

**Bangalore University, Bengaluru -560001**

**B.Sc. I Semester, chemistry – I (General chemistry)**

**Blue print of model question paper – I**

Name of the topic	No. of hours	No. of short Answer questions(2 Marks)			No. of long Answer questions (4 Marks)	Total marks
		Part-A	Part -B	Total		
Mathematical concepts	4	1	1	2	1	08
Gaseous state	9	2	2	4	2	16
Photochemistry	4	1	1	2	1	08
Liquids and solutions	9	1	2	3	3	18
Periodic table and periodic properties	9	3	2	5	2	18
Analytical chemistry	4	1	1	2	1	08
Basic concepts of organic chemistry	4	1	1	2	1	08
Aliphatic hydrocarbons	9	2	3	5	2	18
Total	52	12	13	25	13	102

**PART – A**

(12 x 2 =24)

1. Mathematical concepts
2. Gaseous state
3. Gaseous state
4. Photochemistry
5. Liquids and solutions
6. Periodic table and periodic properties
7. Periodic table and periodic properties
8. Periodic table and periodic properties
9. Analytical chemistry
10. Basic concepts of organic chemistry
11. Aliphatic hydrocarbons
12. Aliphatic hydrocarbons

**PART – B**

(13 x 6 = 78)

- 13 a) Mathematical concepts  
b) Mathematical concepts
14. a) Gaseous state  
b) Gaseous state

15. a) Gaseous state  
b) Gaseous state
  16. a) Photochemistry  
b) Photochemistry
  17. a) Liquids and solutions  
b) Liquids and solutions
  18. a) Liquids and solutions  
b) Liquids and solutions
  19. a) Liquids and solutions  
b) Aliphatic hydrocarbons
  20. a) Periodic table and periodic properties  
b) Periodic table and periodic properties
  21. a) Periodic table and periodic properties  
b) Periodic table and periodic properties
  22. a) Analytical chemistry  
b) Analytical chemistry
  23. a) Basic concepts of organic chemistry  
b) Basic concepts of organic chemistry
  24. a) Aliphatic hydrocarbons  
b) Aliphatic hydrocarbons
  25. a) Aliphatic hydrocarbons  
b) Aliphatic hydrocarbons
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**B. Sc. I Semester, chemistry – I (General chemistry)**

**Model question paper – I**

Time: 3 Hours

Max. Marks: 70

PART – A

Answer **any eight** of the following questions. Each question carries **two** marks. (8 x 2 = 16)

1. Give any two applications of integration in chemistry
2. What is mean free path of gas a molecule? Give its SI unit
3. Define Joule –Thomson coefficient.
4. State Stark –Einstein law of photochemistry
5. Define parachor.
6. What are chalcogens?
7. Define atomic radii
8. Define ionization energy?
9. What are significant figures
10. Explain hemolytic bond cleavage with example
11. Explain Wurtz reaction with an example
12. What are cumulated dienes? Give an example

PART – B

Answer **any nine** of the following questions. Each question carries **six** marks. (9 x 6 = 54)

13. a) i) If  $\log 3=0.4771$ , find value of  $\log 81$  ii) Write the conditions for maxima and minima of a function
- b) Define exact differential? Give an example (4 + 2)
14. a) Derive an expression for most probable velocity of gas molecules from Maxwell – Boltzmann equation
- b) Calculate average velocity of  $\text{CO}_2$  gas molecules at 310K temperature (4 + 2)
15. a) Explain application of Joule - Thomson effect for the liquefaction of air and hydrogen by Linde's process
- b) Define collision number. Give its SI unit (4 + 2)
16. a) Explain the determination of quantum yield of photochemical combination of  $\text{H}_2$  and  $\text{Cl}_2$
- b) Define chemical sensors. (4 + 2)
17. a) Explain the determination of molecular mass of solute by Berkeley and Hartley method
- b) Give any two differences between ideal and non ideal solutions (4 + 2)
18. a) Explain the factors which affect viscosity of liquid.
- b) What is azeotropic mixture? Give example (4 + 2)
19. a) Derive an expression of ratio proportion of liquid mixtures based the theory of steam distillation
- b) How cyclopropane is prepared from 1,3 -dichloropropane (4 + 2)

20. a) Explain the determination of electronegativity by Pauling's method  
 b) Explain the variation of atomic radii of halogens (4 + 2)
21. a) Explain any four properties which shows diagonal relationship between Be and Al  
 b) Give the general electronic configuration of alkali and alkaline earth metals (4 + 2)
22. a) Calculate the molarity of a solution prepared by dissolving 75.5g of pure KOH in 540 cm<sup>3</sup> of solution  
 b) Define equivalent mass of oxidizing agent (4 + 2)
23. a) Explain the generation of i) carbanion ii) carbene (4 + 2)  
 b) Define tautomerism. Give examples
24. a) Describe the conformational analysis of n-butane  
 b) How alkenes are prepared by Wittig reaction method? (4 + 2)
25. a) Explain the mechanism of ozonolysis of alkenes  
 b) Give any two limitations of Baeyer's strain theory of cycloalkanes (4 + 2)

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**B. Sc. I Semester, chemistry – I (General chemistry)**

**Answer of model question paper – I**

Time: 3 Hours

Max. Marks: 70

PART – A

Answer **any eight** of the following questions. Each question carries **two** marks. (8 x 2 = 16)

- Ans. 1) i) It is used in the derivation of velocity rate constant for a first order reaction.  
 ii) It is used in the derivation of velocity rate constant for a second order reaction.
- Ans. 2) The mean distance travelled by a molecule between two successive collisions is called the mean free path. It is denoted by 'λ'.

