

Roll No.

CHE-504

Spectroscopy, Computers and Mathematics/Biology

M. Sc. CHEMISTRY (MSCCH-12/13/16)

First Year, Examination, 2017

Time : 3 Hours

Max. Marks : 80

Note : This paper is of **eighty (80)** marks containing **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 *two* (02) questions only.

1. Give an account of the enzymatic hydrolysis of nucleic acid and comment on their specification. What is the structure of nucleotide ? 19
2. (a) Write in brief Glycogen Metabolism. 5
(b) Compare prokaryotic and eukaryotic cells. 5
(c) Find the derivation of $F(x) = e^x(x^2 + 1)$. 4
(d) Differentiate between purines and pyrimidines. 5

3. Explain the detailed procedures for the determination of amino acid sequence proteins. What are the different levels of structural organisation of proteins ? Explain with suitable examples. 19
4. (a) Write down the application of NMR. 5
- (b) What are Rayleigh, Stokes' and Anti-Stoke's line ? 5
- (c) What is the effect isotopic substitution on the microwave spectra of a diatomic molecule ? 4
- (d) What are the selection rules for harmonic and anharmonic oscillators ? 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 *four* (04) questions only.

1. How is acetylacetone used for the detection of covalency in metal ligand bonds ?
2. Suggest a method and describe in detail for obtaining mass spectrum of a high molecular weight organic compound.
3. Explain the following terms :
 - (a) Coupling constant
 - (b) Input devices of computers
4. Discuss the classification of lipids. Explain the structure and function of cholesterol.
5. From the differential equation of $y = ax^2 + bx$, where 'a' and 'b' parameters. Solve $xy^2dy - (x^3 - y^3)dx = 0$.

6. Describe the various factors which affect the chemical shift.
7. Write a note on solvent effects in UV spectroscopy.
8. Discuss the structure and properties of DNA double helix.

Section-C

(Objective Type Questions)

Note : Section 'C' contains ten (10) objective type questions of one (01) mark each. All the questions of this Section are compulsory.

Choose the correct answer :

1. Which of the following is a temporary memory ?
 - (a) RAM
 - (b) ROM
 - (c) Both RAM and ROM
 - (d) None of the above
2. Amylopectin gives :
 - (a) Violet colour with iodine
 - (b) Blue colour with iodine
 - (c) No colour with iodine
 - (d) None of the above
3. Glycerides are :
 - (a) Hydrocarbon including ring-shaped molecules
 - (b) Fatty acids + glycerol
 - (c) Linear aliphatic molecules
 - (d) None of the above
4. Cholesterol is synthesized by :
 - (a) Liver
 - (b) Spleen
 - (c) Kidney
 - (d) Bone marrow

5. The equation of a line through (2, -3) parallel to y-axis is :
- (a) $y = -3$ (b) $y = 2$
(c) $x = 2$ (d) $x = -3$
6. Glucose is changed into glycogen in the :
- (a) Liver (b) Spleen
(c) Kidney (d) Ileum
7. Information centre of the cell is :
- (a) Nucleus (b) Lysosomes
(c) Ribosomes (d) Vacuoles
8. Pyrimidine are :
- (a) 9-membered two ring compound
(b) 6-membered two ring compound
(c) 11-membered two ring compound
(d) 13-membered two ring compound
9. Input device :
- (a) Accept data from outside world
(b) Accept data from computer
(c) Accept data from secondary storage
(d) None of the above
10. Fingerprint region in an IR spectrum is :
- (a) $1400-900 \text{ cm}^{-1}$
(b) $3000-1300 \text{ cm}^{-1}$
(c) $900-300 \text{ cm}^{-1}$
(d) None of the above

CHE-504