



AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCE
DEPARTMENT OF REHABILITATION MEDICINE
BACHELOR OF SCIENCE IN PHYSIOTHERAPY
END OF MAY-AUGUST 2026 TRIMESTER EXAMINATIONS

UNIT CODE: PHT 128 UNIT NAME: BIOCHEMISTRY
DATE: 4TH AUGUST 2026
TIME: TWO HOURS
START: 6PM STOP : 8PM

INSTRUCTIONS (physical exams)

1. Do not write on this question paper

(Marks and questions distribution as per program curriculum.)

INSTRUCTIONS (Online examinations)

1. This exam is marked out of 70 marks
2. This Examination comprises 3 Sections
3. This online exam shall take 2 Hours
4. Late submission of the answers will not be accepted
5. Ensure your web-camera is on at all times during the examination period
6. No movement is allowed during the examination
7. Idling of your machine for 5 min or more will lead to lock out from the exam
8. The Learning Management System (LMS) has inbuilt integrity checks to detect cheating

9. Any aspect of cheating detected during and or after the exam administration will lead to nullification of your exam
10. In case you have any questions call the invigilator for this exam on Tel. 0705833434 and or the Head of Department on Tel 0720491032
11. For adverse incidences please write an email to: amiu.examinations@amref.ac.ke

SECTION A: MULTIPLE CHOICE QUESTIONS. ANSWER ALL THE QUESTIONS

1. Which atom group provides a hydrogen atom in hydrogen bonding? (1 Mark)
 - A. Hydrogen-bond donor
 - B. Hydrogen-bond acceptor
 - C. Ionic bond
 - D. Hydrophobic interaction
2. Alcohol dehydrogenase belongs to which enzyme class? (1 Mark)
 - A. Transferases
 - B. Oxidoreductases
 - C. Hydrolases
 - D. Lyases
3. Which biomolecule is characterized by its solubility in organic solvents such as chloroform? (1 Mark)
 - A. Protein
 - B. Lipid
 - C. Carbohydrate
 - D. Nucleic acid
4. A monounsaturated fatty acid contains: (1 Mark)
 - A. One carbon-carbon double bond
 - B. No double bonds

- C. One triple bond
- D. Only single bonds

5. Hydrogen bonds are particularly important for: (1 Mark)

- A. Maintaining protein structure
- B. DNA base pairing
- C. Enzyme-substrate interactions
- D. All of the above

6. What feature contributes most to the stability of DNA? (1 Mark)

- A. Single-stranded structure
- B. Double-stranded helix
- C. Ribose sugar
- D. Uracil bases

7. Human telomeric DNA consists of repeated sequences rich in: (1 Mark)

- A. Adenine
- B. Guanine
- C. Cytosine
- D. Uracil

8. Which enzyme catalyzes the breakdown of triglycerides into fatty acids and glycerol?

(1 Mark)

- A. Lipase
- B. Amylase
- C. Protease
- D. Nuclease

9. The unpleasant odor associated with spoiled fats is mainly due to: (1 Mark)

- A. Fatty acid oxidation
- B. Fatty acid reduction

- C. Esterification
- D. Saponification

10. Which value is commonly used to determine the extent of unsaturation in fats and oils?

(1 Mark)

- A. Acid number
- B. Iodine number
- C. Saponification number
- D. Peroxide number

11. Which sugar differs from glucose only in the orientation of the hydroxyl group on carbon 4?

(1 Mark)

- A. Fructose
- B. Ribose
- C. Galactose
- D. Mannose

12. Which enzyme initiates the digestion of starch in the mouth?

(1 Mark)

- A. Pepsin
- B. Amylase
- C. Maltase
- D. Lactase

13. The major glycosidic linkage in amylose is:

(1 Mark)

- A. $\alpha(1 \rightarrow 4)$
- B. $\beta(1 \rightarrow 4)$
- C. $\alpha(1 \rightarrow 6)$
- D. $\beta(1 \rightarrow 6)$

14. A six-membered cyclic monosaccharide is called a:

(1 Mark)

