
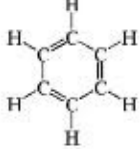
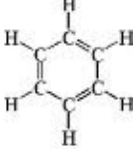
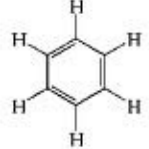



Q.No	Answer	Mark
1.a	Beacause alkanes are having low Reactivity&from the latin phrase Parum affinis means little affinity.	2
1.b	The phenomenon of enrichment of chemical substance(from agas or solution phase) at the surface of a solid	2
1.c	Decomposion of compounds by heating to high temperature in absence of air	1
	$\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH}_3\text{----} \quad \text{CH}_3\text{-CH=CH}_2 + \text{H}_2$	1
1.d	The vapour pressure of any solution containing a non volatile solute in a volatile solvent in proportional to the mole fraction of the solvent in the solution	2
1.e	Organic substance used in very small quantities to determine end point in the titration by visual change of colour Uses-i)for titration ii) to calculate pH	2
1.f	Series of class of organic compounds in which each member differs from its neighbour(imigiate higher or lower member) by a constant difference of $-\text{CH}_2$ -methylene group	1
	$\text{C}_6\text{H}_6, \text{C}_6\text{H}_5\text{-CH}_3, \text{C}_6\text{H}_5\text{C}_2\text{H}_5$	1
1.g	Phase- as a part of system which is chemically and physically uniform through out	1
	Component – minimum no. of independent chemical species necessary to describe the composition of each and every phase of the system in equilibrium	1
1.h	Represents relationship between the no. of degrees of freedom of a system and the no. of components and phases in equilibrium in the system	1
	$F = C - P + 2$	1
1.i	This is because chloroform decomposes when expose to direct sun light or high temperature in the absence of air , hence the dark brown bottle are used to store it	2
1.j	Its neutral, higher boiling point 65 deg. C, lower members are colourless liquid and higher members are colourless waxy solids	2
1.k	Liquid mixtures which when boiled produce vapours of the same composition as the boiling liquid and the liquid therefore does not change in composition as it vaporizes e.g – ethanol - water	2

1.1	<p>Adsorbate- the substance that get adsorbed e.g.-acetic acid</p> <p>Adsorbent – the substance on whose surface adsorption takes place e.g.- charcole</p>	1 1
2.a	<p>Markownikoff's rule-when an unsymmetrical reagent like HBr is added to an unsymmetrical alkene, then the negative part of the reagent always attaches itself to the carbon atom carrying less no. of hydrogen atoms.</p> <p>$\text{CH}_3\text{-CH=CH}_2 + \text{HBr} \rightarrow \text{CH}_3\text{-CHBr-CH}_3 + \text{CH}_3\text{CH}_2\text{CHBr}$</p> <p>(2-bromopropane) (1-bromopropane)</p>	2 2
2.b	<p>ORGANIC COMPOUNDS-1. OPEN CHAIN (acyclic, aliphatic compounds) e.g. alkanes</p> <p>2. CLOSED CHAIN (cyclic or ring compounds)</p> <p>-2.a-carbocyclic</p> <p>2.a1-alicyclic e.g. cyclohexane</p> <p>2.a2-aromatic compound e.g. benzene</p> <p>-2.b-heterocyclic e.g. pyridine</p>	2 2
2.c	<p>Step 1. six carbon atoms are first joined to one another by single covalent bond to form a flat hexagonal ring as shown in fig.</p> <p>Step 2. Each carbon atom of the ring is joined to a hydrogen atom by a single covalent bond.</p> <p>Step 3. all hydrogen atoms are now exhausted & only three valencies of each carbon atom are satisfied. To account for the tetravalency of carbon, double bonds are placed alternately between carbon atoms. Thus structure of benzene can be represented as in fig.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>a)</p> </div> <div style="text-align: center;">  <p>b1)</p> </div> <div style="text-align: center;">  <p>b2)</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 20px;"> <div style="text-align: center;">  <p>c)</p> </div> <div style="text-align: center;">  <p>d)</p> </div> </div>	4

