



# **MAASAI MARA UNIVERSITY**

**REGULAR UNIVERSITY EXAMINATIONS  
2018/2019 ACADEMIC YEAR  
FIRST YEAR SECOND SEMESTER**

**SCHOOL OF SCIENCE AND INFORMATION  
SCIENCE  
DEPARTMENT OF NURSING  
BACHELOR OF SCIENCE IN NURSING (BSc. N)**

**COURSE CODE: NUR 1205  
COURSE TITLE: MEDICAL BIOCHEMISTRY  
END OF SEMESTER TWO EXAMINATION**

**DATE: 23<sup>RD</sup> APRIL, 2019**

**TIME: 0830 - 1130HRS**

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**INSTRUCTIONS TO CANDIDATES**

**This paper has THREE sections. Answer ALL questions in sections A and B. Choose only TWO questions from section C.**

**SECTION A:** Answer all the questions (20 mrks)

1. The followings are biological buffering systems. EXCEPT;

- A) Bicarbonate/carbonic acid buffer system
- B) Calcium buffer system
- C) Hemoglobin buffer system
- D) Phosphate buffer system

2. Below are inhibitors of viral replication matched with their mode of action. Identify one that is **INCORRECTLY** matched?

- A) Non-nucleoside reverse transcriptase inhibitor: Inhibits activity of reverse transcriptase by binding to site other than nucleotide binding site
- B) Nucleoside analogs: results in termination of growing nucleotide chain
- C) Non-nucleoside polymerase inhibitor: Inhibit activation of viral polymerases by binding to site other than nucleotide binding site
- D) Protease inhibitor: Inhibit HIV encoded enzyme Neuraminidase

3. The symptoms of vitamin B12 deficiency include the following except one. EXCEPT;

- A) Night blindness
- B) Megaloblastic anaemia.
- C) Neurological disturbances
- D) Gastric atrophy and malabsorption.

4. Below are metabolic disorders associated with urea formation. Which defect is **CORRECTLY** matched with the enzyme deficiency

- A) Citrullinemia - Arginosuccinate synthase
- B) Arginosuccinic aciduria - Arginase
- C) Arginosuccinic aciduria - Carbamoyl phosphate synthase I
- D) Hyperammonemia type I - Arginisuccinase

5. Below are examples of selective media used in biochemical tests for isolation of pathogenic bacteria. Which one is **NOT**?

- A) Saboraud's Dextrose Agar
- B) Brilliant Green Agar
- C) Blood agar plate
- D) Bismuth Sulfite Agar

6. Gluconeogenesis is a reverse process of glycolysis. Below are steps that are by passed for gluconeogenesis to proceed. Which is the **ODD** one out?

	<b>Glycolysis</b>	<b>Gluconeogenesis</b>
A	Hexokinase	By Glucose 6 phosphatase
B	Phosphofructokinase -1	By Fructose 1,6 bisphosphatase
C	Pyruvate kinase	By: Pyruvate carboxylase and Phosphoenolpyruvate carboxykinase
D	Phosphoglycerate kinase	Phosphoglycerate phosphatase

7. Below are statements in regard to Lesch-Nyhan syndrome. Which statement is **FALSE**?

- A) It is due to a defect or lack of in the HGPRT enzyme
- B) It is sex-linked metabolic disorder: only females suffer from it
- C) Loss of HGPRT leads to elevated PRPP levels and stimulation of de novo purine synthesis.
- D) Uric acid level rises and there is gout

8. Select the step that is **NOT** involved in glycerol oxidation.

- A) Phosphorylation,
- B) Reduction
- C) Oxidation
- D) Isomerisation

9. Which of the following is **NOT** a clinical significance condition of hemostasis?

- A) Hemophilia A
- B) Von Willebrand disease
- C) Lesch-Nyhan
- D) Antithrombin deficiency

10. Which one of the following enzymes is shared between TCA and Electron transport chain?

- A) Succinate dehydrogenase
- B) NADH dehydrogenase
- C) ATP synthetase
- D) Cytochrome C Oxidase

11. Which of the following hormone is NOT matched correctly with its biochemical functions

- A) Insulin - Increases glucose uptake and utilization; Increase lipogenesis

- B) Glucagon - Increase lipid mobilization and glycogenolysis in order to increase blood glucose level
- C) Epinephrine - Increase glycogenolysis, lipid mobilization, smooth muscle contraction, cardiac function, binds to all classes of catecholamine receptors ( $\alpha$  and  $\beta$  adrenergic receptors)
- D) Androgens - Reduces the rate of gastric emptying; Suppresses of food intake; Suppresses post meal glucagon secretion

12. Some enzymes require NAD to carry out their biochemical functions. Which one among those mentioned below **DOES NOT**?

