



# **MAASAI MARA UNIVERSITY**

**REGULAR UNIVERSITY EXAMINATIONS  
2022/2023 ACADEMIC YEAR  
FIRST YEAR SECOND SEMESTER**

**SCHOOL OF NATURAL RESOURCES, TOURISM  
AND HOSPITALITY**

**BACHELOR OF SCIENCE IN ANIMAL HEALTH  
AND PRODUCTION**

**COURSE CODE: AHP 1204-1**

**COURSE TITLE: BIOCHEMISTRY II**

**DATE: 20/4/2023**

**TIME: 1100-1300 HRS**

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**INSTRUCTIONS TO CANDIDATES**

Answer **ALL** questions

*This paper consists of 3 printed pages. Please turn over*

**SECTION A: ANSWER ALL QUESTIONS (20 MRKS)**

1. Select the enzyme that is **NOT** involved in Ubiquitin conjugation
  - A. Ubiquitin-Activating Enzyme
  - B. Ubiquitin-Conjugating Enzyme
  - C. Ubiquitin-Protein Ligase
  - D. Ubiquitin-Protein gyrase
2. Choose the statement that **BEST** explain the role of NADPH
  - A. To prevent oxygen toxicity.
  - B. Used in catabolic processes
  - C. To prevent toxic effect of  $\text{NH}_3$
  - D. To prevent the formation of urine
3. Below are characteristics of Carboxylation of acetyl CoA during fatty acid synthesis. Which one is **NOT**?
  - A. A carboxybiotin intermediate is formed.
  - B. GTP is hydrolyzed.
  - C. The  $\text{CO}_2$  group in carboxybiotin is transferred to acetyl CoA to form malonyl CoA.
  - D. Acetyl CoA carboxylase is the regulatory enzyme.
4. Which of the following statements **DOES NOT** describe the function of growth hormone
  - A. Enhances metabolism and growth of body tissues
  - B. Stimulates Protein synthesis and Lipolysis
  - C. Enhances the development of mammary glands
  - D. Stimulates production of Insulin-like Growth Factor (IGF) in Liver
5. Degradation of pyrimidine nucleotides produces the following **EXCEPT**?
  - A.  $\beta$ -alanine (CMP and UMP)
  - B.  $\beta$ -aminoisobutyrate (dTMP)
  - C.  $\text{NH}_3$
  - D.  $\beta$ -glycine
6. Which one among the four stages below is **NOT** involved in protein synthesis?

- A. Transcription
  - B. RNA processing
  - C. Replication
  - D. Post-translation processing
7. During the biosynthesis of protein the  $\text{NH}_3$  is primarily donated by.....
- A. Glutaamine
  - B.  $\alpha$ -keto acid
  - C. Glutamate
  - D. Alanine
8. Which of the high energy compounds is not produced in TCA cycle?
- A. NADH
  - B. ATP
  - C. GTP
  - D. FADH
9. Select the molecule that act as immediate precursor for glycogen synthesis
- A. Uridine monophosphate glucose
  - B. Uridine triphosphate glucose
  - C. Adenine triphosphate glucose
  - D. Uridine diphosphate glucose
10. Which of the following urea cycle reactions takes place in the liver mitochondria?
- A. Formation of citrulline
  - B. Formation of Argininosuccinate
  - C. Cleavage of Argininosuccinate
  - D. Formation of urea by cleavage of Arginine
11. Select the statements that **DOES NOT** explain the role of the three tRNA binding sites the large ribosomal subunit
- A. The A site binds an aminoacyl-tRNA (a tRNA bound to an amino acid)
  - B. The D site that binds alanine
  - C. P site binds a peptidyl-tRNA (a tRNA bound to the peptide being synthesized).
  - D. The E site binds a free tRNA before it exits the ribosome.

12. The transport of fatty acids into the mitochondria is facilitated by a protein called

- A. Carnitine
- B. Acyl transporter
- C. Mutase
- D. Histones

13. Which among the enzymes listed below is **NOT** produced pancreatic juice during protein degradation

- A. Trypsin
- B. Chymotrypsin
- C. Aminopeptidase
- D. Carboxypeptidase

14. Select the characteristic that **DOES NOT** relate to gene expression in prokaryotes

- A. Polysomes are found in the cytoplasm
- B. Genes are grouped in operons
- C. Have one type of RNA polymerase for all types of RNA
- D. The existence of introns is extremely rare

15. Which of the following characteristics below **DOES NOT** relate to the de novo synthesis of pyrimidine?

- A. Pyrimidine ring is made first, then attached to ribose-P (unlike purine biosynthesis)
- B. Only 2 precursors (aspartate and glutamine, plus  $\text{HCO}_3^-$ ) contribute to the 6-membered ring
- C. Requires 11 steps (instead of 6 for purine)
- D. The product is UMP (uridine monophosphate)

16. Select the statement that **BEST** explain the function of Glycogen synthase during glycogen synthesis

- A. Catalyzes phosphorolytic cleavage of the  $\alpha$  (1 $\rightarrow$ 4) glycosidic linkages of glycogen
- B. Catalyzes elongation of glycogen chains
- C. Transferase: transfers 3 glucose residues from a 4-residue limit branch to the end of another branch

D. Catalyzes attachment of glucose to one of its own tyrosine.

17. Which of the terms below **DOES NOT** describe the genetic code

- A. Non overlapping
- B. Unambiguous
- C. Replicative
- D. Degenerate

18. Choose one that **DOES NOT** represent four complexes of electron transport chain

- A. NADH dehydrogenase
- B. Succinate dehydrogenase
- C. Cytochrome c Oxidase
- D. Ketoglutarate dehydrogenase

19. Which of the following is the end product of glycolysis?

- A. Pyruvate
- B. Lactate
- C. Alcohol
- D. Acetyl CoA

20. TCA cycle is initiated by the joining together of Acetyl CoA and .....to form citrate

- A. Succinate
- B. Fumarate
- C. Isocitrate
- D. Oxaloacetic acids

### **SECTION B: ANSWER ALL QUESTIONS (40 MRKS)**

1. Outline the following events concerning protein synthesis
  - a. Initiation (4 mrks)
  - b. RRNA processing (3 mrks)
2. Describe the functions of proteins that are involved in DNA replication (5 mrks)
3. Illustrate the mechanism of lac Z gene (5 mrks)
4. Outline the biochemical events in amino acids catabolism that yields Succinyl CoA as intermediate of TCA cycle (5 mrks)

5. Discuss the synthesis of glycogen (6 mrks)
6. Outline diagrammatically the oxidative phosphorylation (6 mrks)
7. State the tissue specificity of glycolysis (6 mrks)

### **SECTION C: ANSWER ANY TWO QUESTIONS**

#### **QUESTION ONE**

Organs of the body carry out specific biochemical functions based on their cells adaptation. Explain the biochemical functions of the organs stated below

- a. Liver (10 mrks)
- b. Kidney (10 mrks)

#### **QUESTION TWO**

Lipid metabolism is regulated through hormones and compartmentalisation. Illustrate the following

- a. Hormonal regulation of fatty acid degradation (10 mrks)
- b. Citrate transport system (10 mrks).

#### **QUESTION THREE**

Hormones are important chemical messengers that control metabolic processes. Discuss the following:

- a. The biochemical functions of anterior pituitary hormones (10 mrks).
- b. The primary activities of triiodothyronine on target (10 Marks)

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