2.d	<p style="text-align: center;"><i>Main Reactions</i></p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p><u>Oxidation</u></p> $\text{CH}_3-\text{CH}(\text{C}_6\text{H}_5)-\text{CH}_3 + \text{O}_2 (\text{Air}) \longrightarrow \text{CH}_3-\text{C}(\text{OOH})(\text{C}_6\text{H}_5)-\text{CH}_3$ <p>Cumene Cumene Hydroperoxide (CHP)</p> </div> <div style="text-align: center;"> <p><u>Decomposition</u></p> $\xrightarrow[\text{Acid Catalyst}]{\text{Acid Catalyst}} \text{C}_6\text{H}_5\text{OH} + \text{CH}_3-\text{C}(=\text{O})-\text{CH}_3$ <p>Phenol Acetone</p> </div> </div>	4
2.e	Alkene- $\text{CH}_2=\text{CH}_2$, Alkynes C_2H_2 , isomerism in alkenes, definition, description.	4
2.f	<p>The system water is a 3 phase, one component system. The three phases namely ice, water, water vapor can be represented by one chemical species H_2O. Which is the only one component of system.</p> <p>Fig represents P-T plot of system.</p> <p>Description of fig.</p>	4
	<p>The figure is a phase diagram for water. The vertical axis is Pressure (atm) with markings at 0.006, 1, and 218. The horizontal axis is Temperature (°C) with markings at 0, 0.01, 100, and 374. The diagram shows three regions: Solid (ice), Liquid (water), and Gas (steam). The phase transition lines are labeled S-L, L-G, and S-G. The Triple Point is at 0.01°C and 0.006 atm. The Critical Point is at 374°C and 218 atm. A horizontal dashed line at 1 atm intersects the L-G curve at 100°C.</p>	
Q3 (a)	<p>Higher alkane are produced by heating on alkyl halides with sodium metal in dry ether solution.</p> <p>This process is term as Wurtz synthesis .When two molecules of alkyl halides are heated with sodium metal in presence of dry ether solution then formation of symmetrical alkane (even no. of carbon atom)along with NaX takes place</p>	01 01

(b)	<div style="display: flex; justify-content: space-between;"> <div> $R-X + 2Na + X-R \xrightarrow[\text{ether}]{Na} R-R + 2NaX$ <p>Alkyl halide</p> $CH_3Br + 2Na + Br-CH_3 \xrightarrow[\text{ether}]{Na} H_3C-CH_3 + 2NaBr$ <p>Methyl bromide</p> </div> <div style="text-align: center;"> <p>Symmetrical alkane</p> <p>Ethane</p> </div> </div>	<div style="display: flex; justify-content: space-between;"> <div>02</div> <div>4 marks</div> </div>
	<p>IUPAC rules for nomenclature of organic compound</p> <ol style="list-style-type: none"> 1) Identify the longest chain of carbon atom. This chain is called the parent chain and other chain attached to parent chain are known as branched chain. 2) Identify all of the substituent. 3) Number the carbons of the parent chain from the end that gives the substituent the lowest numbers. If two or more side chains are in equivalent positions, assign the lowest number to the one which will come first in the name. 4) Prefix the name of substituent to the name of parent chain and indicate its position on parent chain by writing number. 5) If the same substituent occurs more than once, the location of each point on which the substituent occurs is given. In addition, the number of times the substituent group occurs is indicated by a prefix (di, tri, tetra, etc.). 6) If there are two or more different substituent they are listed in alphabetical order using the base name (ignore the prefixes). <div style="display: flex; justify-content: space-around; align-items: flex-end; margin-top: 20px;"> <div style="text-align: center;"> $\begin{array}{c} CH_3 \\ \\ CH_3-CH-CH-CH_2-CH_3 \\ \\ Cl \end{array}$ <p>3-chloro-2-methylpentane</p> </div> <div style="text-align: center;"> $\begin{array}{c} CH_3 \quad Br \\ \quad \\ CH_3-CH-CH-CH_3 \end{array}$ <p>2-bromo-3-methylbutane</p> </div> </div>	

(c)	<p>Aldehyde:</p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{H} \end{array}$ <p>Esters:</p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C}-\text{OR}' \end{array}$ <p>Halogen:</p> $\text{R}-\text{X}$ <p style="text-align: center;">$\text{X} = \text{F, Cl, Br, I}$</p> <p>Carboxylic:</p> $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C} \\ \text{OH} \end{array}$	<p>01</p> <p>01</p> <p>01</p> <p>01</p>
(d)	<p>Dehydrogenation reaction means removal of hydrogen. Generally dehydration reaction is used to prepared unsaturated hydrocarbon from saturated one. Alkane containing six to ten carbon atoms is converted into benzene and it's homologous at high temperature in presence of catalyst Cr_2O_3 and Al_2O_3. e.g. When n-hexane is passed over Cr_2O_3 catalyst supported over Al_2O_3 at 600°C due to removal of hydrogen from n-hexane formation of aromatic compounds i.e. Benzene takes place</p>	<p>01</p> <p>01</p>

n-Hexane

$$\xrightarrow[600^{\circ}\text{C}]{\text{Cr}_2\text{O}_3 - \text{Al}_2\text{O}_3}$$

