Preparation of benzene:** **i)Sulphonic Acid:** by the hydrolysis of sulphonic acid with superheated steam.	2	**4**

	 **ii) Aromatic Acid:** By heating an aromatic acid or its sodium salt with soda lime. $C_6H_5COONa + NaOH \longrightarrow C_6H_6 + Na_2CO_3$	2	
3-d	**Classification of monohydric alcohol:** Primary Alcohol: Monohydric alcohols in which hydroxyl (-OH) group is attached to primary carbon atom are known as primary alcohols.  Primary alcohol Secondary Alcohol: Monohydric alcohols in which hydroxyl (-OH) group is attached to secondary carbon atom are known as secondary alcohols.  Sec alcohol Tertiary Alcohol: Monohydric alcohols in which hydroxyl (-OH) group is attached to tertiary carbon atom are known as tertiary alcohols.	4	**4**

	 Tertiary alcohol		
3-e	**Define azeotrope.** Azeotropic mixtures are called azeotropes. This mixture when distilled, it gets distilled at a certain fixed temperature as a whole, so an azeotropic mixture cannot be separated into its constituents by distillation.  	2 2	**4**
3-f	**Baeyer's strain theory:** In 1885, Adolf von Baeyer published a paper on polyacetylene compounds in the journal of the German Chemical Society. At the end of the paper, a discussion appeared on the strain in small ring compounds. Baeyer reasoned that since the bond angle in a perfect tetrahedron (the tetrahedral carbon had been proposed independently by van't Hoff and LeBel in 1874) is 109^o 28' [109 degrees, 28 minutes; (1^o = 60 ')], then the amount of strain in a small ring	4	**4**

	compound would be the half the difference between the tetrahedral value and the internal angle of a regular polygon. Why half? Because the strain would be distributed equally to "each bond" connected to a carbon.  **Baeyer considered ethylene to be a special polygon with an internal angle of 0°, thus its value of +54° 44'. The internal angle of the equilateral triangle (cyclopropane) is 60° and for a square (cyclobutane) is 90°. Try the calculation. What is the internal angle of a regular pentagon or hexagon? The sum of all supplementary angles about any polygon is equal to 360°. Thus, the supplementary angle for each internal angle of a regular hexagon is 120°. Do the calculation for each of these cyclic hydrocarbons. You can see why Baeyer reached the conclusion that cyclopentane, with its minimum value, is less strained than cyclohexane. Although Baeyer used the value 109° 28' for the tetrahedral carbon, he nonetheless viewed the cycloalkanes as planar species. He reasoned that the equatorial and axial positions on cyclohexane would be unique. Thus, there should be an axial cyclohexanecarboxylic acid and an equatorial one. Of course, with the benefit of over 100 years of hindsight, we realize that these two carboxylic acids interconvert rapidly at ambient temperature! [Note: The value for cyclobutane should be 9° 44'.]**		
4	**Any 4**		**16**

4-a	**Nitration: benzene on nitration gives nitrobenzene**  **Nitrobenzene** **Fig 1-Nitration of Benzene** **Sulphonation: benzene on sulphonation gives benzene sulphonic acid**  	2 2	**4**
4-b	**Alcohol from Alkene:** Ethanol is made by the hydration of ethylene in the presence of a catalyst such as sulfuric acid (H_2SO_4).	2	**4**



Ethylene Water Ethanol

In a similar manner, isopropyl alcohol is produced by the addition of water to propene (propylene).

Alcohol from Alkyl Halide:

Haloalkanes when boiled with aqueous solution of an alkali hydroxide or moist silver oxide furnish alkanols.

$$\underset{\text{Haloalkane}}{RX} + KOH(aq) \longrightarrow \underset{\text{Alkanol}}{ROH} + KX$$

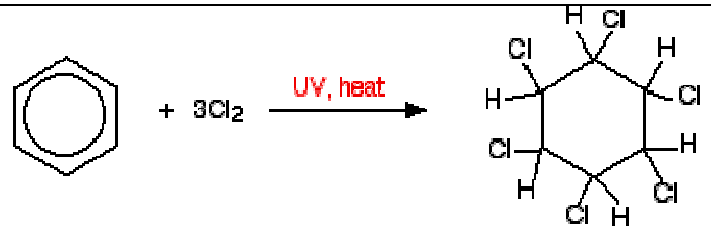
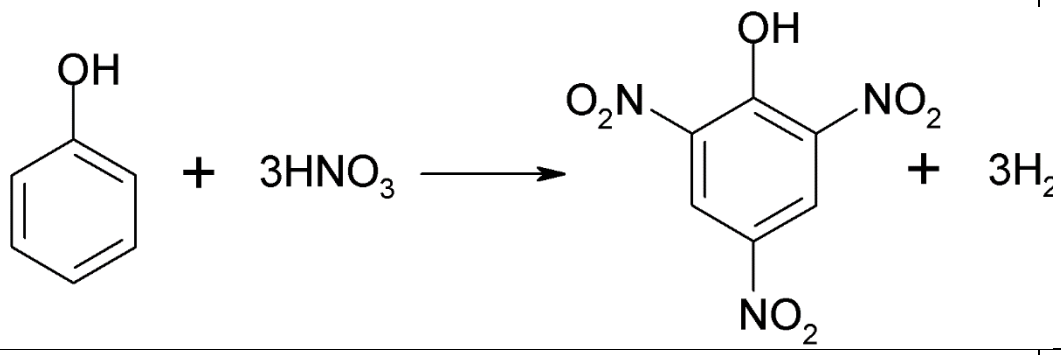
$$C_2H_5Br + KOH(aq) \longrightarrow C_2H_5OH + KBr$$

