

CHE-504**Spectroscopy, Computers and Mathematics,
Biology****M.Sc. Chemistry (MSCCH-12/13/16/17)****First Year, Examination-2019****Time: 3 Hours****Max. Marks : 80**

Note:- This paper is of **Eighty (80)** marks divided into **Three (03)** Sections A, B and C. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section-A**(Long Answer Type questions)**

Note:- Section 'A' contains four (04) long-answer-type questions of Nineteen (19) marks each. Learners are required to answer any two (02) questions only. (2×19=38)

1. Classify amino acids in various ways with suitable examples. Give two methods of preparation of amino acids. 19
2. (a) Compare animal and plant cells. 5
(b) Differentiate RAM and ROM. 5
(c) Find the point on X-axis which is equidistant from (2, -5) and (-2, 9). 5
(d) Draw the Haworth projection formula of α -D glucose and β -D. Glucose. 5
3. (a) Define phospholipids. Classify them with suitable example and state their functions. 10

- (b) Define electronic spectroscopy. What is its absorption range? Write the relationship between wavelength, frequency and wave number 9
4. (a) Write a short note on finger print region. 5
- (b) Describe the shielding and the deshielding effects involved in NMR spectroscopy. 5
- (c) Explain the cause of Raman effect. Give its importance. 5
- (d) Write a note on Mc Lafferty rearrangement. 5

Section-B

(Short Answer Type Questions)

Note:- Section 'B' contains eight (08) short answer type questions of Eight (08) marks each. Learners are required to answer any four (04) questions only. (4×8=32)

1. Explain clearly the term "Spin-Spin-Coupling"? Why does a peak for a particular set of protons split into a multiplet? Give examples. 8
2. Explain the following terms.
- (a) Inversion of sugar 4
- (b) Raman Shift 4
3. Find the general solution for the differential equation.
- (a) $dy + \sin x \, dx = 0$ 4
- (b) $dy/dx = \log x$ 4

4. (a) Differentiate system software and application software 4
 (b) Differentiate between DNA and RNA. 4
5. (a) Discuss energy levels of rigid rotator and non-rigid rotator 4
 (b) What are absorption laws. 4
6. (a) Describe the structural peculiarities of prokaryotic organization. 4
 (b) What are the forces responsible for the stability of α -helix? Why it is named as 3.6₁₃ helix . 4
7. Describe briefly the theory of NMR spectroscopy. What information can be obtained from the NMR absorption peaks. 8
8. (a) Describe some basic-principals of mass spectrometry. 4
 (b) Explain the terms overtones and Hot bands.4

Section-C

Note:- Section 'C' contains ten (10) objective type questions of One(01) marks each. All the questions of this section are compulsory.

(10×1=10)

1. First page of Website is termed as: 1
 (a) Homepage (b) Index
 (c) Java script (d) Bookmark
2. Which graph is parallel to X-axis 1
 (a) $y = x+1$ (b) $y = z$ (c) $x = 3$ (d) $x=2y$

3. Plant cell wall mainly composed of : 1
(a) Cellulose (b) Starch
(c) Protein (d) Lipid
4. Which of the following is not present in DNA. 1
(a) Adenine (b) Guanine
(c) Uracil (d) Thymine
5. Which of the following is the sweetest 1
(a) Glucose (b) Fructose
(c) Maltose (d) Sucrose
6. Most deshielded protons are: 1
(a) $\text{CH}_3\text{-F}$ (b) $\text{CH}_3\text{-I}$
(c) $\text{CH}_3\text{-Cl}$ (d) $\text{CH}_3\text{-Br}$
7. Which is microwave active 1
(a) H_2 (b) HCl (c) CH_4 (d) BF_3
8. Sucrose on hydrolysis gives. 1
(a) Glucose and Glucose
(b) Glucose and Fructose
(c) Fructose and Fructose
(d) Glucose and Galactose
9. Which of the following is a temporary memory? 1
(a) RAM (b) ROM
(c) Both RAM and ROM (d) None of above
10. When $I_a = I_b = I_c$, then, the molecules: 1
(a) Oblate (b) Spherical top
(c) Assymmetric (d) None of above