Benzene

This is one of the method to prepared aromatic compound from aliphatic .It is also known as Aromatization.

Alcohol	Phenol
1)Alcohol are neutral in nature	1)Acidic in nature
2)It has a pleasant Alcoholic odour	2)It has typical phenolic odour
3)No Reaction observed with FeCl ₃	3)It gives Violet colorization with FeCl ₃
4)Alcohol when reacted with halo-acid it form alkyl halides	4)No reaction
5)It undergoes oxidation to give acetaldehyde and acetic acid.	5)On Oxidation it will gives pink or brown color due to formation of quinone
6)When reacted with PCl ₅ it will form Alkyl Halides	6)When reacted with PCl ₅ it forms tri phenyl phosphate

Application of adsorption

- It is used to removed colored impurities from solution
- For production of high vacuum
- For water purification process
- This phenomenon is applicable in heterogeneous catalysis.
- Used in gas mask for adsorption of toxic gases.

1)Removal of coloring matter from solution:

(i) Animal charcoal removes colors of solutions by adsorbing colored impurities. (ii) Animal charcoal is used as decolorizer in the manufacture of cane sugar.

2) Heterogeneous catalysis: Mostly heterogeneous catalytic reactions proceed through the adsorption of gaseous reactants on solid catalyst. For example,

02

1 mark
for each
point

½
marks
each

01

01

	<p>(i) Finely powdered nickel is used for the hydrogenation of oils.</p> <p>(ii) Finely divided vanadium pentaoxide (V_2O_5) is used in the contact process for the manufacture of sulphuric acid.</p>	01
Q4	Isomers are molecules that have the same molecular formula, but have a different arrangement of the atoms in space. That excludes any different arrangements which are simply due to the molecule rotating as a whole, or rotating about particular bonds.	
a	<p>In pentane following three isomers are observed,</p> <div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;"> $\text{CH}_3-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{CH}_3$ <p>n-pentane</p> </div> <div style="text-align: center;"> $\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3-\text{CH}-\text{CH}_2-\text{CH}_3 \end{array}$ <p>Isopentane</p> </div> <div style="text-align: center;"> $\begin{array}{c} \text{CH}_3 \\ \\ \text{H}_3\text{C}-\text{C}-\text{CH}_3 \\ \\ \text{CH}_3 \end{array}$ <p>Neopentane</p> </div> </div>	03
b	<p>Grignard reagents form via the reaction of an alkyl or aryl halide with magnesium metal. The reaction is conducted by adding the organic halide to a suspension of magnesium in an etherial solvent. The reaction proceeds through single electron transfer.</p> $\begin{aligned} \text{R-X} + \text{Mg} &\rightarrow \text{R-X}^{\cdot-} + \text{Mg}^{\cdot+} \\ \text{R-X}^{\cdot-} &\rightarrow \text{R}^{\cdot} + \text{X}^- \\ \text{R}^{\cdot} + \text{Mg}^{\cdot+} &\rightarrow \text{RMg}^+ \\ \text{RMg}^+ + \text{X}^- &\rightarrow \text{RMgX} \end{aligned}$ <p>RMgX are known as Grignard reagent. e.g. CH_3MgCl</p> <p>Uses:</p> <ul style="list-style-type: none"> It is used for manufacturing of higher aromatics It is used for manufacturing of alkane from alkane halide. 	01 01
c	<p>: Adsorption isotherm:</p> <p>It is a relation between the quantity of substance adsorbed per gram of the adsorbent and the equilibrium pressure (gases) or equilibrium concentration (solution) at constant temperature.</p> <p>In 1909, Freundlich expressed an empirical equation for representing the isothermal variation of adsorption of a quantity of gas adsorbed by unit mass of solid adsorbent with pressure.</p> <p>This equation is known as Freundlich Adsorption Isotherm or Freundlich Adsorption equation or simply Freundlich Isotherm.</p> $x/m = k p^n \text{ (gases)}$	01

