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Dr.R.M.L.Avadh University **Mark- 50**

B.Sc. IIIrd year

Year 2008

Paper I: General Chemistry, Molecular Spectroscopy and Analytical chemistry

Note-Answer any three questions from Section-A and five questions from Section-B

.Section-A

1- A) What are the possible symmetry elements and symmetry operations for a molecule belonging to C2v point group? 5 mark

B) Construct a group multiplication table for C_{2v} point group taking H_2O as An example. 5-marks

2. A) Explain isotopic exchange and kinetic method for the determination of organic and Inorganic reaction mechanism. 5-mark

B) Draw Orgel energy level diagram for d1 state. Give its utility 5-mark

3. Discuss the vibrational spectrum of a diatomic molecule taking it as a simple harmonic Oscillator. What is zero point energy? 10-mark

4. A) What is Raman spectrum? Name the different types of lines present in it and explain The reasons for observing this lines.5-mark

B) Which of the following molecules would give you pure rotational Raman spectrum? 5-mark

H_2, H_2O, CH_4, N_2, SF_6

5. A) What do you mean by the term chemical shift? Name the various factors on which the value of chemical shift depends. Discuss in detail. 10-marks

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Section -B

1. Explain the principle of microwave spectroscopy. What is selection rule? 4-mark

2. What do you mean by shielding and deshielding of protons? 4-marks

3. Discuss the reasons and effects of pollution caused by oxides of

   Carbon and sulphur. 4-mark

4. Discuss the separation of metal ions by paper chromatography. 4-mark

5. How will you distinguish between following pairs of compounds on the basis of IR spectroscopy?- 2+2 =4mark

   I. Ethyl Alcohol and Diethyl Ether

   II. Acetic Acid and Ethyl Acetate

6. What are electromagnetic radiations? Give different regions of Electromagnetic Spectrum along with their frequency range. 4-mark

7. What are stokes and Antistokes lines? Why is the intensity of stokes lines is generally greater than antistokes lines. 4-mark

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