If  $l_1, l_2, l_3 \dots l_n$  are the free paths for a molecule of a gas. Then its mean free path is given by  

$$\lambda = \frac{l_1 + l_2 + l_3 + \dots + l_n}{n}$$
 Where, n = No. of molecules with which the molecule collide.

In SI unit Mean free path is measured in meter (m).

- Ans. 3) The rate of change of temperature with pressure at constant enthalpy of gas is called Joule – Thomson coefficient.

i.e. 
$$\mu = \left( \frac{\partial P}{\partial T} \right)_H$$

If  $\mu$  is positive, cooling effect is observed during expansion.  $\mu$  is negative, heating effect is observed during expansion.

Ans. 4) State Stark –Einstein law states that in a photochemical reaction, each molecule of the reacting substance absorbs a single photon of radiation causing the reaction and is activated form the products.

Ans. 5) The product of molar volume and one-fourth power of surface tension of given liquid at given temperature called parachor

$$\text{Mathematically, } V_m \gamma^{1/4} = [P]$$

(OR)

The molar volume of given the liquid at given temperature when its surface tension is unity called parachor.

$$\text{Mathematically, } V_m \gamma^{1/4} = [P]$$

$$V_m = [P] \quad \text{When } \gamma^{1/4} = 1$$

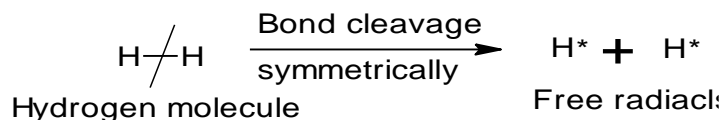
Ans. 6) Group 16 elements of the periodic table are called chalcogens because these are ore forming elements. This group is also known as the oxygen family. It consists of the elements oxygen (O), sulfur (S), selenium (Se), tellurium (Te), and the radioactive element polonium (Po).

Ans. 7) The distance between the centre of the nucleus and the outermost shell containing electrons of atom is called atomic radius. The atomic radius of more than one atom is called atomic radii.

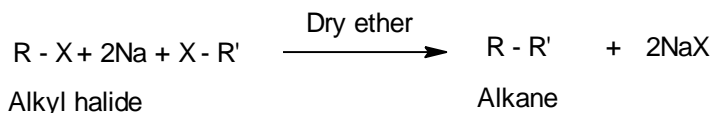
Ans. 8) Amount of energy required to remove the most loosely bonded valence electron from isolated neutral gaseous atom of an element is called ionization energy.

Ans. 9) All of the measured digits in a determination including the last uncertain digit are called significant figures. It refers to the digits in a measured or computed number that are meaningful.

Ans. 10) A process in which a symmetrical bond cleavage takes place as a result each atom acquires one electron is called homolytic bond cleavage. For example-



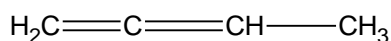
Ans. 11) The higher alkanes are produced by heating alkyl halides with sodium metal in dry ether. Two molecules of the alkyl halides loss their halogen atoms as NaX. The net result is the joining of two alkyl groups to a symmetrical alkanes (R-R type) having an even number of carbon atoms.



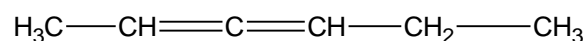
Where, R = R' = alkyl group

Ans. 12) A diene in which If the double bonds are adjacent to each other, then that diene is called cumulated diene.

For example –



1, 2 - Butadiene



2, 3 - Hexadiene

### PART – B

Answer **any nine** of the following questions. Each question carries **six** marks. (9 x 6 = 54)

Ans. 13) a) i) Given that  $\log 3=0.4771$ ,  $\text{Log } 81 = \text{Log } (3 \times 3 \times 3 \times 3)$

$$= \text{Log } 3^4$$

$$= 4\text{Log } 3 \quad \because \text{By Log property}$$

$$= 4 \times 0.4771$$

$$\therefore \text{Log } 81 = 1.9084$$

ii) A function  $y = f(x)$  is said to be maximum if  $\frac{d^2y}{dx^2} < 0$  (negative value)

A function  $y = f(x)$  is said to be minimum if  $\frac{d^2y}{dx^2} > 0$  (positive value)

b) The number of quantities in thermodynamics whose change in value independent on the path called state functions and these are called exact differential or perfect differential. For example - Enthalpy, internal energy, entropy, free energy, etc

Ans. 14) a) The expression of most probable velocity can be obtained by differentiating Maxwell – Boltzmann equation with respect to velocity C and equating the result to zero.