$$x/m = kC^n \text{ (solution)}$$

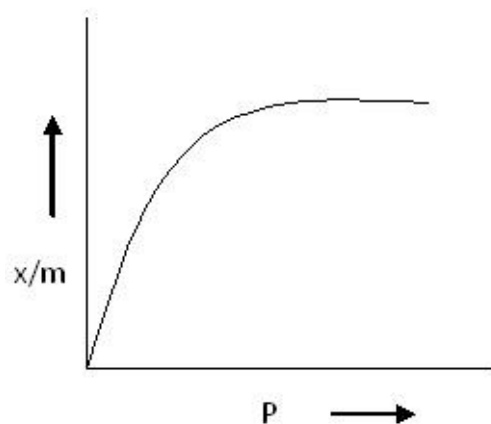
Where ,

x/m = mass of adsorbate per gram of adsorbent

P is Pressure,

C is concentration

k and n are constants whose values depend upon adsorbent and gas at particular temperature



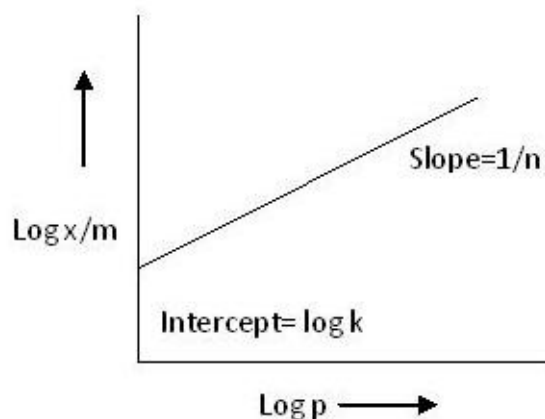
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Taking the logarithms of a first equation.

$$\frac{\log(x)}{m} = \log k + \frac{1}{n} \log P$$

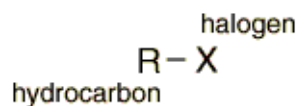
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Hence, if a graph of $\log x/m$ is plotted against $\log p$, it will be a straight line in the following diagram.



From this the value of slope equal to $1/n$ and the value of intercept equal to $\log k$ can be obtained. Over and above, if the graph of $\log x/m$ against $\log p$ comes out to be a straight line, it can be assured that the Freundlich adsorption isotherm is satisfied for this system.

: The haloalkanes (also known as halogenoalkanes or alkyl halides) are a group of [chemical compounds](#) derived from [alkanes](#) containing one or more [halogens](#).



d

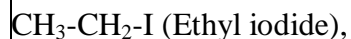
The general formula of alkyl halide is $\text{C}_n\text{H}_{2n+1}\text{X}$, where $\text{X} = \text{Cl}, \text{Br}, \text{I}$.
Example: $\text{CH}_3\text{-Cl}$ (Methyl Chloride), $\text{CH}_3\text{-Br}$ (Methyl bromide), $\text{C}_2\text{H}_5\text{-Br}$ (Ethyl Bromide), $\text{C}_3\text{H}_7\text{-Br}$ (Propyl bromide) etc. etc.

Alkyl halides are classified into three classes:

PRIMARY ALKYL HALIDE:

Alkyl halides containing primary C-atom are called primary alkyl halides.

For example:



SECONDARY ALKYL HALIDE:

Alkyl halides containing secondary C-atom are called secondary alkyl halides.

For example:

01

01

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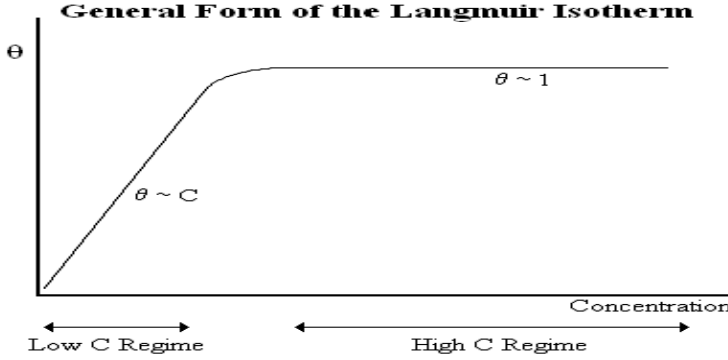
01