- A. Furanose

- B. Pyranose
- C. Pentose
- D. Hexose

15. Most monosaccharides are: (1 Mark)
- A. Colored crystals
 - B. Water-insoluble compounds
 - C. Sweet, water-soluble crystalline substances
 - D. Nonpolar compounds
16. Which representation is commonly used to depict cyclic monosaccharides? (1 Mark)
- A. Lewis structure
 - B. Haworth projection
 - C. Molecular formula
 - D. Condensed formula
17. What occurs during hydrolysis of a disaccharide? (1 Mark)
- A. Formation of a glycosidic bond
 - B. Cleavage of a glycosidic bond
 - C. Formation of peptide bonds
 - D. Oxidation of sugars
18. When starch is heated with water, it undergoes: (1 Mark)
- A. Crystallization
 - B. Gelatinization
 - C. Sublimation
 - D. Hydrolysis to amino acids
19. Biosynthesis of proteins from amino acids is an example of: (1 Mark)
- A. Catabolism
 - B. Anabolism

- C. Fermentation
- D. Oxidation

20. Which statement best describes catabolic pathways? (1 Mark)

- A. They require ATP input only
- B. They synthesize complex molecules
- C. They release energy from complex molecules
- D. They do not require enzymes

21. The primary effect of an enzyme on a chemical reaction is to: (1 Mark)

- A. Increase reaction rate
- B. Change equilibrium constant
- C. Increase free energy change
- D. Alter reaction products

22. Enzymes accelerate reactions by: (1 Mark)

- A. Increasing activation energy
- B. Lowering activation energy
- C. Raising substrate concentration
- D. Changing reaction equilibrium

23. According to the induced-fit model, substrate binding: (1 Mark)

- A. Has no effect on enzyme shape
- B. Changes the conformation of the active site
- C. Denatures the enzyme
- D. Blocks catalysis

24. Many enzymes require which of the following for optimal activity? (1 Mark)

- A. Cofactors or coenzymes
- B. DNA
- C. RNA primers

D. Lipid bilayers

25. Which metabolic pathway directly generates ATP, NADH, and FADH₂ from acetyl-CoA? (1 Mark)

- A. Glycolysis
- B. Pentose phosphate pathway
- C. Citric acid cycle
- D. Glycogenesis

26. The immediate precursor of fatty acid synthesis in the cytoplasm is: (1 Mark)

- A. Acetyl-CoA
- B. Glucose-6-phosphate
- C. Pyruvate
- D. Lactate

27. The breakdown of glycogen to release glucose units is called: (1 Mark)

- A. Glycogenesis
- B. Glycogenolysis
- C. Gluconeogenesis
- D. Lipolysis

28. The pyruvate dehydrogenase complex is located in the: (1 Mark)

- A. Cytoplasm
- B. Nucleus
- C. Mitochrial matrix
- D. Endoplasmic reticulum

29. Which amino acid contains an indole ring? (1 Mark)

- A. Tyrosine
- B. Phenylalanine
- C. Tryptophan

D. Histidine

30. Which amino acid is classified as a strongly basic amino acid? (1 Mark)

A. Glycine

B. Serine

C. Arginine

D. Valine

**SECTION B: SHORT STRUCTURED QUESTIONS. ANSWER ALL QUESTIONS
(20 MARKS)**

31. Calculate the pH of a solution with a hydrogen ion activity of 5×10^{-6} . (3 marks)

32. Describe irreversible enzyme inhibition. (3 marks)

33. Explain functions of DNA polymerases during DNA replication. (3 Marks)

34. Describe the nomenclature of enzymes. (4 marks)

35. Describe key regulatory steps in glycolysis. (3 marks)

36. Enumerate roles of proteins in transmission of nervous impulse. (4 marks)

37. Describe ONE medical application of C-20 arachidonic acid. (4 marks)

38. Describe Leloir pathway and its medical application. (4 marks)

39. Describe fructose-1-phosphate pathway and its medical application. (4 marks)

**SECTION C: LONG STRUCTURED QUESTION. ANSWER ALL TWO QUESTIONS
(20 MARKS)**

40. Discuss roles of hormones in metabolic regulation of glycolysis. (10 marks)

41. Discuss occurrence of glucose 6-phosphate dehydrogenase deficiency and its medical significance. (10 marks)

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