From Maxwell – Boltzmann equation

$$\frac{dN_C}{N} = 4\pi \left(\frac{M}{2\pi RT}\right)^{3/2} e^{-\frac{MC^2}{2RT}} C^2 dc$$

$$\frac{1}{N} \frac{dN_C}{dc} = 4\pi \left(\frac{M}{2\pi RT}\right)^{3/2} e^{-\frac{MC^2}{2RT}} C^2, \quad \because \frac{1}{N} \frac{dN_C}{dc} = \text{molecular probability}$$

Differentiating this equation w. r. t. c

$$\frac{d\left[\frac{1}{N} \frac{dN_C}{dc}\right]}{dc} = 4\pi \left(\frac{M}{2\pi RT}\right)^{3/2} \left[ 2C e^{-\frac{MC^2}{2RT}} + C^2 e^{-\frac{MC^2}{2RT}} \left(-\frac{2MC}{2RT}\right) \right]$$

$$= 4\pi \left(\frac{M}{2\pi RT}\right)^{3/2} \left[ C e^{-\frac{MC^2}{2RT}} \left(2 - \frac{MC^2}{RT}\right) \right]$$

Since at the peak of any curve  $\frac{d\left[\frac{1}{N} \frac{dN_C}{dc}\right]}{dc} = 0$

$$\therefore 4\pi \left(\frac{M}{2\pi RT}\right)^{3/2} \left[ C e^{-\frac{MC^2}{2RT}} \left(2 - \frac{MC^2}{RT}\right) \right] = 0$$

$$\Rightarrow 4\pi \left(\frac{M}{2\pi RT}\right)^{3/2} \neq 0$$

Hence  $C e^{-\frac{MC^2}{2RT}} \left(2 - \frac{MC^2}{RT}\right) = 0$

i. e.  $\left(2 - \frac{MC^2}{RT}\right) = 0$

$$\therefore C^2 = \frac{2RT}{M}$$

Hence, most probable velocity  $C_{mp} = \sqrt{\frac{2RT}{M}}$

b) Given that  $M_{CO_2} = 12 + 2(16) = 44 \text{ g} = 44 \times 10^{-3} \text{ kg}$ ,  $T_{CO_2} = 310 \text{ K}$ ,

$$R = 8.314 \text{ KJmol}^{-1}, \quad \bar{C} = ? \quad \bar{C} = \sqrt{\frac{8RT}{\pi M}}$$

$$= \sqrt{\frac{8 \times 8.314 \times 310}{3.14 \times 44 \times 10^{-3}}}$$

$$\therefore \bar{C} = 386.31 \text{ ms}^{-1}$$

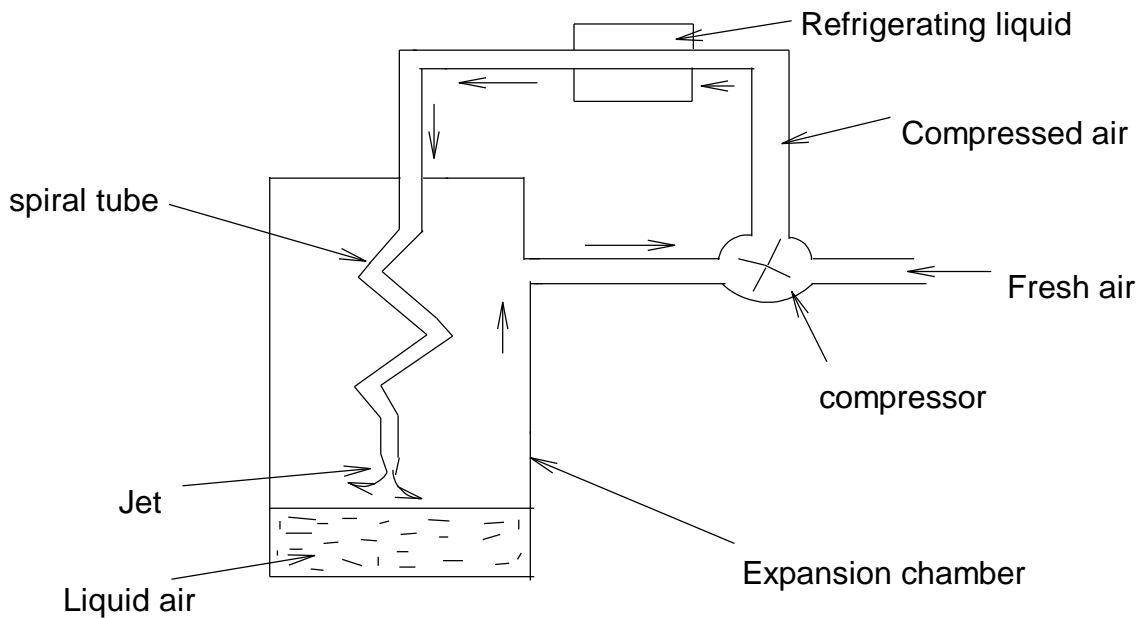
Ans15. a) For liquefaction of any gas, the following conditions are to be maintained

- 1) The gas must be pure and dry.
- 2) The gas must be cooled below its critical temperature

3) The pressure applied be sufficiently large to cause liquefaction. The pressure required to liquefy a gas is maximum at its critical temperature and decreases as the temperature is lowered.