4.e		$\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ \\ \text{Br} \end{array}$ <p>Sec. alkyl halide</p>	01 mark
		<p>TERTIARY ALKYL HALIDE:</p> <p>Alkyl halides containing tertiary c-atom are called tertiary alkyl halide.</p> <p>For example:</p>	
		$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{C} - \text{CH}_3 \\ \\ \text{Br} \end{array}$ <p>Ter. alkyl halide</p>	
		<p>Different theories have been put forward to explain the role of indicators in the acid-base titration's like Ostwald's ionic theory, Quinonoid theory etc. Ostwald's theory considers indicator to be a weak acid or base whose unionized forms differently colored. In presence of acid or base, i.e. pH change, there is ionization of indicator and hence the color change appears.</p> <p>For example phenolphthalein phenolphthalein is a weak acid (PhH)</p> <p>PhH Ph⁻ + H⁺(1) (colorless (Pink in base) in acid)</p> <p>H⁺ + OH⁻ H₂O</p> <p>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 color change from colorless 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 color only after excess of weak base is added.</p> <p>Methyl orange Methyl orange behaves like a weak base (MeOH)</p>	<p>02 marks</p> <p>1 mark</p> <p>1 mark</p>

4.f	<p> $\text{MeOH} \rightleftharpoons \text{Me}^+ + \text{OH}^- \dots\dots\dots(2)$ (yellow in base) (red in acid) </p> <p> $\text{OH}^- + \text{H}^+ \rightleftharpoons \text{H}_2\text{O}$ </p> <p> In presence of a base, equilibrium (2) is displaced towards left hand side and appears yellow in base solution. On the addition of strong acid, OH^- of MeOH is removed and hence equilibrium (2) is displaced towards right hand side when solution appears red. Thus there is color changes from golden yellow to red when medium changes from basic to acidic. This indicator is not used in the titration of weak acid since it will not remove OH^- of the indicator and can make color change only after excess of weak acid has been added. </p> <p> Assumption: co-planner Bond angle Stain angle calculation Drawback of theory </p>	02 mrks –each
Q-5.a	<p> DEFINATION/CONCEPT: - The complete process of reaction of alkene with ozone owed by hydrolysis of the product (OZONIDE) known as ozonolysis </p> <p> 2.Ozonides are highly unstable and explosive. 3. Hydrolysis – inpresence of H_2 Using Pt catalyst ---- to form Aldehydes or Ketones. </p> <p> Example—1 $\text{Ethane} + \text{O}_3 \rightleftharpoons \text{Ethylene ozonide}$ Ozonolysis of 2-Methyl 2 butene gives aldehyde and ketone </p> <p> <u>:- either examples of Alkene to give aldehyde or ketone ----- carries 2 marks to each reaction</u> </p> <p> 4. ozonolysis of 2 methyl 2 butene gives aldehyde and ketone --- reaction 5. Alkene $\xrightarrow{\text{O}_3}$ ozonide $\xrightarrow[\text{H}_2\text{O}]{\text{Zn}}$ Carbonyl (aldehyde) </p> <p> The important application if ozonolysis is to locate position of double bond in the alkene. </p>	ANY 4 POINTS- --
:-5-B	<p> 1. INTRO: - S--- rhombic & monoclinic 2. One crystalline form --- polymorphism </p>	

