**Avinashilingam Institute for Home Science and Higher Education for Women**
**(Deemed to be University) Coimbatore-641043.**

**Master's Degree Examination – November - 2018**
**III Semester**

**Class : II PG** **Time: 3 hours**
**Major : Chemistry** **Max. Marks: 60**

**17MCHC12 – Spectroscopy -I**

**Part A** **10 x 1/2 = 5**

**Choose the correct answer**

1. The electronic spectra consists of

a. A large number of absorption bands . b. A large number of closely packed lines.

c. A large number of peaks d. A smaller number of peaks.

2. Ultraviolet Spectroscopy is useful for the detection of

a. Functional group b. extent of conjugation c. geometrical isomers d. all of these

3.Nuclear Overhauser effect helps in predicting the

a. geometry of the molecule b. Olefinic protons

c.protons on adjacent carbon atoms d. Allylic protons

4. Signals in a proton NMR Spectroscopy do not provide information about

a. the molecular mass of an Organic molecule

b. the relative number of hydrogen atom in a particular environment

c. the number of chemically different hydrogen atoms on adjacent atoms

d. the environment of different hydrogen atoms in a molecule

5. In $^{13}C$ – NMR _____ is absent

a. Spin – Spin Splitting b.Chemical Shift c. Spin-Spin coupling d.both (a) and (c)

6. IN 2D NMR experiment _____ gives information of second frequency dimension.

a. evolution period b. preparation period c. detection period d. relaxation time

7. ESR Spectra are observed in which region of electromagnetic Spectrum?

a. microwave b. radiofrequency c. UV-Visible d.X-ray.

8. The ESR Spectrum of $CD_3$ radical consists of

a. four lines b. quintet c.Septet d. triplet

9.The diffraction of neutrons is caused by

a. Nuclear scattering b. proton scattering c. Light scattering. d. Electorn scattering

10.The Structure of Cs Cl is

a. Simple cube b. BCC c.FCC d. tetrahedron

## Part B

**5 x 4 = 20**

**Answer ALL questions**

**Each answer should not exceed 200 words or one page**

11.a. State and explain Beer – Lambertz law

(Or)

11.b. Describe the various types of absorption bands. which arise as a result of the electronic transitions. Discuss the effect of solvent polarity on K and R-bands.

12.a. Define Chemical Shift. Explain any two factors affecting chemical shift.

(Or)

12.b. Explain the theory spin-spin compling with an example

13.a. Give a brief account on COSY.

(Or)

13.b. What do you mean by broad band decoupling and off resonance decoupling?

14.a. Define "g" value. What are the factors affecting 'g' value? Give its significance.

(Or)

14.b. What is Krammer's degeneracy?

15.a. Derive Bragg's equation.

(Or)

15.b.Write the basic principles and applications of Neutron diffraction.

## Part C

**5 x 7 = 35**

**Answer ALL questions**

**Each answer should not exceed 600 words or three pages**

16.a. Write any six applications of UV visible spectroscopy.

(Or)

16.b. Describe the Woodward-Fieser rules for calculating the absorption maximum in dienes.

17.a. What are the Salient features of Pulse Fourier technique used in NMR studies? Explain.

(Or)

17. b.(i) Explain anisotropy with examples.(5)

18.a. Explain the basic principles and applications of $C^{13}$ NMR Speetroscopy.

(Or)

b. Describe the chemical shift in $C^{13}$ NMR. What are the advantages of $C^{13}$ NMR over proton magnetic resonance spectroscopy?

19.a. Write the principle and applications of ESR Spectroscopy?

(Or)

19.b.Give a brief note on (i) Hyperfine splitting and (ii) Zero field splitting.

20.a.Discuss power method of crystal analysis.

(Or)

20.b. Discuss X – ray diffraction in elucidating the structures of crystals and powders.