



**AMREF INTERNATIONAL UNIVERSITY
SCHOOL OF MEDICAL SCIENCES**

DEPARTMENT OF NURSING AND MIDWIFERY SCIENCES

BACHELOR OF SCIENCE IN PHYSIOTHERAPY [UPGRADING]

END OF JANUARY-APRIL 2023 SEMESTER EXAMINATIONS

Course Unit: PHT 128 : MEDICAL BIOCHEMISTRY

Date: TUESDAY 4TH APRIL 2023

Time: 2 Hours

Start: 1800hrs

Finish:2000hrs

Instructions

- 1) This paper has three sections: Section A, Section B and Section C
- 2) Answer **ALL** questions in Section A and Section B and only Two question in Section C
- 3) Use the University examination booklets provided
- 4) Re-writing the questions on your answer sheet is unnecessary
- 5) Do not write on the question paper

MULTIPLE CHOICE QUESTIONS: SECTION A (1 MARKS EACH)

1. The enzyme carbamoyl phosphate synthetase requires

- (A) Mg^{++}
- (B) Ca^{++}
- (C) Na^{+}
- (D) K^{+}

2. Which co-enzyme is not involved in oxidative decarboxylation of pyruvic acid?

- (A) TPP
- (B) Mg^{++}
- (C) Biotin
- (D) CoA-SH

3. Degradation of proteins to amino acids, glucose from carbohydrates and fatty acids from lipids is known as

- (A) Anabolism
- (B) Metabolism
- (C) Catabolism
- (D) Cretinism

4. The normal daily output of Urea through urine in grams is: -----

- (A) 10 to 20
- (B) 15 to 25
- (C) 20 to 30
- (D) 25 to 35

5. Living cells have the unique ability to synthesize only _____ the form of optical isomer due to _____.

- (A) 'd' form, stereospecific enzymes
- (B) 'l' form stereospecific enzymes
- (C) 'd' form, DNA
- (D) 'L' form, DNA

6. The importance of phospholipids as constituent of cell membrane is because they possess

- (A) Fatty acids
- (B) Both polar and nonpolar groups
- (C) Glycerol
- (D) Phosphoric acid

7. Dietary fibre denotes -----

- (A) Undigested proteins
- (B) Plant cell components that cannot be digested by own enzymes
- (C) All plant cell wall components
- (D) All non-digestible water insoluble polysaccharide

8. The nitrogenous base in lecithin is -----

- (A) Ethanolamine
- (B) Choline
- (C) Serine
- (D) Betain

9. Prostaglandin synthesis is increased by activating phospholipases by

- (A) Mepacrine
- (B) Angiotensin II
- (C) Glucocorticoids
- (D) Indomethacin

10. The most potent Vitamin D metabolite is-----

- (A) 25-Hydroxycholecalciferol
- (B) 1,25-Dihydroxycholecalciferol
- (C) 24, 25-Dihydroxycholecalciferol
- (D) 7-Dehydrocholesterol

11. In β -oxidation 3-ketoacyl-CoA is splitted at the 2, 3 position by the enzyme:

- (A) Hydratase
- (B) Dehydrogenase
- (C) Reductase
- (D) Thiolase

12. Which of the following is biological uncoupler of oxidative phosphorylation?

- (A) 2,4-dichlorophenoxyacetic acid
- (B) Keratin
- (C) Thermogenin
- (D) 2,4-trinitrophenol

13. Three of the bases found in nucleic acids are pyrimidines and two are purines. Which of the following is correct?

	Pyrimidines	Purines
(A)	adenine and thymine	cytosine and guanine
(B)	adenine and cytosine	thymine and guanine
(C)	uracil and thymine	adenine and guanine
(D)	cytosine and uracil	thymine and cytosine

14. An enzyme of the citric acid cycle also found outside the mitochondria is -----

- (A) Isocitrate dehydrogenase
- (B) Citrate synthetase
- (C) α -Ketoglutarate dehydrogenase
- (D) Malate dehydrogenase