$$\underset{\text{Bromoethane}}{C_2H_5Br} + \underset{\text{Moist silver oxide}}{AgOH} \longrightarrow \underset{\text{Ethanol}}{C_2H_5OH} + AgBr$$

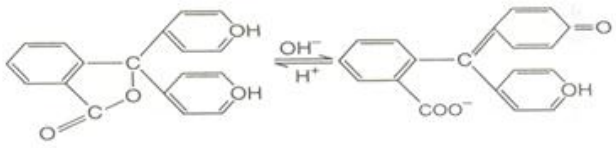
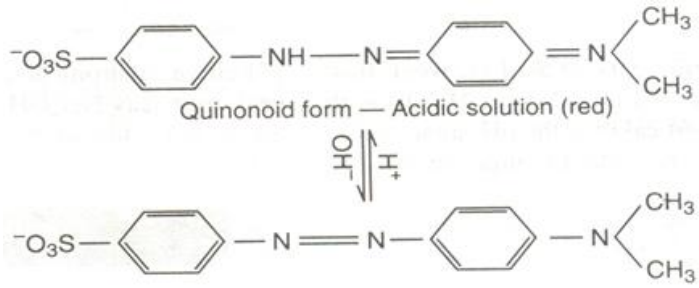
Primary alkyl halides give good yield of alcohols. However, tertiary alkyl halides, in this reaction give, mainly alkene due to dehydrohalogenation.

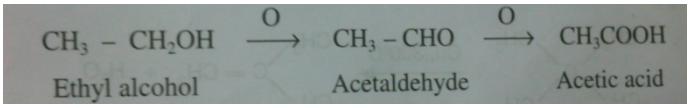
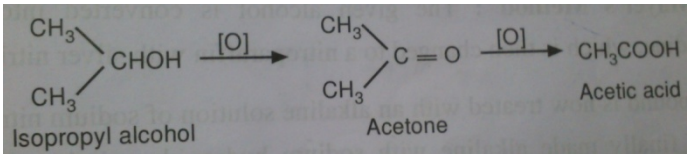
2

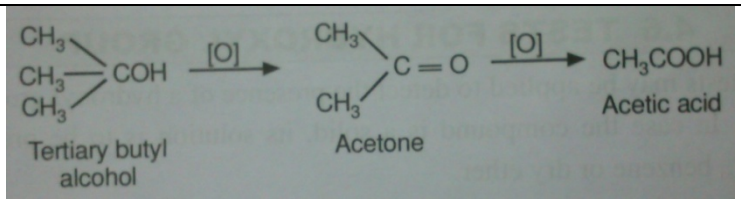
4-c	**i)**	2	**4**

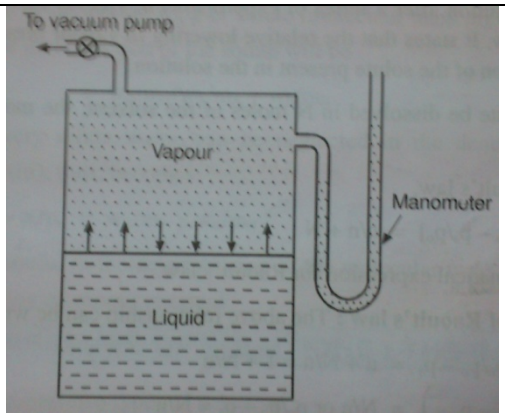
	 **ii)** 	2	
4-d	**Physical properies of Alkane:** 1) First four members(C1 to C4) of alkane are gases,next thirteen members (C5 to C17) are colourless liquids and higher alkanes are solids. 2) Liquid alkanes are lighter than water. 3) Alkanes are insoluble in water but freely soluble in organic solvent. 4) Boiling point and specific gravity increases with increase in molecular weight. **Uses of Alkane:** 1) Alkanes are used in domastic fuel (natural gas) 2) Methane is used in manufacturing of carbon black. 3) Used as refrigerent and solvent. 4) Used in rubbercompounding,packingtc. 5) Used in lubricant, paper, plasticizers.	1 mark each for any 2 1 mark each for any 2	**4**
4-e	**IUPAC rule for Alkanes:**	1/2 mark	**4**