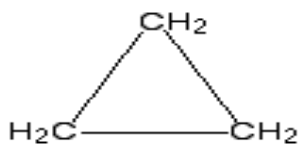
	<div><p>Phase diagram of sulfur (S₈ only)</p></div>	4MARK															
5-C	<div><p>:-DEFINATION:- Isomerism ,types of isomerism:</p><ul style="list-style-type: none">Chain isomerism 2. Position isomerism<p>Examples of each type -----2 marks</p><p>General Methods of preparation :-</p><ul style="list-style-type: none">ROH + HBr Zncl₂ RBr +H₂OROH + HCL H₂SO₄ RCL + H₂O<p>Any two method ---- or reaction ---</p></div>	<div>2 marks</div> <div>2 marks</div>															
5-D	<div><p>Difference between Ideal Solution and Non Ideal solution</p><table><tr><th>Ideal solutions</th><th colspan="2">Non-ideal solutions</th></tr><tr><td></td><th>Positive deviation from Raoult's law</th><th>Negative deviation from Raoult's law</th></tr><tr><td>1.ObeyRaoult's law at every range of concentration.</td><td>1.Do not obey Raoult's law.</td><td>1.Do not obey Raoult's law.</td></tr><tr><td>2.?H_{mix} = 0; neither is evolved nor absorbed during dissolution.</td><td>2.?H_{mix}>0. Endothermic dissolution; heat is absorbed.</td><td>2.?H_{mix}<0. Exothermic dissolution; heat is evolved.</td></tr><tr><td></td><td></td><td>3.?V_{mix} <0. Volume is decreased during dissolution.</td></tr></table></div>	Ideal solutions	Non-ideal solutions			Positive deviation from Raoult's law	Negative deviation from Raoult's law	1.ObeyRaoult's law at every range of concentration.	1.Do not obey Raoult's law.	1.Do not obey Raoult's law.	2.? H_{mix} = 0; neither is evolved nor absorbed during dissolution.	2.? H_{mix} >0. Endothermic dissolution; heat is absorbed.	2.? H_{mix} <0. Exothermic dissolution; heat is evolved.			3.? V_{mix} <0. Volume is decreased during dissolution.	<div>2 marks</div>
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	<p>3. $\Delta V_{\text{mix}} = 0$; total volume of solution is equal to sum of volumes of the components.</p> <p>4. $P = p_A + p_B = p_A^0 X_A + p_B^0 X_B$ i.e., $p_A =$</p> <p>5. A—A, A—B, B—B interactions should be same, i.e., 'A' and 'B' are identical in shape, size and character.</p> <p>6. Escaping tendency of 'A' and 'B' should be same in pure liquids and in the solution.</p> <p>Examples: dilute solutions; benzene + toluene; n-hexane + n-heptane; chlorobenzene + bromobenzene; n-butyl chloride + n-butyl bromide.</p>	<p>3. $\Delta V_{\text{mix}} > 0$. Volume is increased after dissolution.</p> <p>4. $p_A > p_A^0 X_A$; $p_B > p_B^0 X_B$ $\therefore p_A + p_B > p_A^0 X_A + p_B^0 X_B$</p> <p>5. A—B attractive force should be weaker than A—A and B—B attractive forces. 'A' and 'B' have different shape, size and character.</p> <p>6. 'A' and 'B' escape easily showing higher vapour pressure than the expected value.</p> <p>Examples: acetone + ethanol acetone + CS_2; water + methanol; water + ethanol; CCl_4 + toluene; CCl_4 + CHCl_3; acetone + benzene; CCl_4 + CH_3OH; Cyclohexane + ethanol</p>	<p>4. $p_A < p_A^0 X_A$; $p_B < p_B^0 X_B$ $\therefore p_A + p_B < p_A^0 X_A + p_B^0 X_B$</p> <p>5. A—B attractive force should be greater than A—A and B—B attractive forces. 'A' and 'B' have different shape, size and character.</p> <p>6. Escaping tendency of both components 'A' and 'B' is lowered showing lower vapour pressure than expected ideally.</p> <p>Examples: acetone + aniline; acetone + chloroform; $\text{CH}_3\text{OH} + \text{CH}_3\text{COOH}$; $\text{H}_2\text{O} + \text{HNO}_3$; Choloroform + diethyl ether, water + HCl; acetic acid + pyridine; chloroform + benzene</p>	2 marks
5-E	<p>Langmuir proposed that dynamic equilibrium exists between adsorbed gaseous molecules and the free gaseous molecules. Using the equilibrium equation, equilibrium constant can be calculated.</p> $\text{A(g)} + \text{B(S)} \xrightleftharpoons[K_d]{K_a} \text{AB}$ <p>Langmuir Equation which depicts a relationship between the number of active sites of the surface undergoing adsorption (i.e. extent of adsorption) and pressure.</p> <p>To derive Langmuir Equation and new parameter ' θ ' is introduced. Let θ the number of sites of the surface which are covered with gaseous molecules. Therefore, the fraction of surface which are unoccupied by gaseous molecules will be $(1 - \theta)$.</p>	2 marks		