Linde used Joule Thomson effect as the basis for the liquefaction of gases. When a compressed gas is allowed expand into vacuum or a region of low pressure, it produces intense cooling. In a compressed gas the molecules are very close and the attractions between them are appreciable. As the gas expands, the molecules move apart. In doing so, the intermolecular attraction must be overcome. The energy for it is taken from the gas itself which is thereby cooled.

Linde used an apparatus worked on the above principle for the liquefaction of air shown in figure. Pure dry air is compressed to about 200 atmospheres. It is passed through a pipe cooled by a refrigerating liquid such as ammonia. Here, the heat of compression is removed. The compressed air is then passed into a spiral pipe with a jet at the lower end. The free expansion of air at the jet results in a considerable drop of temperature. The cooled air which is now at about one atmosphere pressure passed up the expansion chamber. It further cools the incoming air of the spiral tube and returns to the compressor. By repeating the process of compression and expansion, a temperature low enough to liquefy air is reached. The liquefied air collects at the bottom of the expansion chamber.



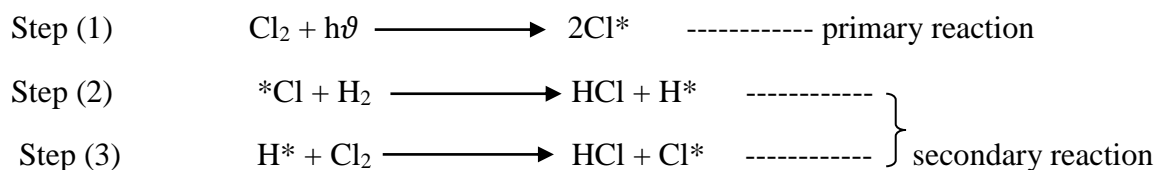
b) The number of collisions experienced by a single gas molecule with other gas molecules per second and per c.c. is called collision number. It is denoted by  $Z_1$

i. e.  $Z_1 = \sqrt{2} \pi \bar{C} \sigma^2 N$        $\sigma =$  molecular diameter

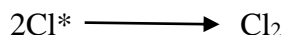
In SI unit collision number is measured in per second ( $s^{-1}$ )



Ans16.a) Combination of hydrogen and chlorine is the example of photochemical chain reaction. A mixture of hydrogen and chlorine is exposed to light of wavelength less than  $4000\text{\AA}$ . The hydrogen and chlorine react rapidly to form hydrogen chloride. In the primary step, a molecule of chlorine absorbs a photon and dissociates into two Cl atoms. This is followed by the secondary reactions stated below-



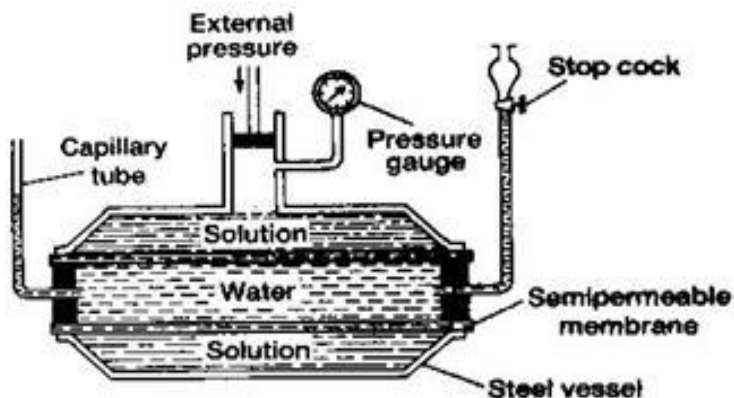
The Cl atom used in step (2) is represented in step (3). Thus the (2) and (3) constitute a self propagating chain reaction. This produces two molecules of HCl in each cycle. Thus one photon of light absorbed in step (1) forms a large number of HCl molecules by repetition of the reaction sequence (2) and (3). The chain reaction terminates when the Cl atoms recombine at the walls of the vessel where they lose their excess energy.



The number of HCl molecules formed for a photon of light is very high. The quantum yield of the reaction varies from  $10^4$  to  $10^6$

b) Chemical sensors are devices work like transistors, and convert one form energy into another, used in the field of microelectronics and optoelectronics. They bring changes in i) colour ii) conductivity iii) potentials and iv) ejection of photoelectrons as long as light falls on them. For example- Photo cells, thermocouples, photographic plates, photoconductivity cells, fire alarms, auto exhaust, on and off switches, etc.