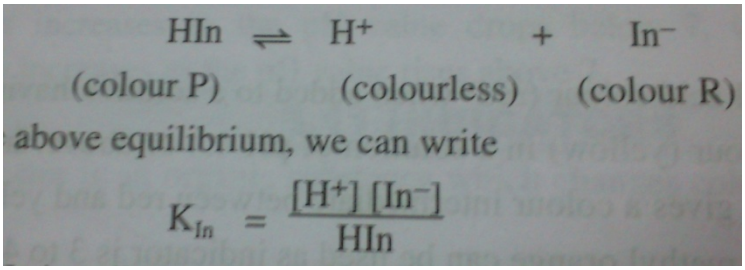
	1. Select the longest possible chain of carbon atom. 2. Number the carbon atom in such a way that carbon carrying substituent will get least possible number. 3. Give the parents name based on number of carbon atom. 4. Prefix the substituent name to the parent name. 5. Prefix the number to the substituent. 6. Number and names are separated by hyphen 7. Numbers are separated by comma 8. When same substituents are present many times then used the term Di,tri…	each	
4-f	**Quinonoid theory** According to quinonoid theory, an acid-base indicators exist in two tautomeric forms having different structures which are in equilibrium. One form is termed benzenoid form and the other quinonoid form.  The two forms have different colors. The color change is due to the interconversation of one tautomeric form into other. One form mainly exists in acidic medium and the other in alkaline medium. Thus, during titration the medium changes from acidic to alkaline or vice-versa. The change in pH converts one tautomeric form into other and thus, the colour change occurs. Phenolphthalein has benziod form in acidic medium and thus, it is colourless	4	**4**

	while it has quinonoid form in alkaline medium which has pink colour.  **Methyl orange** has quinonoid form in acidic solution and benzenoid form in alkaline solution. The color of benzenoid form is yellow while that of quinoniod form is  red		
5	**Any 4**		**16**
5-a	I)acid & -COOH ii)Amine,-NH2 I I iii)Alkene,C=C I I iv)Halogen derivatives ,-X(-Cl,-Br,-I)	1 1 1 1	**4**
5-b	i)$CaC_2 + H_2O \rightarrow C_2H_2 + Ca(OH)_2$ calcium carbide reacts with water to give acetylene. X X I I ii)R-C-C-R + 2Zn →R-C≡C-R + 2ZnX2	2 2	**4**

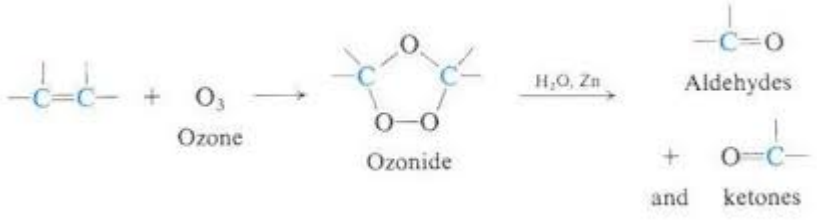
	I I X X When 1,1,2,2-tetrahalides are heated with zinc dust in alcohol, they produce alkynes.		
5-c	**Toluene from benzene:** 1. By the action of alkyl halide on benzene in the presence of anhydrous aluminum chloride catalyst, Toluene is formed. This reaction is called Friedel Crafts reaction. $C_6H_6 + CH_3Cl \rightarrow C_6H_5CH_3 + HCl$ 2. By heating halogen derivatives of benzene or one of its homologous & an alkyl halide with metallic sodium in dry ether.This reaction is called Wurtz-Fittig reaction. $C_6H_5Br + 2Na + CH_3I \rightarrow C_6H_5CH_3 + NaBr + NaI$	2 2	4
5-d	**Uses of aromatic compound:** i) Benzene is used to produce styrene & from styrene polystyrene is formed. II) Alkyl benzene is used in detergent. iii) Some industries use benzene to make rubber, lubricants dyes. iv)production of epoxy resin & nylon	1 mark each	4
5-e	  	2	4

	 A primary alcohol is easily oxidized to an aldehyde and then to an acid, both containing the same no. of carbon atoms, as the original alcohol for e.g. ethyl alcohol is oxidized to acetaldehyde which is further oxidized to acetic acid. A secondary alcohol on oxidation gives first a ketone with the same no. of carbon atoms as original alcohol.Ketones are difficult to oxidized but on prolonged action of oxidizing agent ,these are oxidized to an acid or a mixture of acids.e.g. Isopropyl alcohol gives first acetone & then acetic acid. A tertiary alcohol is resistant to oxidation in neutral or alkaline solution but is readily oxidized by an acid oxidizing agent to give a mixture of ketone & acid each with fewer no. of carbon atoms than the original alcohol. The oxidizing agents usually used are acid dichromate, acid or alkaline potassium permanganate & dilute nitric acid. Thus oxidizing the alcohol & analyzing the products of oxidation will indicate whether it is primary, secondary or tertiary alcohol.	2	
5-f			4