- A) Glyceraldehyde-3-phosphate dehydrogenase
- B) Glutathione Reductase
- C) Malate dehydrogenase
- D)  $\beta$ -hydroxy acyl-CoA dehydrogenase.

13. Which of the following **TWO** amino acids are solely ketogenic hence give rise only to acetyl CoA or acetoacetyl-CoA.

- A) Lysine and leucine
- B) Glucogenic and leucine
- C) Lysine and Proline
- D) Leucine and Ketogenic

14. Select the precursor and result of electron chain transport?

- A) FADH and NADH
- B) ATP and NADH
- C) NADH and ATP
- D) ATP and FADH

15. Which of the statements below **DOES NOT** apply to hyperlipidemia

- A) It is a major modifiable risk factor for atherosclerosis
- B) It is a major modifiable risk factor for cardiovascular disease, including coronary heart disease
- C) It is a major modifiable risk factor for hypertension
- D) It is major modifiable risk factors for both of disorders involving hypercholesterolemia and hypertriglyceridemia

16. Which statement below **WRONGLY** describe HDL (high density lipoprotein)

- A) Carry cholesterol from organs and blood to liver to get rid of it
- B) It removes excess cholesterol from tissues (it cleans blood).
- C) High levels linked to a reduced risk of heart and blood vessel disease.
- D) High level predisposes one to cardiovascular diseases

17. A lipid profile usually includes the levels of the following; EXCEPT?

- A) Total cholesterol
- B) Very low-density lipoprotein
- C) High-density lipoprotein
- D) Triglycerides

18. The following are lysosomal storage disorders; EXCEPT?

- A) Von Willebrand disease
- B) Tay-Sachs
- C) Niemann-Pick disease
- D) Gaucher's disease

19. Below are amino acid metabolism disorders linked to the affected degradative pathway. Which one is **WRONGLY** matched?

- A) Phenylketonuria- phenylalanine
- B) Homocysteinuria- methionine
- C) Maple syrup urine disease- Leucine, isoleucine and valine
- D) Tyrosinaemia- Tryptophan

20. Which of the hormone is **NOT** hypothalamic derived?

- A) Corticotropin releasing hormone
- B) Prolactin releasing inhibiting hormone
- C) Growth hormone releasing hormone
- D) Lutenizing hormone

**SECTION B:** Answer **ALL** questions (40 mrks)

1a. State three stages involved in fatty acid synthesis (3 mrks)

b. Illustrate the reactions sequence in the  $\beta$ -oxidation (5 mrks)

2a. Use biochemical reactions to explain the principles behind the following tests (4 mrks)

i. Indole

ii. Methyl red

iii. Voges Proskauer

iv. Citrate

b. Define the following terms (4 mrks)

i. Selective Media

ii. Differential Media

iii. Enrichment Culture

iv. Pure Culture

3a. Discuss Viral uncoating as a target for drug (4 mrks)

- b. Discuss DNA synthesis inhibitors (4 mrks)
- 4a. Explain the classification of hormones based on chemical Structure (4 mrks)
- b. Illustrate the mechanism of action of lipophilic (hydrophobic) hormones (4 mrks)
- 5a. Show the reciprocal regulation of PFK-1 and F1, 6-BP (4 mrks)
- b. State any FOUR examples of storage diseases (4 mrks)

**SECTION C: Answer only TWO questions (40 mrks)**

- 1a. Explain the primary activities of thyroid hormone (T3) on different target tissues. Clearly indicated the biochemical mechanisms involved (10 mrks)
- b. Illustrate the urea (10 mrks)
- 2a. Describe the clinical significance of thiamine deficiency (10 mrks)
- b. Illustrate the biosynthesis pathways for the following:
- i. Synthesis of AMP and GMP from IMP (6 mrks)
- ii. ADP, ATP, GDP AND GTP (4 mrks)
- 3a. While citing examples, discuss the mechanism for the drugs that inhibit cell wall synthesis 'Peptidoglycan synthesis' State the differences in the susceptibility to such drugs (10 mrks)
- b. Explain using appropriate biochemical equations the following effects (10 mrks)
- i. Bohr Effect
- ii. Chloride effect
- iii. Haldane effect
- 4a. Discuss bleeding disorders related to fibrinogen (10 mrks)
- b. Describe the regulation of glycogen synthesis. Include an appropriate diagram as an illustration (10 mrks)

THE END