**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**

**B.Sc. CHEMISTRY– II SEMESTER**

**SEMESTER EXAMINATION: APRIL 2019**

**CH215 : Chemistry-II**

Time- 2 ½ hrs Max Marks-70

**This paper contains two printed pages and three parts**

**PART-A**

**Answer any SIX questions: 6x 2 = 12 marks**.

1. Define ‘mean free path’.
2. State group displacement law.
3. Write one chemical equation each representing acid -base reaction in liquid ammonia and liquid HF.
4. What are differentiating solvents? Explain with an example.
5. The half life period of a reaction becomes one fourth of the initial value when the concentration of the reactant is doubled. Calculate the order of the reaction.
6. Give two examples each for path dependent and path independent functions.
7. Define the terms: (i) plane of symmetry (ii) axis of symmetry
8. What are constitutional isomers? Give one example.

**PART-B**

**Answer any EIGHT questions: 6x 8 = 48 marks**

1. (a)What is Joule Thomson effect? What is its practical application?

(b)Draw the Andrew’s curves for the isotherms of carbon dioxide. Explain the important features of the curves. (3+3)

1. (a)What is mass defect? How is it related to the binding energy?

(b) Describe the viscosity method of determining molecular weight of polymers. (2+4)

1. (a)What is meant by radioactive equilibrium?

(b)Explain with a suitable example the application of radio isotopes in medicine, agriculture and archeology.

1. Explain the Bronsted-Lowry, Lewis and Pearson concepts of acids and bases with suitable examples.
2. (a) What are the criteria for the selection of non aqueous solvents for chemical reactions?

(b)What are the advantages of liquid ammonia as a solvent. (3+3)

1. (a) Derive an expression for the work done during isothermal reversible expansion of an ideal gas.

(b) Classify the following as intensive and extensive properties: pressure, density, molar heat capacity and volume. (4+2)

1. Derive an expression for the rate constant of a second order reaction when initial concentrations of reactants are different.
2. Explain the crystal structures of (i) NaCl and (ii) CaF2
3. ( a) Draw the structures of all possible stereo isomers of tartaric acid. Identify the enantiomeric and diastereomeric pairs.

( b) Assign E or Z configuration to the following compounds. Explain the basis of your assignment.

 (3+3)

1. (a) What is resolution? Explain the principle of chemical method of resolution.

(b) Calculate the angle strain involved in cyclopropane, cyclobutane and cyclopentane. (3+3)

**PART-C**

**Answer any TWO questions: 2x 5 = 10 marks**

1. Calculate work done and internal energy change when one mole of water at 100o C and 101.3 kNm-2 becomes steam. Assume steam to behave ideally ( density of water at 100oC = 1 g/cm3 , R=8.314 JK-1mole-1 )
2. The rate constant of a second order reaction at 25oC and 40oC are 5.7x10-5 dm3mol-1s-1 and 1.64x10-4 dm3mol-1s-1. Calculate the activation energy and pre-exponential factor.
3. What structural requirements are needed for an allene derivative to exhibit enantiomerism? Write structures of any two allene derivatives containing a chiral axis.

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