Ans17. a) The apparatus consist of two concentric tubes; the inner one contains a semi-permeable membrane of copper ferrocyanide and contains the pure solvent. The outer tube made of gun metal is provided with a piston to which a pressure gauge is attached. The inner tube is connected to a capillary tube at one end and a reservoir of pure solvent at the other end as shown in figure.



The solution whose osmotic pressure is to be determined is placed inside the outer tube. The level of the solvent in the capillary tube falls down when osmosis starts. A pressure is applied

slowly and the solvent level in the capillary tube is observed. The pressure at which the movement of the solvent level in the capillary tube is just reversed is noted down from the range which is taken as the osmotic pressure. This gives the osmotic pressure ( $\pi$ ).

We know that, osmotic pressure,  $\pi = CRT$

If  $w$  is the mass of the solute dissolved in  $V$  dm<sup>3</sup> of the solution and has molecular mass  $m$ , then  $n = \frac{w}{m}$  and  $C = \frac{w}{mV}$

$$\therefore \pi = \frac{wRT}{mV}$$

And

$$m = \frac{wRT}{\pi V}$$

By knowing the osmotic pressure ( $\pi$ ) of the solution at temperature  $T$ , the molar mass of the non-volatile solute can be calculated.

b) Differences between ideal and non ideal solutions

Ideal solution	Non- ideal solution
1) It obeys Raoult's law at all concentrations and at all temperatures.	1) It does not obey Raoult's law at all concentrations and at all temperatures.
2) Enthalpy of solution not change on mixing i.e. $\Delta H_{mix} = 0$	2) Enthalpy of solution change on mixing i.e. $\Delta H_{mix} \neq 0$
3) Volume of solution not change on mixing i.e. $\Delta V_{mix} = 0$	3) Volume of solution change on mixing i.e. $\Delta V_{mix} \neq 0$
Ex. Solution of benzene and toluene.	Ex. Solution of water and sulphuric acid

Ans18.a) The following factors which affect viscosity of liquid are

- i) Temperature: The viscosity of a liquid decreases rapidly with increasing temperature because with it the fraction of the molecules having more than a given amount of kinetic energy increases rapidly.
- ii) Size and weight of molecules: Viscosity of a liquid increases with increase in size and weight of liquid molecules because surface area increases
- iii) Shape of molecules: Viscosity of a liquid increases as the branching in the chain of molecules increases
- iv) Intermolecular forces: As intermolecular forces increases in the liquid viscosity of the liquid increases. For example – water having more viscous compare to benzene due to intermolecular hydrogen bonding takes place in water.

b) A mixture of liquid in liquid boils at constant temperature and distils over completely at the same temperature without change in composition is called constant boiling mixture or azeotropic mixture.

For example- mixture of water and ethanol, mixture of water and n-propanol.

Ans19.a) Let us consider a liquid mixture of two liquids A and B with partial pressure  $p_1$  and  $p_2$ . Let the number of moles of these liquids be  $n_1$  and  $n_2$  and  $w_1$  and  $w_2$  be the corresponding weights. Molecular mass liquid A be the  $M_1$  and liquid B be the  $M_2$ .

The number of molecules of each component in the vapour will be proportional to its vapour pressure.

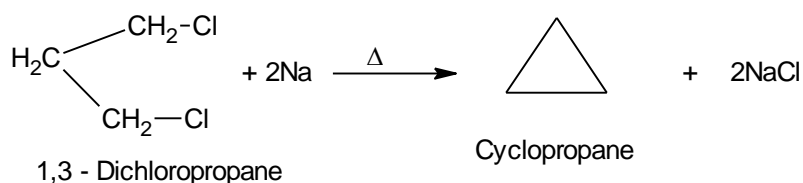
Hence 
$$\frac{n_1}{n_2} = \frac{p_1}{p_2}$$

but, 
$$n = \frac{w}{M}$$

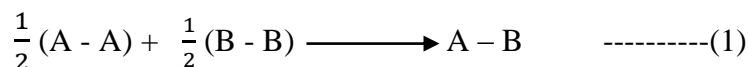
$$\frac{w_1/M_1}{w_2/M_2} = \frac{p_1}{p_2}$$

$$\frac{w_1}{w_2} = \frac{p_1 M_1}{p_2 M_2}$$

b) When 1,3-dichloropropane is heated with sodium or zinc to form cyclopropane.



