



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES
DEPARTMENT OF PHYSIOTHERAPY
BACHELOR OF SCIENCE IN PHYSIOTHERAPY (DIRECT ENTRY)
END OF SEMESTER APRIL, 2025 EXAMINATIONS**

COURSE: PTH 128: BIOCHEMISTRY

DATE: 11th April 2025

Duration: 2 HOURS

Start: 9am

Finish: 11am

INSTRUCTIONS

- 1. This exam is out of 70 Marks**
- 2. This Examination comprises THREE Sections. Section I: Multiple Choice Questions Section II: Short Answer Questions and Section III: Long Answer Questions**
- 3. Answer ALL Questions.**

SECTION I: MULTIPLE CHOICE QUESTIONS (20 MARKS)

- Hormone receptors possess all the following properties except
 - All of them are proteins
 - They possess a recognition domain
 - They bind hormones with a high degree of specificity
 - Number of receptors in a target cell is constant
- Cyclic GMP acts as the second messenger for
 - Nerve growth factor
 - Atrial natriuretic factor
 - Epinephrine
 - Norepinephrin
- Signal transducer for glucagons is a
 - Cyclic nucleotide
 - Phosphoinositide
 - Stimulatory G-protein
 - Inhibitory G-protein
- The α and β forms of D-Glucose are known as _____.
 - Anomer
 - Epimer
 - Racemic mixture
 - Enediol
- Which of the following makes water a liquid at room temperature?
 - Noncovalent interactions
 - Hydrogen bonds between water molecules
 - Van der Waals forces of attraction
 - Covalent bonding
- DNA rich in A-T pairs have
 - 1 Hydrogen bond
 - 2 Hydrogen bonds
 - 3 Hydrogen bonds
 - 4 Hydrogen bonds

7. In purine nucleus nitrogen atom at 1 position is derived from

- A. Aspartate
- B. Glutamate
- C. Glycine
- D. Alanine

8. Serum amylase is increased in: -

- A. Acute parotitis
- B. Acute pancreatitis
- C. Pancreatic cancer
- D. All of these

9. The daily water allowance for normal adult (60 kg) is about

- A. 200–600 ml
- B. 500–800 ml
- C. 800–1500 ml
- D. 1800–2500 ml

10. α helix has:

- A. 3.4 amino acid residue/turn
- B. 3.0 amino acid/turn
- C. 3.8 amino acid/turn
- D. 3.6 amino acid/turn

11. Different isoenzymes of an enzyme have the same

- A. Amino acid sequence
- B. Michaelis constant
- C. Catalytic activity
- D. All of these

12. One of the following amino acid is solely ketogenic:

- A. Lysine
- B. Alanine
- C. Valine
- D. Glutamate

13. The following statement is FALSE regarding ketone bodies: -

- A. They may result from starvation
- B. They are formed in kidneys
- C. They include acetoacetic acid and acetone
- D. They may be excreted in urine.

14. A manifestation of vitamin A deficiency is: -

- A. Painful joints
- B. Night blindness
- C. Loss of hair
- D. Thickening of long bones

15. The end product of purine catabolism in man is

- A. Inosine
- B. Hypoxanthine
- C. Xanthine
- D. Uric acid

16. All the enzymes of glycolysis pathway are found in

- A. Extramitochondrial soluble fraction of the cell
- B. Mitochondria
- C. Nucleus
- D. Endoplasmic reticulum

17. Catecholamine hormones are synthesized in the: -

- A. Chromaffin cells of adrenal medulla
- B. Zona glomerulosa of adrenal cortex
- C. Zona fasciculata of adrenal cortex
- D. Zona reticularis of adrenal cortex

18. In thyroxine, tyrosine residues are iodinated at positions: -

- A. 1 and 3
- B. 2 and 4
- C. 3 and 5
- D. 4 and 6

19. Gout is a metabolic disorder of catabolism of:-

- A. Pyrimidines
- B. Purines
- C. Alanine
- D. Phenylalanine

20 The pH optima for salivary amylase is

- A. 6.6–6.8
- B. 2.0–7.5
- C. 7.0–9
- D. 8–6

SECTION II: SHORT ASSAY QUESTIONS (30 MARKS)

1. Differentiate the following:

- a) Substrate level phosphorylation and Oxidative phosphorylation. (2 Marks)
- b) Nucleotides and Nucleosides. (2 Marks)

2. Explain briefly the role of vitamins in TCA cycle. (4 Marks)

3. Give the carbon structure of the following fatty acids:

- (i). 18:2 $\Delta^{(9, 12)}$ (2 Mark)
- (ii). 20:4 $\Delta^{(5, 8, 11, 14)}$ (3 Marks)

4. Describe briefly:

- (i). The classification of amino acids based on nutrition requirement ([6 Marks)
- (ii). Crystal structure (3Marks)

5. Explain:

- a. Phenylketonuria disorder (2 Marks)
- b. Mechanism of action of Allopurinol drug in minimizing uric acid excretion. (2 Marks)

6. List **TWO** chemical groups carried by enzyme cofactors. (2 Marks)

7. Highlight **FOUR** (4) key enzymes of gluconeogenesis (2 Marks)

SECTION C: LONG ASSAY QUESTIONS (20 MARKS)

INSTRUCTIONS: Answer ONLY ONE Question

1. (a) Describe the classifications of enzymes based on International Union of Biochemistry (IUB). (12 Marks)

(b) Describe **FOUR** Factors affecting enzyme activity. (8 Marks)

2. (a) Describe in details **THREE** types of structural polysaccharides. (9 Marks)

(b) Describe the regulation of glycolysis. (11 Marks)