



**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

SPECIAL/SUPPLEMENTARY

**FIRST YEAR FIRST TRIMESTER 2021/2022 ACADEMIC YEAR
FOR THE DEGREE OF BACHELOR OF SCIENCE IN NURSING**

COURSE CODE: NCD 116

COURSE TITLE: CLINICAL BIOCHEMISTRY I

DATE: 5th October 2022

TIME: 8:00am-11:00am

INSTRUCTIONS TO CANDIDATES

TIME: 3 Hours

**MMUST observes ZERO tolerance to examination cheating
Please turn over**

SECTION I: MULTIPLE CHOICE QUESTIONS (20mks)

1. Which of these elements is NOT a constituent of Carbohydrates?

- a) Carbon
- b) Hydrogen
- c) Oxygen
- d) Nitrogen

2. Another word that might describe complex carbohydrates is...

- a) Monosaccharide
- b) Disaccharide
- c) Polysaccharide

3. Carbon is the basis for carbohydrates and all other biologically important molecules. All of the following are reasons why Carbon lends itself to being the basic building block of life on our planet - except for one. Which statement is incorrect?

- a) Carbon readily makes four stable bonds, in single, double or triple configurations.
- b) Carbon is a very dense & heavy element, giving living things stability.
- c) Carbon is the least electronegative non-metal
- d) Carbon has a high affinity for Oxygen & Hydrogen, which make bonds easily with C

4. As a component of Carbohydrates, Oxygen is very important, too. Which of the following statements is incorrect about the way Oxygen behaves as part of a molecule?

- a) Oxygen has six outer valence electrons, and makes up to 2 bonds
- b) Oxygen is highly electronegative; it is an 'electron hog', sharing them unevenly
- c) The uneven sharing of electrons results in Oxygen forming polar covalent bonds
- d) The presence of oxygen in Carbohydrates makes them highly insoluble in water

5. Which one of the following is true for albumin?

- a) The most abundant protein in blood plasma.
- b) Gives blood its red color.
- c) Is a very large protein with a mass of over 100kDa in size?
- d) Is absent from blood plasma except in some disease conditions.
- e) Can NOT be assayed by normal dye binding assays.

6. Which lipoprotein carrier is the predominant carrier of cholesterol in plasma in humans?

- a) LDL.
- b) HDL.
- c) VLDL.
- d) IDL.

Albumin

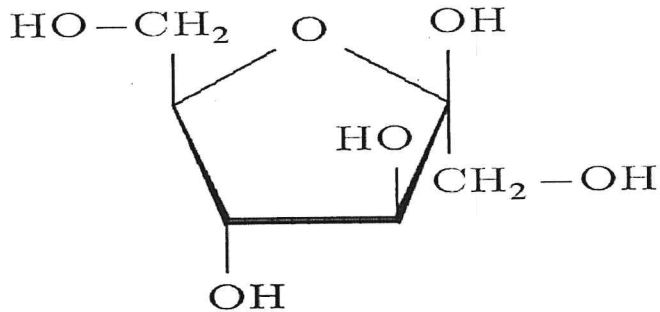
7. Which of these functional groups are you not going to find in a carbohydrate?

- a) Carbonyl -C=O
- b) Sulfhydryl -SH
- c) Hydroxyl -OH
- d) Ether -C-O-C-

8. Which of the following carbohydrates does this structural diagram represent?

- a) Glucose
- b) Fructose
- c) Maltose
- d) Sucrose

9.



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- e) Glycogen

10. Alcoholics often present with a deficiency in vitamin B1 (thiamine). What can you conclude about an alcoholic with thiamine deficiency?

I. He/she will not produce any pyruvate and NADH

II. There will be a buildup of lactic acid

III. He/she will not produce any acetyl-CoA from the breakdown of carbohydrates

- a) III only
- b) II and III
- c) I and III
- d) I only

11. The basic unit of protein is called a/an _____.

- a) Peptide
- b) Amino acid
- c) Alpha-protein
- d) Peptone
- e) .

12. Which of the following could NOT lead to low cholesterol levels?

- a) Malabsorption.
- b) Statin treatment.

- c) Liver disease/cirrhosis.
- d) Nephrotic syndrome.
- e) Chronic parenchymal disease

13. The sugars glucose, fructose, and galactose all belong to which category of carbohydrates?

- a) . Monosaccharides
- b) Disaccharides
- c) Polysaccharides

14. The sugars lactose, maltose and sucrose all belong to which category of carbohydrates?

- a) Monosaccharides
- b) Disaccharides
- c) Polysaccharides

15. Which of the following is NOT a role of Carbohydrates in a cell or organism?

- a) Provide energy, either immediate or long-term (storage)
- b) Provide structure, support, strength in certain organisms
- c) Formation of muscle tissues & bone in vertebrate bodies
- d) Osmoregulation - moderating fluid balance in living organisms

16. Which of the following does NOT produce hyperglycemia?

- a) Decreased insulin secretion.
- b) Increased carbohydrate intake.
- c) Decreased peripheral glucose uptake.
- d) Increased ketogenesis.
- e) Increased hepatic glucose output.

17. What percentage of all people with diabetes have type 2 diabetes?

- a) 10%.
- b) 5% to 10%.
- c) 25%.
- d) 50%.
- e) 90% to 95%

18. Which of the following is FALSE regarding testing for Helicobacter pylori?

- a) Testing for H pylori is an effective alternative to an endoscopy.
- b) The faecal antigen test for H pylori is said to be a very specific test but not sensitive.
- c) Carbon-13 urea breath test is high when urease is present in the stomach.
- d) H pylori splits urea in the stomach into water and carbon dioxide.
- e) Serological testing for H pylori is currently based on the quantitation of immunoglobulin G antibodies against H pylori by the means of an ELISA.

19. Which of the following is not a cause of hypoglycemia?

- a) Sepsis
- b) acute liver failure
- c) chronic renal failure
- d) insulinoma
- e) Tay-Sachs disease

20. In diabetes mellitus, glucagon levels are elevated due to

- a) high insulin

- b) lowered due to high conversion to glucose
- c) lowered due to low insulin
- d) elevated and not suppressed by carbohydrate loading

SECTION II: SHORT ANSWER QUESTIONS (40mks)

1. A reaction needs some energy put into it in order to start. (2mrk)
2. An enzyme can have multiple active sites. (2mrks)
3. How many net molecules of ATP are made in glycolysis? (2mrks)
4. What is the last carrier in the electron transport chain? (2mrks)
5. X-linked recessive disorder usually affect females? True False (2mrks)
6. Structurally RNA and DNA are fully identical. True False (2mrks)
7. Match the following table (8marks)

a) Carbohydrate storage in animal liver	A. proteoglycan
b) Extracellular matrix of animal tissues.....	B. starch
c) Blood clotting factor	C. chitin
d) Carbohydrate storage in plants	D. cellulose
e) Polyanionic acid-sugar that forms core of proteoglycans.....	E. glycogen
f) Structural component of plant cell walls	F. hyaluronic acid
g) Disaccharide	G. sucrose
h) Exoskeleton of insects	H. heparin
9. State any four functions of biological membranes (8mks)
10. Describe four functions of proteins in the human body (8mks)

SECTION III: LONG ANSWER QUESTIONS (40mks)

1. You are contacted about a 23-year old woman who complains of faintness and sweating attacks, which are improved by eating. Discuss the differential diagnosis, and describe and explain the advice you would give about her investigation.

2. Using examples as appropriate, describe how the Biochemistry Laboratory can contribute towards assessing drug efficacy and toxicity?