Ans19. a) Pauling defined electronegativity as the power of an atom in a molecule to attract the bonding pair of electrons to itself. He calculated electronegativities of different elements from thermodynamic data. He considered that in a reaction of the type



The bond dissociation energy of A – B is higher than the mean of the bond dissociation energy of (A – A) and (B – B) bonds and that their difference ( $\Delta$ ) is related to the difference in the electronegativities of A and B according to the following empirical equation.

$$\Delta = E_{\text{A-B}} - \frac{1}{2}(E_{\text{A-A}} + E_{\text{B-B}}) = 23(\chi_{\text{A}} - \chi_{\text{B}})^2 \quad \text{-----(2)}$$

Where  $E_{\text{A-B}}$ ,  $E_{\text{A-A}}$  and  $E_{\text{B-B}}$  represent the bond dissociation energies of A – B, A – A and

B – B bonds, respectively and  $\chi_A$  and  $\chi_B$  denote the electronegativities of A and B, respectively.

$$\text{Thus } \Delta = 23(\chi_A - \chi_B)^2 \quad \text{-----(3)}$$

$$\text{OR } \chi_A - \chi_B = 0.208 \sqrt{\Delta} \quad \text{----- (4)}$$

Pauling later took geometric mean instead of the arithmetic mean of  $E_{A-A}$  and  $E_{B-B}$  and suggested the following empirical correction.

$$E_{A-B} - \frac{1}{2}(E_{A-A} \times E_{B-B})^{1/2} = \Delta' = 30(\chi_A - \chi_B)^2 \quad \text{-----(5)}$$

$$\therefore \chi_A - \chi_B = 0.182 \sqrt{\Delta'} \quad \text{-----(6)}$$

This equation (6) is used to determine the electronegativity

b) As the atomic number of halogens increases, the principle quantum number also increases the attractive force between the nucleus and electrons present in valency shell decreases. Hence atomic radii of halogens increases

Ans20. a) Be and Al show diagonal relationship because of the following reasons-

- i) Polarizing powers of  $\text{Be}^{2+}$  and  $\text{Al}^{3+}$  are of similar magnitude
- ii) The standard oxidation potentials of Be and Al are quite close to each other
- iii) Both Be and Al metals dissolve rapidly in 3M  $\text{H}_2\text{SO}_4$  but very slowly in nitric acid in which the metals are rendered passive due to formation of an inert film of oxide on the surface of metal.
- iv) Be and Al both react with strong alkalis liberating hydrogen and forming beryllate and aluminate ions.
- v) Oxides and hydroxides of both the metals are amphoteric in nature.

b) The general electronic configuration of alkali metals -  $nS^1$

and alkaline earth metals -  $nS^2$ , Where n = Principle quantum number

Ans21. a) Given that mass of KOH (w) = 75.5g, Volume of solution (v) = 540  $\text{cm}^3$ , Molarity of

KOH = ?, Molecular mass of KOH (M) = 39+16+1 =56g

$$\text{Now, Molarity of KOH} = \frac{\text{Mass of KOH} \times 1000}{\text{Molecular mass of KOH} \times \text{Volume of solution}}$$

$$= \frac{w \times 1000}{56 \times 540}$$

$$= \frac{75.5 \times 1000}{56 \times 540}$$

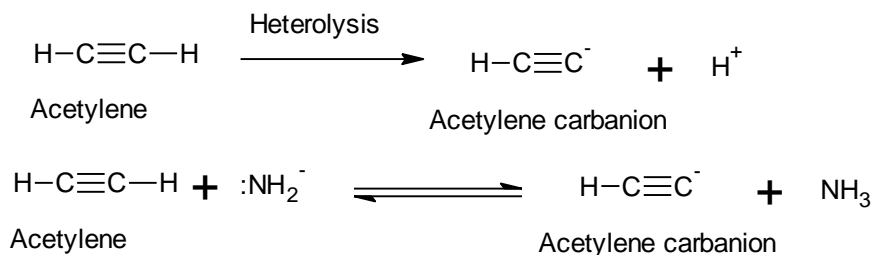
$$\therefore \text{Molarity of KOH} = 2.496\text{M}$$

b) The ratio of molecular mass of oxidizing agent to its oxidation number is called equivalent mass of oxidizing agent.

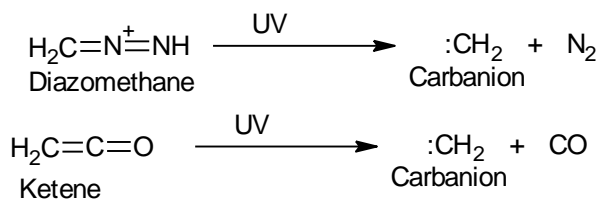
Mathematically,

$$\text{Equivalent mass of oxidizing agent} = \frac{\text{Molecular mass of oxidizing agent}}{\text{Oxidation number}}$$

Ans22. a) i) Carbanion is a negatively charged carbon atom which is generated by heterolytic bond cleavage of unsymmetrical molecule

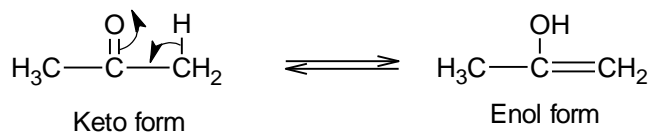


ii) Carbene is neutral species having a carbon atom with two bonds and two electrons which is generated by decomposition of diazomethane or ketene in presence of UV light

