D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1
DEPARTMENT OF CHEMISTRY (UG)
General Chemistry-II
Unit – I   Section A

1. What is meant by ionic bond?
2. What are the conditions for the formation of ionic bond?
3. What is meant by hydration energy?
4. What is meant by solvation energy?
5. Define lattice energy.
6. Why ionic solids conduct electricity in the molten state?
7. What is meant by polarization of ions?
8. What is meant by polarity of bonds?
9. What are the different types of orbital overlap?
10. What is meant by bond length?
11. What is meant by sigma and pi bond?
12. Write the geometry of NH_3 molecule.
13. Write the geometry of H_2O molecule.
14. What are bonding orbitals?
15. What are anti bonding orbitals?
16. What is meant by bond order?
17. Calculate the bond order for He_2 molecule.
18. Calculate the bond order for CO molecule.
19. Calculate the bond order in O_2^- molecule.

Section – B

1. What are the characteristic properties of ionic bond?
2. Explain Born Haber Cycle.
3. Write the different types of overlap and the formation of sigma and pi bond.
4. Discuss the geometry of ClF_3 and Pcl_5 molecule.

5. Write the partial ionic character of a covalent molecule based on dipole moment data.
6. Draw the MO diagram for O_2 molecule.
7. Give the similarities and differences between valence bond and molecule orbital bonds.

Section – C

1. How will you calculate lattice energy by means of Born Haber cycle?
2. State and explain Fajan's rule.
3. What are the conditions for the formation of covalent bond?
4. Based on VSEPR theory, predict the geometry of H_2O, NH_3 and PCl_5 molecules.
5. Based on MOT theory explain why O_2 molecule is paramagnetic in nature?

Unit – II   Section – A

1. What are alkali metals?
2. Write the occurrence of Li metal.
3. What is meant by diagonal relationship?
4. Write the diagonal relationship between Li and Mg.
5. Write the flame colouration of alkali metals.
6. What are alkaline earth metals?
7. Write the occurrence of Be metal.
8. Which is more reducing Li or Na? Why?

Section – B

1. Write the diagonal relationship between Li and Mg.
2. How Li is extracted from its ore?
3. Write the exceptional property of Li.
4. Write the exceptional property of Be.
5. How be is extracted from its ore?
6. Show the diagonal relationship between Be and Al.

Section – C

1. Write a comparative study of oxides, halides, hydroxides and carbonates of alkali metals.
2. Write the extraction of Li metal.
3. Write a comparative study of the elements with respect to oxides, hydroxides, halides and sulphates of alkaline earth metals.
4. Write the extraction of Berylium.

Unit – III   Section – A

1. What are ideal gases?
2. What are real gases?
3. What is meant by Boyle's temperature?
4. Define inversion temperature.
5. State Boyle's law.
6. State Charles' law.
7. Write Graham's law of diffusion.
8. Write Avagadro's law.
9. Write the expression for RMS velocity.
10.   What is meant by equipartition of energy?
11.   State Joule's law.
12.   Define Joule- Thomson effect.

Section – B

1. Derive Boyle's law and Charles' law from kinetic gas equation.
2. Derive the relationship between RMS velocity and most probable velocity.
3. Derive the relationship between RMS velocity and average velocity.
4. Discuss the postulates of kinetic theory of gases.
5. Explain Joule – Thomson effect.
6. Derive an expression for Joule – Thomson coefficient.
7. Write notes on Boyle's law and ideal gas equation.

Section – C

1. Write notes on Maxwell's distribution of molecular velocities. Define Boyle's law and Charles' law

2. Derive an expression for kinetic gas equation.

3. Discuss Joule Thomson effect, Joule -Thomson coefficient and its derivation.

4. Write notes on virial equation of state, inversion temperature and Joule's law.

5. Derive gas laws from kinetic gas equation.

6. Give the expressions for average velocity, most probable velocity and rms velocity and give the relation between them.

UNIT – IV   Section – A

1. Write the structural formula for the following: Neopentane and 2,2-dimethyl butane.

2. Write the general molecular formula of alkanes, alkenes and alkynes.

3. What is Markownikoff's rule?

4. What is meant by peroxide effect?

5. What are alkynes? Give example.

6. Name the following: $CH_2= CH\ CH= CH\ CH_2\ CH= CH\ CH_3$ and

   $(CH_3)_2\ C = CH_2$

Section – B

1. Discuss the mechanism of free radical substitution in alkanes.

2. What happens when propylene is treated with HI in presence and absence of peroxide?

3. Write short notes on the reactions which are used to detect the position of double bonds.

4. Write notes on the allyic substation by NBS.

5. Write notes on ozonalysis.

6. Discuss the acidity of alkynes.

7. Explain the addition of water to alkynes with mercuric sulphate catalyst.

Section – C

1. Write notes on hydroboration, hydroxylation with $KMnO_4$ and ozonalysis.

2. What happens when propylene is treated with sulphuric acid, water, halogen and HX?

3. Write notes on Markownickoff's rule and peroxide effect.

4. (i). Discuss the acidic nature of acetylene.

   (ii) How will you prepare the following? n- Propyl bromide from propene, Allyl chloride from propyne and Glycol from ethylene.

5. Write down the structural formula of olefins from which the following products are obtained on ozonalysis: ethylmethylketone and propanaldehyde, formaldehyde only.

Unit – V   Section – A

1. What is Grignard regent?

2. What happens when glycerol is oxidized?

3. What is LTA?

4. How will you prepare allyl alcohol?

5. What is Wurtz reaction?

6. What is meant by Dieckmann's condensation?

7. What are cycloalkanes? Give example.

8. What are alicyclic compounds? Give example.

9. How will you convert benzene to cyclohexane?

10. What happens when cyclopentanone is reduced?

11. What is the action of heat on calcium adipate?

12. What happens when 1, 4- Dibromobutane is treated with sodium?

13. How is cyclohexane prepared from benzene?

Section – B

1. What is meant by oxymercuration reaction?

2. Write notes on theory of strainless rings.

3. Complete the reaction:

   I. $\longrightarrow$ Cyclopropane + Chlorine

   II.   _____ Cyclopropane + Br_2

4.   Describe Sashase Mohr theory of strainless rings.

5. Explain hydroboration reaction and its application.

6. Write notes on ozonalysis and oxidation with $KMnO_4$ reaction of olefins.

Section – C

1. Give the preparation and properties of allyl alcohol.

2. Show how Bayer's strain theory accounts for the relative stability of cycloalkanes.

3. Discuss the substitution and ring opening reactions of cycloalkanes.

4. How the stability of cycloalkanes is explained on the basis of Baeyer strain theory?

5. Explain why:

   (i) Angle strain for cyclopropane is more than that of cyclobutane.

   (ii) Cyclohexane is more stable than cyclopentane.