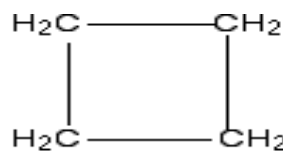
	<p>Now, Rate of forward direction depends upon two factors: Number of sites available on the surface of adsorbent, $(1 - \theta)$ and Pressure, P. Therefore rate of forward reaction is directly proportional to both mentioned factors.</p> <p style="text-align: center;">Rate of forward reaction $\propto P (1 - \theta)$</p> <p style="text-align: center;">Rate of adsorption $\propto P (1 - \theta)$</p> <p style="text-align: center;">Or, Rate of adsorption = $K_a P (1 - \theta)$</p> <p>Limitations of Langmuir Adsorption Equation</p> <ul style="list-style-type: none"> The adsorbed gas has to behave ideally in the vapor phase. This condition can be fulfilled at low pressure conditions only. Thus Langmuir Equation is valid under low pressure only Another assumption was that all the sites on the solid surface are equal in size and shape and have equal affinity for adsorbate molecules i.e. the surface of solid is homogeneous. But we all know that in real solid surfaces are heterogeneous. Langmuir Equation assumed that molecules do not interact with each other. This is impossible as weak force of attraction exists <p style="text-align: center;">General Form of the Langmuir Isotherm</p>  <p style="text-align: right;">even between</p> <p>molecules of same type.</p> <p><u>NOTE:-EXPLANATION ----- 2 MARKS</u></p> <p><u>ASSUMPTIONS / REACTION----- 2 MARKS</u></p>	2 mark
5-F	<p><u>TWO COMPONENT SYSTEM</u></p> <p><u>INTRO:-</u>The phase rule is an expression of the number of variables and equations that can be used to describe a system in equilibrium. In simple terms, the number of variables are the number of chemical components in the system plus the extensive variables, temperature and pressure. The number of phases present will depend on the variance or degrees of freedom of the system. The general form of the phase rule is stated as follows:</p> $F = C + 2 - P$ <p>where F is the number of degrees of freedom or variance of the system.</p> <p>C is the number of components, as defined above, in the system.</p> <p>P is the number of phases in equilibrium,</p> <p>and the 2 comes from the two extensive variables, Pressure and Temperature.</p> <p><u>EXPLANATION -----2 MARKS</u></p>	2 marks

DAIGRAM OF ABOVE SYSTEM ---- 2 MARKS**6-A**

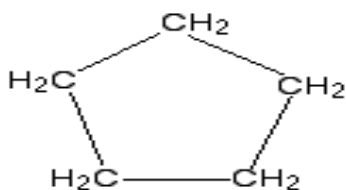
Cycloalkanes again only contain carbon-hydrogen bonds and carbon-carbon single bonds, but this time the carbon atoms are joined up in a ring. The smallest cycloalkane is cyclopropane.

4 marks
4 points

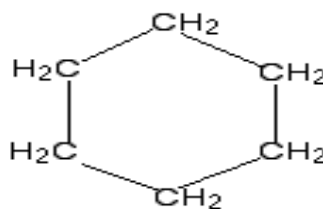
cyclopropane



cyclobutane



cyclopentane



cyclohexane


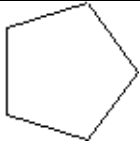
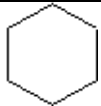
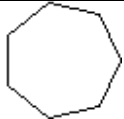
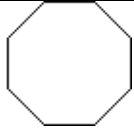
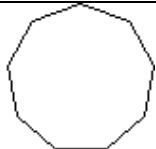
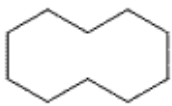
If you count the carbons and hydrogens, you will see that they no longer fit the general formula C_nH_{2n+2} . By joining the carbon atoms in a ring, you have had to lose two hydrogen atoms.

You are unlikely to ever need it, but the general formula for a cycloalkane is C_nH_{2n} .

Don't imagine that these are all flat molecules. All the cycloalkanes from cyclopentane upwards exist as "puckered rings".