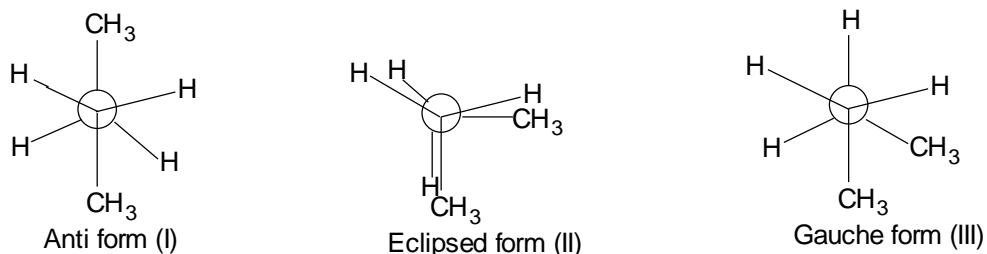


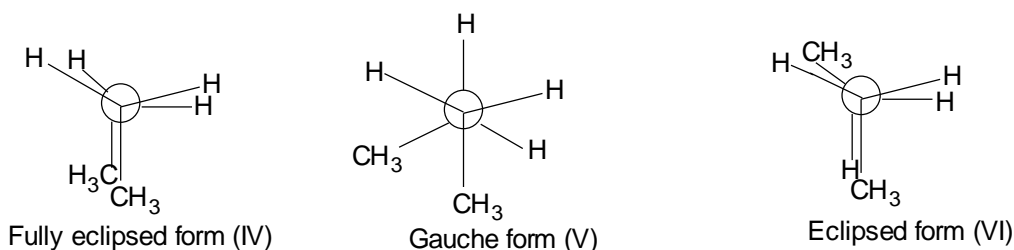
b) When two structural isomers are mutually inter-convertible and exist in dynamic equilibrium, they are called Tautomers and the phenomenon is called Tautomerism.

For example, acetone exhibits tautomerism and may be represented as an equilibrium mixture of two isomers.



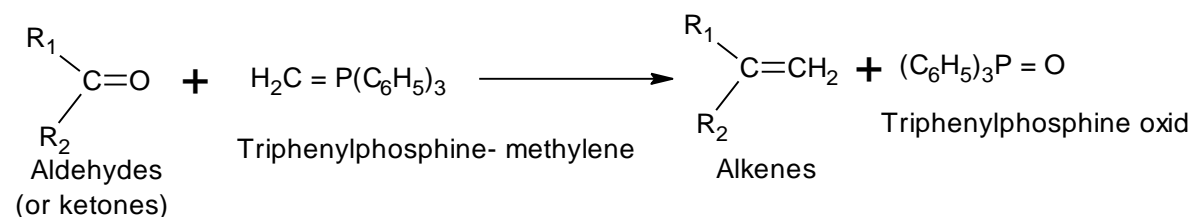
Ans23. a) n – Butane is a somewhat complex molecule from the standpoint of conformation because there are three carbon – carbon single bonds (one central and two terminal) around which rotation can take place. If we consider rotation about the central carbon – carbon bond C<sub>2</sub> – C<sub>3</sub>, the situation is quite similar to that in the case of ethane, except that n –butane molecule has more than one staggered and eclipsed conformations. Staggering or eclipsing in these conformations may be complete or partial as shown below.





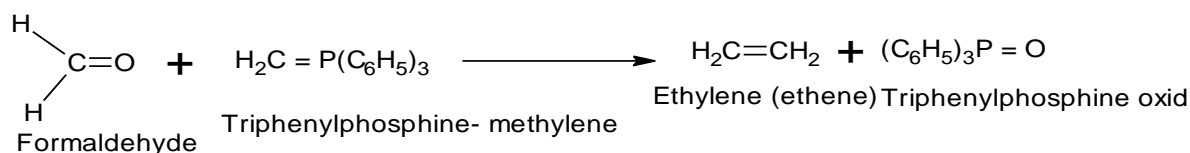
The completely staggered conformation (I) called the anti form shows the methyl groups as far apart as possible. Assuming that the angle of rotation about the central C<sub>2</sub>–C<sub>3</sub> bond is zero for conformation I, if we rotate one of the C<sub>2</sub> or C<sub>3</sub> carbon atoms through an angle of 60°, the eclipsed form (II) appears. In conformation (II) the methyl group attached to one carbon is at the back of hydrogen, rather than the methyl group attached to the other carbon. Rotation by another 60° leads to a staggered conformation (III) also called gauche form, in which the two methyl groups are only 60° apart. Further rotation by 60° gives rise to the fully eclipsed conformation (IV). On further rotation by 60° the gauche form (V) appears in which the two methyl groups are again 60° apart. Still further rotation by 60° leads to the eclipsed form (VI). If we rotate (VI) by another 60° thereby completing a rotation of 360°, we return to the anti form (I).

b) Wittig reaction involves the preparation of olefins by the interaction of aldehydes or ketones (aliphatic or aromatic) with triphenylphosphine -alkylidines.



