



(University of Choice)

MASINDEMULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS
2015/2016 ACADEMIC YEAR

FIRST YEAR, FIRST TRESTER EXAMINATIONS

FOR THE DEGREE
OF
BACHELOR OF HEALTH PROFESSION EDUCATION

COURSE CODE: NUR 101

COURSE TITLE: MEDICAL BIOCHEMISTRY I

DATE: 7th December, 2015

TIME: 9:00 to 12:00 Noon

Instructions to Candidates

Answer All Questions

Section A: Multiple Choice Questions (MCQ)

20 Marks

Section B: Short Answer Questions (SAQ)

40 Marks

Section C: Long Answer Question (LAQ)

40 Marks

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 4 Printed Pages. Please Turn Over.

Section A: Multiple Choice Questions (MCQ)

20 Marks

1. Vitamins are
 - (A) Accessory food factors
 - (B) Generally synthesized in the body
 - (C) Produced in the endocrine glands
 - (D) Protein in nature
2. Vitamine A is a
 - (A) Steroid
 - (B) Ploysioprenoid compound containing a cyclohexenyl ring
 - (C) 6-Hydroxychromane
 - (D) Benzoquinolone
3. Vitamin D absorption is increased in
 - (A) Acid pH of intestine
 - (B) Alkaline pH of intestine
 - (C) Impaired fat absorption
 - (D) Contents of diet
4. Vitamin K is found in
 - (A) Green leafy plants
 - (B) Meat
 - (C) Fish
 - (D) Milk
5. The general formula of monosaccharides is
 - (A) $C_nH_{2n}O_n$
 - (B) $C_{2n}H_{2O_n}$
 - (C) $C_nH_{2O_{2n}}$
 - (D) $C_nH_{2n}O_{2n}$
6. The general formula of polysaccharides is
 - (A) $(C_6H_{10O_5})_n$
 - (B) $(B) (C_6H_{12O_5})_n$
 - (C) $(C_6H_{10O_6})_n$
 - (D) $(D) (C_6H_{10O_6})_n$

$CH_2(OH)-CH_2$
2
7. The aldose sugar is
 - (A) Glycerose
 - (B) Ribulose
 - (C) Erythrulose
 - (D) (D) Dihydroxyacetone
8. A triose sugar is
 - (A) Glycerose
 - (B) (B) Ribose
 - (C) Erythrose
 - (D) (D) Fructose
9. A pentose sugar is
 - (A) Dihydroxyacetone
 - (B) Ribulose
 - (C) Erythrose
 - (D) (D) Glucose
10. The pentose sugar present mainly in the heart muscle is
 - (A) Lyxose

- (B) Ribose
- (C) Arabinose
- (D) Xylose

11. In glucose the orientation of the —H and —OH groups around the carbon atom 5 adjacent to the terminal primary alcohol carbon determines
- (A) D or L series
 - (B) Dextro or levorotatory
 - (C) α and β anomers
 - (D) Epimers
12. The carbohydrate of the blood group substances is
- (A) Sucrose
 - (B) Fucose
 - (C) Arabinose
 - (D) Maltose
13. Heavy proteinuria occurs in
- (A) Acute glomerulonephritis
 - (B) Acute pyelonephritis
 - (C) Nephrosclerosis
 - (D) Nephrotic syndrome
14. Mucopolysaccharides are
- (A) Homopolysaccharides
 - (B) Heteropolysaccharides
 - (C) Proteins
 - (D) Amino acids
15. Cyclic AMP is formed from ATP by the enzyme adenylate cyclase which is activated by the hormone:
- (A) Insulin
 - (B) Epinephrine
 - (C) Testosterone
 - (D) Progesterone
16. Non essential amino acids
- (A) Are not components for tissue proteins
 - (B) May be synthesized in the body from essential amino acids
 - (C) Have no role in the metabolism
 - (D) May be synthesized in the body in diseased
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17. All proteins contain the
- (A) Same 20 amino acids
 - (B) Different amino acids
 - (C) 300 Amino acids occurring in nature
 - (D) Only a few amino acids
18. Proteins contain
- (A) Only L- α - amino acids
 - (B) Only D-amino acids
 - (C) DL-Amino acids
 - (D) Both (A) and (B)
19. The optically inactive amino acid is
- (A) Glycine
 - (B) Serine
 - (C) Threonine
 - (D) Valine
20. At neutral pH, a mixture of amino acids in solution would be predominantly:
- (A) Dipolar ions

- (B) Nonpolar molecules
- (C) Positive and monovalent
- (D) Hydrophobic

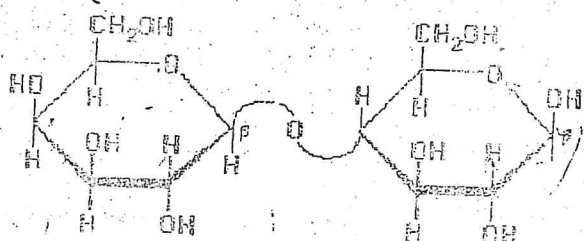
Section B: Short Answer Questions (SAQ's)

40 Marks

1. Water and mineral salts are part of a balanced diet:

- i. Outline five (5) chemical properties of water (4 marks)
- ii. Explain five (5) functions of water in a human body (5 marks)
- iii. Citing examples describe the roles of intracellular and extracellular electrolytes. (5 marks)

2. Study the following structure and answer the questions that follow



- (a) How many of the monosaccharide units are furanoses and how many are pyranose (2 marks)
 - (b) What is the glycosidic linkage between the two monosaccharide units? (2 marks)
3. Describe one biological advantage of storing glucose units in branched polymers (glycogen, amylopectin) rather than in linear polymers (4 marks)
4. Explain why lactate accumulates in the blood during bursts of very vigorous exercise (4 marks)

5. Using specific examples outline six classes of enzymes (6 marks)

- a) What is enzyme cofactor (1 mark)
- b) Name four organic enzyme cofactors (2 marks)

6. Galactosaemia (type I) is an inborn disorder of carbohydrate metabolism; describe the genetic defect and clinical manifestation of the disorder (6 marks)

7. Name four water soluble vitamins (4 marks)

Section B: Long Answer Questions (SAQ)

40 Marks

1. Describe chemistry, functions, deficiency symptoms, dietary sources and daily requirements of Vitamin C. (20 marks).

2. Discuss the various diagnostic tests based on liver secretory, metabolic, synthetic, and excretory functions (20 marks)

enzymes - synthesis & breakdown of sugar molecules
 albumin - breakdown of sugar
 stores - stores of enzymes
 gall bladder
 break down of unnecessary body chemicals
 synthesis of vitamins take place in it