Cyclohexane, for example, has a ring structure which looks like this:

Cycloalkane	Molecular Formula	Basic Structure
Cyclopropane	C_3H_6	

	Cyclobutane	C_4H_8	
	Cyclopentane	C_5H_{10}	
	Cyclohexane	C_6H_{12}	
	Cycloheptane	C_7H_{14}	
	Cyclooctane	C_8H_{16}	
	Cyclononane	C_9H_{18}	
	Cyclodecane	$C_{10}H_{20}$	
<u>DEFINITION:- 1 MARKS</u> <u>EXPLANATION WITH EXAMPLES --- 2 MARKS</u> <u>ONE IUPAC EXAMPLES ----- 1 MARKS</u>			
6-B	DIFFERENCE BETWEEN PHYSICAL ADSORPTION AND CHEMISORPTION.		
	PHYSICAL ADSORPTION	CHEMISORPTIONS	
	The forces operating in these are weak vander Waal's forces.	The forces operating in these cases are similar to those of a chemical bond.	
	The heat of adsorption are low i.e. about $20 - 40 \text{ kJ mol}^{-1}$	The heat of adsorption are high i.e. about $40 - 400 \text{ kJ mol}^{-1}$	
	No compound formation takes place in these cases.	Surface compounds are formed.	
	The process is reversible i.e. desorption of the gas occurs by increasing the temperature or decreasing the pressure.	The process is irreversible. Efforts to free the adsorbed gas give some definite compound.	
	It does not require any activation energy.	It requires any activation energy.	
	This type of adsorption decreases with increase of temperature.	This type of adsorption first increases with increase of temperature. The effect is called activated adsorption.	
			2 marks

6-C	It is not specific in nature i.e. all gases are adsorbed on all solids to some extent.	It is specific in nature and occurs only when there is some possibility of compound formation between the gas being adsorbed and the solid adsorbent.	2 marks
	The amount of the gas adsorbed is related to the ease of liquefaction of the gas.	There is no such correlation exists.	
	It forms multimolecular layer.	It forms unimolecular layer.	
	<p>NOTE:- ANY FOUR POINTS FROM ABOVE --- 4 MARKS</p> <p>A. Addition of halogen to Alkenes:- The reaction of the carbon-carbon double bond in alkenes such as ethene with halogens such as chlorine, bromine and iodine. This is called halogenation.</p> <p>Reactions where the chlorine or bromine are in solution (for example, "bromine water") are slightly more complicated and are treated separately at the end.</p> <p>Simple reactions involving halogens</p> <p>In each case, we will look at ethene as typical of all of the alkenes. There are no complications as far as the basic facts are concerned as the alkenes get bigger.</p> <p>Example:-Ethene and fluorine Ethene reacts explosively with fluorine to give carbon and hydrogen fluoride gas. This isn't a useful reaction, and you aren't likely to need it for exam purposes in the UK at this level (A level or equivalent).</p> <p>B:- Addition of Halogen acids to alkenes:-</p> <p>As illustrated by the preceding general equation, strong halogen acids such as HCl, HBr, HI & H₂SO₄, rapidly add to the C=C functional group of alkenes to give products in which new covalent bonds are formed to hydrogen and to the conjugate base of the acid. Example:-</p> $\text{CH}_3\text{CH}_2\text{CH}=\text{CH}_2 + \text{HBr} \longrightarrow \text{CH}_3\text{CH}_2\text{CHBrCH}_3$ <p style="text-align: center;">regioselective addition</p> <p style="text-align: center;">not</p> $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{Br}$ <p>Halogen acids:-HBr,HCl etc</p> <p><u>Note:-explanation of each type with reaction and example carries 2 marks each</u></p>		1 marks

	<p>$\text{C}_2\text{H}_4(\text{g}) + \text{H}_2\text{O}(\text{g}) \rightarrow \text{CH}_3\text{CH}_2\text{OH}(\text{l})$.</p> <p>The catalyst is most commonly phosphoric acid,[17] adsorbed onto a porous support such as diatomaceous earth or charcoal. This catalyst was first used for large-scale ethanol production by the Shell Oil Company in 1947.[18] The reaction is carried out with an excess of high pressure steam at 300°C.</p> <p><u>EXAMPLE WITH EXPLANATION -----</u></p> <p><u>PART B:- USES OF ALKENES:-</u></p> <p>Alkenes are used for artificial ripening of fruits, as a general anesthetic, for making poisonous mustard gas (War gas) and ethylene-oxygen flame.</p> <ol style="list-style-type: none">1. Making plastics by polymerisation2. Making ethylene glycol3. Making industrial ethanol and further oxidation to ethanoic acid4. Making Halogenoalkanes important industrial solvents5. catalytic reforming to form benzene and other aryl compounds <p><u>ANY FOUR USES ----- HALF MARKS EACH---TOTAL 2 MARKS</u></p>	2 marks
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