

Dr.R.M.L.Avadh University

Mark- 50

B.Sc. IIIrd year

Year 2008

**Paper I: General Chemistry, Molecular Spectroscopy and Analytical chemistry**

**Note-**Attempt Question No. 1 which is compulsory and four more from the rest .Marks allotted to each question are given against it.

- 1- A) What are common toxic elements? Discuss their effects in the environment. 1-mark
- B) Discuss the number of different symmetry elements in benzene molecule. 1-mark
- C) Explain how monuments are damaged by pollutants. 1-mark
- D) Explain how some nuclear disintegrations become self-sustaining. 1-mark
- E) How do kinetic methods determine the reaction mechanism? 1-mark
- F) State Born-Oppenheimer approximation. 1-mark
- G) How is I.R spectroscopy employed for watching the progress of a chemical change? 1-mark
- H) What is isotope effect in rotational spectra? 1-mark
- I) Is melting point true criteria of purity of a substance? 1-mark
- J) Explain in brief the shielding and deshielding of protons. 1-mark
2. What is electromagnetic radiation? Describe the various regions of electromagnetic radiation concerned with the corresponding spectroscopic techniques. 10-mark
3. Discuss the rotational spectrum of a diatomic rigid rotor. How is the bond-length of a molecule determined by it? 10-mark
4. A) Write down the types of electronic transitions and selection rules for d-d transitions.5-mark
- B) Discuss the electronic spectrum of  $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$  complex. 5-mark

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5. A) What is the basic principle of thin layer chromatography? Describe its applications. 5-mark
- B) State Lambert-Beer<sup>cs</sup> law and give the applications of Colorimetric analysis. 5-mark
6. What are Raman spectra? Discuss the origin of Raman lines. 10-mark
7. What are radio isotopes? How are they separated? Give their applications. 10-mark
8. What are the symmetry operations? Explain them with suitable examples. 10-mark
9. What do you mean by chemical shift? Discuss the PMR spectra of ethyl bromide. 10-mark
10. Write short notes on any four of the following-  $2.5+2.5+2.5+2.5=10$  mark
- A) Photochemical pollutants
  - B) Degree of freedom
  - C) Polarisability of molecule
  - D) Franck –Condon Principle
  - E) Polarography and its applications.

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