	 Most liquids have a tendency to vaporize. If such a liquid is left in an open container, it slowly vaporizes away. But when such liquid is placed in a closed container and the air from the container is evacuated, the liquid vaporizes & vapour fills the available space above the liquid surface. Slowly equilibrium is established between the vapour & the liquid phase. At this stage vapors exerts a definite pressure .The maximum pressure exerted by the vapour at any definite temp.,when the liquid & the vapour phases are in equilibrium is called the vapour pressure of liquid. The vapour pressure of the liquid depends upon nature of liquid,temp. & presence of impurities. When a volatile solute is dissolved into a solvent then the vapors of both the solute & solvent will be present in the vapour phase .The total vapour pressure above such a solution will be equal to the sum of pressures exerted by the vapours of both the solute & solvent. If a non volatile solute is added to a volatile liquid, the vapour pressure of the solution is lower than the vapour pressure of pure solvent. The vapour pressure of any solution containing a non volatile solute in a volatile solvent is proportional to the mole fraction of the solvent in the solution.	2 1 1	
6	Any 4		16

6-a	**Ostwald's theory**: This theory is based on the phenomenon of ionization. According to this theory an acid-base indicator is a weak organic acid or a weak organic base. These acid-base indicators ionize to liberate a small no. of H+ ions or OH- ions. The indicators have different colours in the undissociated & dissociated form. The colour imparted to the solution by the indicator depends upon the relative proportions of the dissociated molecule & the ions provided by the indicator, on dissociation in the solution. Consider that the indicator to be used be an acid of chemical formula Hln.It dissolves in water & dissociate to some extent .The ionization of Hln in solution can be represented as  Where Kln is indicator dissociation constant. The undissociated molecule Hln has one color say colour p & the ln- has another colour R.The actual colour imparted by the indicator will depend upon the hydrogen ion conc. of the solution to which it is added. If the solution is acidic, the equilibrium in the above reaction will shift towards the left. The dissociation of Hln will be suppressed, there will be large conc. Of H+ & so indicator shows the colour P.(acidic colour) If the solution is alkaline ,the equilibrium shift towards the right. There will be large conc. Of ln- ions & the indicator will show the colour	4	4

	R(basic colour)Thus the above dissociation reaction explains the change of colours of an indicator when the solution changes from acidic to alkaline condition.		
6-b	**Uses of alcohol:** i)alcohol is used in drinks ii)As a Fuel iii) As a solvent iv) As an industrial feedstock	1 mark each	4
6-c	**Physical properties of alcohol:** i)alcohols are neutral substance ii)Lower members are soluble in water & organic solvents, but the solubility goes on decreasing with the rise of molecular weight iii)Lower members have a pleasant smell but a burning taste & the higher ones are odourless& tasteless iv)Their boiling points rises with rise in molecular weight. v) they are lighter than water. vi) lower members are colourless liquids.	1 mark each any 4	4
6-d	i) By fusing sodium benzene sulphonate with caustic soda $C_6H_5SO_3Na \xrightarrow{NaOH} C_6H_5ONa \xrightarrow{NaOH} C_6H_5OH$ ii)By heating chlorobenzene under pressure with 10% solution of sodium carbonate or sodium hydroxide at about 300^0C in the presence of copper salts as a catalyst $C_6H_5Cl + NaOH \rightarrow C_6H_5OH + NaCl$	2 2	4

6-e	**Physical properties of phenol-** i)It is colorless ,crystalline substance ii) Phenol turns pink on exposure of air &light, moderately soluble in water, more in alcohol & ether. Uses of Phenol- i)In the manufacture of drugs like aspirin ii)As an antiseptic-carbolic lotion & carbolic soap	2 2	4
6-f	 When ozone is passed through an alkene in an inert solvent like CCl4,it adds across the double bonds to form an ozonide.On warming with zinc & water ,the ozonides cleave at the double bond. The products are aldehydes ,ketones or an aldehyde & a ketone depending on the structure of the alkene. The oxygenated carbons in carbonyl compound obtained by ozonolysis are that were joined by double bond in the original alkene.Suppose an alkenes on ozonolysis gives the carbonyl compounds. CH3 H I I H3C-C=O & O=C-CH3 Joining the oxygenated carbon by double bond,we get the following structure of unknown alkenes.	2 2	4

	CH3 H l l H3C- C = C -CH3 2-Methyl-2-butene		