D.K.M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1

SPECTROSCOPY(12CCH6D)

UNIT-I SECTION-A 2 marks

1. Define Molecular Spectroscopy.
2. State Lambert's law
3. State Beer's law
4. What is meant by auxochrome?
5. What do you mean by absorption spectrum?

SECTION-B 5 marks

1. Explain (a) Emission spectrum (b) Absorption spectrum.
2. Write note on chromophores & auxochromes.
3. Explain the factors governing absorption maximum and intensity.
4. Discuss the different types of electronic transitions.

SECTION-C 10 marks

1. Explain the instrumentation of UV spectrophotometer.
2. Explain briefly on electronic transitions with suitable examples.
3.(i) Explain the factors governing λ_{max} & ϵ_{max}.
(ii) Define the terms: Chromophore & Auxochrome.
4. Explain in detail about the double beam spectrophotometer with description of components.

UNIT-II SECTION-A 2 marks

1. What is the essential condition for a molecule to have infrared spectrum?
2. Define anti stokes lines.
3. What is Rayleigh scattering?

4. State Hooke's law
5. What are the differences between the Rayleigh and Raman scattering?

SECTION-B 5 marks

1. Distinguish between IR & Raman spectroscopy.
2. Illustrate mutual exclusion principle.
3. How will you identify aldehyde & ketone molecules in IR spectra?
4. Discuss about sampling techniques in IR spectroscopy.
5. What are the factors affecting vibrational frequencies.

SECTION-C 10 marks

1. Describe the sampling techniques in IR spectroscopy.
2. (i) Discuss the instrumentation of Raman spectroscopy with block diagram
   (ii) Identify the aldehydes & ketones by using IR spectroscopy.
3. Describe the instrumentation of IR spectroscopy with all the components.

UNIT-III SECTION-A 2 marks

1. What is base peak?
2. State Nitrogen rule.
3. What is a metastable peak?
4. State ring rule with an example.
5. What is isotopic peak?

SECTION-B 5 marks

1. Explain the factors influencing the fragmentation.
2. Describe the instrumentation of mass spectrometer.
3. Discuss about metastable ion.

4. How will you determine the molecular formula of a compound using mass spectroscopy?

SECTION-C 10 marks

1. Explain the following (i) Molecular peak (ii) Isotopic peak (iii) Metastable peak.
2. Explain different fragmentation patterns with examples.
3. Discuss the mass spectra of (i) Alkene (ii) Branched alkane.
4. Explain the basic principle and instrumentation of mass spectroscop

UNIT-IV SECTION-A 2 marks

1. Define Chemical shift.
2. How many NMR peaks are obtained for toluene?
3. Write the principle behind NMR spectroscopy.
4. Mention the number of NMR signals in (a) Methane (b) Methyl alcohol
5. What is meant by coupling constant?

SECTION-B 5 marks

1. Explain spin-spin coupling.
2. Explain the basic instrumentation of NMR spectroscopy.
3. Represent the NMR spectrum of 1,1,2-tribromo methane & acetophenone.

SECTION-C 10 marks

1. Describe the NMR spectra of the following (i) Ethyl alcohol (ii) acetaldehyde.
2. Discuss the NMR spectrum of any five simple organic components.
3. Describe the basic instrumentation of NMR spectroscopy with all the components.

UNIT-V SECTION-A 2 MARKS

1. Calculate the media for 10.20; 10.02 and 10.08.
2. What is a computer?
3. Write the basic principle of ESR spectroscopy.
4. What are the different types of computers?

5. Calculate mean deviation.

SECTION-B 5 marks

1. Mention the applications of computers in chemistry.
2. How will you calculate (i) Mean deviation (ii) Standard deviation?
3. Write the characteristic of computers.
4. Explain in detail about the calculations of statistical data-sum, average & median deviation.
5. Explain the principle of ESR spectroscopy.

SECTION-C 10 marks

1. (i) Explain briefly on the applications of computers in chemistry.
(ii)List the applications of ESR.

2. Write the various applications of ESR spectroscopy.

3. (i)Explain the characteristic of a computer
(ii)Define average and standard deviation.

4. (i)Draw a block diagram of a digital computer.
(ii)Explain the instrumentation of photo calorimeter.