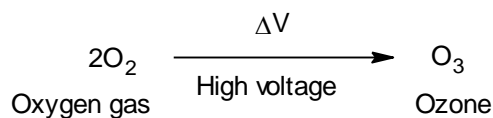
Where, R<sub>1</sub> = R<sub>2</sub> = H or alkyl group

For examples 1) When R<sub>1</sub> = R<sub>2</sub> =H

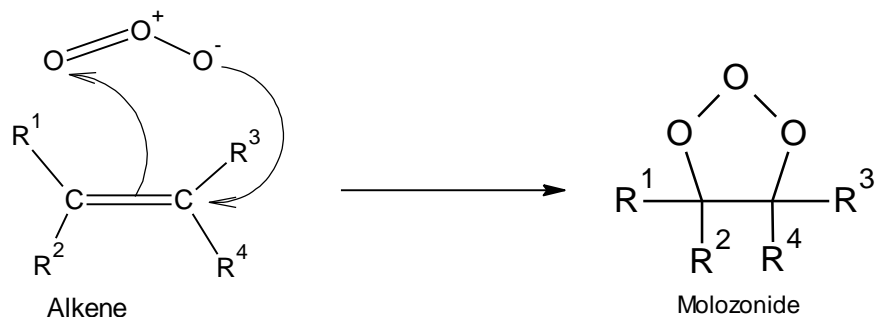


Ans25. a) Mechanism of ozonolysis of alkenes takes following steps

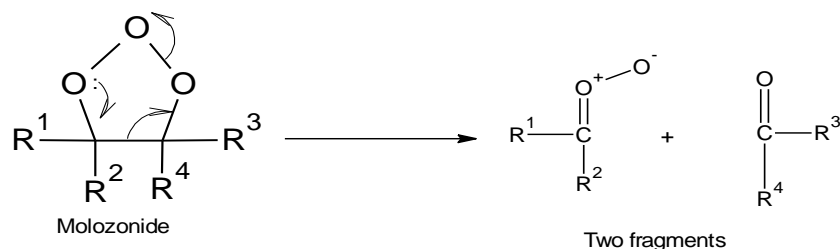
1) Oxygen gas is exposed to high voltage to form ozone (O<sub>3</sub>):



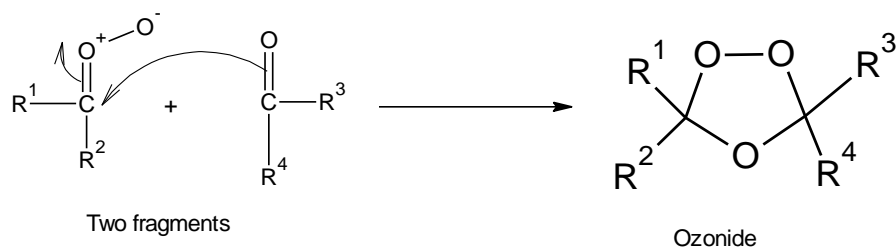
2) Ozone reacts with the alkenes to form a molozonide intermediate.



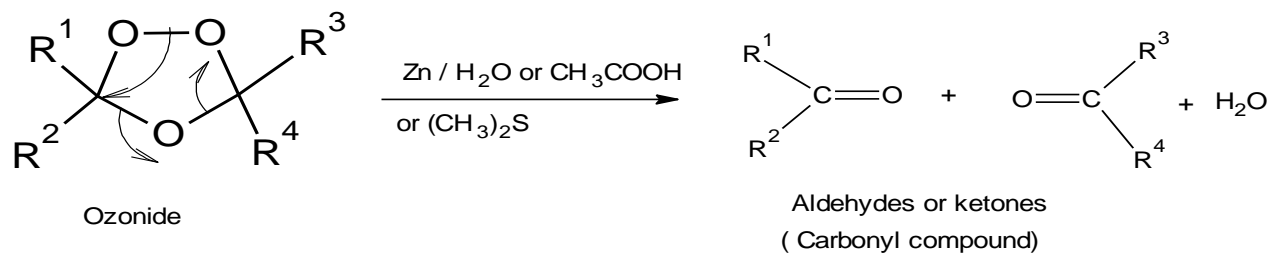
3) The molozonide intermediate then breaks down into two fragments.



4) These two fragments then rearrange to form an ozonide intermediate



5) Reduction of the ozonide with reducing agent (zinc in dimethylsulphide) then results in cleavage of the ozonide into two carbonyl compounds.



b) Limitations of Baeyer's strain theory:-

i) This theory fails to explain the stability of cyclohexane and other higher membered of cycloalkane.

ii) This theory fails to explain why the ethylenic bond formed readily instead of formation of cycloalkane.

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