15. In the synthesis of glycogen from glucose the reversible step is

- (A) Glucose \rightarrow glucose 6-phosphate
- (B) Glucose 6-phosphate \rightarrow glucose 1-phosphate
- (C) Glucose 1-phosphate \rightarrow UDP glucose
- (D) UDP glucose \rightarrow glycogen

16. All the following are coenzymes except -----

- (A) Ubiquinone
- (B) CoA
- (C) Pyruvate dehydrogenase
- (D) Lipoic acid

17. A person with phenylketonuria cannot convert-----
(A) Phenylalanine to tyrosine
(B) Phenol to ketones
(C) Phenylalanine to isoleucine
(D) Phenylalanine to lysine
18. The first line of defense in the brain in the conditions of hyperammonemia is -----
(A) Urea formation
(B) Glutamate synthesis
(C) Glutamine synthesis
(D) Asparagine synthesis
19. A child presented with increased frequency of urination, photophobia and impaired vision.
Which out of the following defects could be responsible for the said symptoms?
(A) Tyrosinuria
(B) Cystinosis
(C) Alkaptonuria
(D) Albinism
21. Glucose-6-phosphatase is not present in-----
(A) Liver and kidneys
(B) Kidneys and muscles
(C) Kidneys and adipose tissue
(D) Muscles and adipose tissue
22. Pyruvate carboxylase is regulated by-----
(A) Induction
(B) Repression
(C) Allosteric regulation
(D) All of these

23 Obesity increases the risk of

- (A) Hypertension
- (B) Diabetes mellitus
- (C) Cardiovascular disease
- (D) All of these

24. Our body can get pentoses from-----

- (A) Glycolytic pathway
- (B) Uronic acid pathway
- (C) TCA cycle
- (D) HMP shunt

25. One molecule of glucose gives _____ molecules of CO₂ in one round of HMP shunt.

- (A) 6
- (B) 1
- (C) 2
- (D) 3

26. The amino acid with a nonpolar side chain is.....

- (A) Serine
- (B) Valine
- (C) Asparagine
- (D) Threonine

27. A ketogenic amino acid is-----

- (A) Valine
- (B) Cysteine
- (C) Leucine
- (D) Threonine

28. The following are factors affecting enzyme activity except-----

- (A) Concentration
- (B) pH
- (C) Temperature
- (D) Cofactors

29. Pyruvate dehydrogenase a multienzyme complex is required for the production of.....

- (A) Acetyl-CoA
- (B) Lactate
- (C) Phosphoenolpyruvate
- (D) Enolpyruvate

30. Enzyme increases the rate of reaction by lowering the activation energy.

- (A). True
- (B). False

SHORT ASSAY QUESTIONS: SECTION B (20 MARKS)

Attempt ALL Questions

- 1) (a.i.) Which reaction steps of HMP are involved in generation of NADPH?
[1½ Marks]
 - a. ii.) Outline TWO uses of NADPH. 2 Marks]
- 2) (b). Define
 - a. i. Metabolons [½ Mark]
 - b. ii. Protein turnover [½ Mark]
 - c. iii. Cofactors [½ Mark]
- 3) (a) Briefly explain why we require fats in our diet. [1Mark]
- 4) (b) Describe the mobilization of fatty acids from adipocytes [3 Marks]
- 5) (i). Explain how Allopurinol works to decrease Uric Acid excretion. [2 Marks]
- 6) (ii). Highlight **FOUR** (4) key enzymes of gluconeogenesis [2 Marks]
- 7) Outline **FOUR** (4) functions of vitamins in TCA cycle. [4 Marks]
- 8) Briefly explain mechanisms of ammonia toxicity. [3 Marks]

SECTION C: LONG ASSAY QUESTIONS (20 Marks)

Answer any TWO Questions

- 1) Describe the fate of Propionyl-CoA in the β -oxidation of fatty acids. [10 Marks]
- 2) Describe the fate of pyruvate in glucose metabolism. [10 Marks]
- 3) Describe the composition of respiratory chain. [10 Marks]