



(University of Choice)

UNIVERSITY EXAMINATIONS
2018/2019 ACADEMIC YEAR
FIRST YEAR, SECOND TRIMESTER EXAMINATIONS
FOR THE DIPLOMA
OF
DIPLOMA OF MEDICAL BIOTECHNOLOGY/LABORATORY SCIENCES
COURSE CODE: BBD 125
COURSE TITLE: ORGANIC CHEMISTRY AND ANALYSIS
MAIN EXAMINATION

DATE: 28TH MAY 2019

TIME: 3.00 - 5.00 PM

INSTRUCTIONS TO CANDIDATES

This paper is divided into three sections; **A**, **B** and **C**, carrying respectively: Multiple Choice Questions (**MCQs**), Short Answer Questions (**SAQs**) and Long Answer Questions (**LAQs**).
ANSWER ALL QUESTIONS.

TIME: 2 HOURS

MMUST observes **ZERO** tolerance to examination cheating

This Paper Consists of 5 Printed Pages. Please Turn Over.

SECTION A MULTIPLE CHOICE QUESTIONS

1. Which of the following techniques exploits the mass to charge ratio of the components of proteins?
 - (A) Peptide mass fingerprinting
 - (B) Mass spectrometry
 - (C) Sequence determination
 - (D) Chromatography
2. Proteins with only one polypeptide chain are to as
 - (A) Monomeric proteins
 - (B) Multimeric proteins
 - (C) Homomultimeric proteins
 - (D) Heteromultimeric proteins
3. Diastereomers that differ in the configuration of a single asymmetric carbon are called
 - (A) Isomers
 - (B) Enantiomers
 - (C) Stereoisomers
 - (D) Epimers
4. Which of the following is the most abundant biomolecule in nature?
 - (A) Amino acids
 - (B) Carbohydrates
 - (C) Proteins
 - (D) Lipids
5. The lipid molecule most abundant in the nervous system is known as
 - (A) Steroids
 - (B) Phosphoacylglycerols
 - (C) Sphingomyelin
 - (D) Waxes
6. The building blocks of proteins are referred to as
 - (A) Amino acids
 - (B) Carbohydrates
 - (C) Peptides
 - (D) Lipids
7. Exergonic reactions
 - (A) Measure the randomness or chaosness of a system
 - (B) Have a net gain of free energy
 - (C) Absorb energy from the environment
 - (D) Release energy to the environment
8. Compounds that result from the covalent linkage of carbohydrate molecules to proteins and lipids are known as
 - (A) Oligosaccharides
 - (B) Diastereomers

- (C) Glycoconjugates
 - (D) Homopolysaccharides
9. A stable extracellular pH can be maintained by
- (A) The histidine system
 - (B) The bicarbonate system
 - (C) The phosphate system
 - (D) None of the above
10. Which of the following is a component of the secondary structure of proteins?
- (A) Beta pleated sheets
 - (B) Amino acid sequence
 - (C) 3-D structure
 - (D) Cysteine bonds
11. Which one of the following is NOT a basic amino acid?
- (A) Histidine
 - (B) Lysine
 - (C) Proline
 - (D) Arginine
12. Steroids are lipid molecules with a fused-ring system. Which one of the following is NOT a steroid?
- (A) Androgens
 - (B) Ceramide
 - (C) Estrogen
 - (D) Progestins
13. Which one of the following is NOT an hexose sugar?
- (A) Glucose
 - (B) Galactose
 - (C) Fructose
 - (D) Glyceraldehyde
14. What is the metabolic reaction that leads to the production of complex structures from simpler structures?
- (A) Anabolism
 - (B) Catabolism
 - (C) Exergonic reactions
 - (D) Endergonic reactions
15. The process of protein structure disruption is known as
- (A) Allostery
 - (B) Conjugation
 - (C) Denaturation
 - (D) Conformation
16. A positive test for starch using iodine results in which colour?
- (A) Blue
 - (B) Red

- (C) Colourless
(D) Orange
17. Which one of the following is NOT a globular protein?
(A) Insulin
(B) Keratin
(C) Myoglobin
(D) Immunoglobulin
18. What is the hydrolysis reaction between sodium hydroxide with tryacylglycerides?
(A) Hydrolysis
(B) Condensation
(C) Glycosylation
(D) Saponification
19. Which of the following is a protein without its prosthetic group?
(A) Holoprotein
(B) Lipoprotein
(C) Glycoprotein
(D) Apoprotein
20. Which one of the following is NOT a reducing sugar?
(A) Glucose
(B) Galactose
(C) Sucrose
(D) Fructose

SECTION B SHORT ANSWER QUESTIONS (40 MARKS)

1. What is a functional group? Name a few important functional groups of organic compounds. (6 marks)
2. (a) What is a buffer? (2 marks)
(b) Differentiate between a weak and a strong acid. (3 marks)
3. State five techniques used to analyze amino acids. (5 marks)
4. Using relevant examples, explain the difference between simple and conjugated proteins. (6 marks)
5. Reducing sugars are sugars that can be oxidized by weak oxidizing agents. Explain why sucrose is a non-reducing sugar. (5 marks)
6. Elaborate how a peptide bond is formed between two amino acid residues. (5 marks)
7. State the four levels of organization of the protein structure. (4 marks)
8. Explain the reaction that results in the red precipitate for a positive Benedict's test. (4 marks)

SECTION C LONG ANSWER QUESTIONS (40 MARKS)

1. Describe the biological functions of proteins. (15 marks)
2. Polysaccharides are carbohydrate molecules with more than 12 monosaccharide units. Describe the different classes of polysaccharides stating their structure and function. (15 marks)

3. Briefly describe ionic bonds, covalent bonds, hydrogen bonds and hydrophobic interactions. (10 marks)