

PC – 265 CV-19  
(532) M.Sc. CHEMISTRY (SECOND SEMESTER)  
Term End Examination JUNE 2020

Compulsory/Optional      Group      Paper - IV      SPECTROSCOPY & COMPUTER FOR CHEMISTS  
Time : Three Hours]      [Maximum Marks : 080      [Minimum Pass Marks :029

नोट:- दोनो खण्डों से निर्देशानुसार उत्तर दीजिए। प्रश्नों के अंक उनके दाहिनी ओर अंकित हैं। Note: Answer From Both the Section as Directed. The Figures in the right-hand margin indicate marks.

SECTION - A

1. Answer the following questions:-

1X10=10

- (a) Write the mathematical formula for the Calculation of the Number of Microstates?
- (b) Write the full form of PESOS & SIMS with special Reference to PHOTO - ELECTRONIC SPECTROSCOPY?
- (c) Write the name of Scientists Who discovered Electron Spin Resonance Spectroscopy?
- (d) Write the mathematical expression for Thermal Diffusion Co-efficient with Special reference to PHOTOACOUSTIC SPECTROSCOPY?
- (e) What is minimum interplanar Spacing required for Bragg's Diffraction?
- (f) Which one have Shorter wavelengths either K-alpha x-rays or K-beta X-rays?
- (g) Processing is done in Which part of computer?
- (h) how many digits is present in Binary? Systems?
- (i) What is alternative name of if - STATEMENT?
- (j) Write the name of process which is used for arranging the data elements either in ascending or descending Order?

2. Answer the following questions:-

2X5=10

- (a) Write the name of factors affecting Resolution and Strength of the Signal in the case of Photo electron Spectroscopy?
- (b) A PMR Spectrometer operates at 300 MHZ. Find the value of the magnetic field? Given:  $g_N = 5.585$  and  $\beta_N = 5.05 \times 10^{-27} \text{ JT}^{-1}$ .
- (c) Calculate Miller indices of crystal planes which cut through the crystal axes at 29,-3b,-3c?
- (d) What is fundamental differences in between Branching and Looping?
- (e) Give uses of MS-word?

SECTION - B

Answer all questions:-

12X5=60

3. Discuss the basic principles, instrumentation and applications of PHOTO-ELECTRON SPECTROSCOPY?

OR

Describe electronic spectra of polyatomic molecules in detail with examples?

4. (a) Which of the following is NMR active and Why:-  $^1\text{H}^1$ ,  $6^{12}\text{C}$ ,  $6^{13}\text{C}$ ,  $9^{19}\text{F}$ ,  $8^{16}\text{O}$ ,  $1^{1}\text{H}_2$ ,  
(b) Explain factors affecting CHEMICAL SHIFT?

OR

(a) Which of the following system will Show ESR Spectrum and Why:  $\text{H}$ ,  $\text{H}_2$ ,  $\text{Na}^+$ ,  $\text{NO}$ ,  $\text{Cu}^+$ ,  $\text{Cu}^{++}$ .

(b) What is the value of "g" (Lande factor) in the Case of the following systems:-

- (i) Organic radicals
- (ii) Free electron
- (iii) Transition metal ions.

5. Derive Bragg's equation? Why is X-ray employed for the study of diffraction by crystal? Explain.

OR

How X-ray used for Structural analysis and absolute configuration of molecules?

6. Differentiate algorithm and flow chart and explain one of them with example?

OR

Describe various decision making Statements and explain their usefulness giving Suitable examples?

7. Write a program in "C" to execute results for Calculation of:-

- (i) Vander Waals Equation
- (ii) Evaluation of Lattice Energy?

OR

Explain how you Can prepare a graph and Chart by using Mx-EXCEL? Explain features of Mail Merge in MS-Word?