



KENYATTA UNIVERSITY
EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE
(MEDICAL LABORATORY SCIENCE)

HML 118: BASIC BIOCHEMISTRY

2ND SEMESTER 2021/2022

TIME: 2 HOURS

INSTRUCTIONS:

SECTION A: Answer all questions. Each question is 4 marks.

1. Illustrate the mechanism of action of enzymes. (4 marks)
2. Name two essential fatty acids and state one importance of each in the body. (4 marks)
3. State four final effects of hormone action. (4 Marks)
4. Explain the importance of the Cori cycle. (4 marks)
5. Distinguish between the following forms of monosaccharide isomerism:
 - i) Alpha and beta anomers (2 marks)
 - ii) Aldose and ketose isomerism (2 marks)

SECTION B: Answer One question. Each question is 20 marks

6.
 - a) Describe the process of heme degradation. (10 marks)
 - b) Outline the structure of Deoxyribonucleic acid. (10 marks)
7. Discuss the four levels of protein structure. (20 marks)

SECTION C: Answer ALL questions in the Answer booklet. (Each question is ½ n

1. Which of the following is an imino acid?
 - a) Alanine
 - b) Glycine
 - c) Proline
 - d) Serine
2. The main source of glucose carbons for gluconeogenesis is
 - a) Guanine
 - b) Alanine
 - c) Cysteine
 - d) Threonine
3. Unfolding of a protein can be termed as
 - a) Renaturation
 - b) Denaturation
 - c) Oxidation
 - d) Reduction
4. Identify the purine base of nucleic acids in the following
 - a) Cytosine
 - b) Thymine
 - c) Uracil
 - d) Adenine
5. Gluconeogenesis involves conversion of
 - a) Glucose to pyruvate
 - b) Pyruvate to glucose
 - c) Phosphoenolpyruvate to glucose
 - d) Pyruvate to fructose
6. Which of the following is the rate-limiting enzyme for the synthesis of heme?
 - a) delta-aminolevulinic acid synthase 1
 - b) Uroporphyrinogen synthase III
 - c) Protoporphyrinogen oxidase
 - d) Ferrochelatase

Glutamine is converted to glutamate and NH_4^+ by

- a) Amino transferases
- b) Glutaminase
- c) Glutamine synthase
- d) Glutamate dehydrogenase

8. Urea production occurs almost exclusively in

- a) Kidneys
- b) Liver
- c) Blood
- d) Urine

9. Which of the following statements is true?

- a) High insulin/glucagon ratio activates lipolysis in muscle
- b) High insulin/glucagon ratio inhibits lipolysis in liver
- c) High insulin/glucagon ratio activates lipolysis in adipocytes
- d) Low insulin/glucagon ratio activates lipolysis in adipocytes

10. Which of the following are exclusively glucogenic?

- a) Arginine
- b) Leucine
- c) Lysine
- d) Threonine

11. Which of the following type of metabolite is used for generating glucose under severe starvation conditions?

- a) Amino acids
- b) Fats
- c) Glycogen
- d) Starch

12. Gluconeogenesis responds to which of the following?

- a) Hormonal control
- b) pH control
- c) Temperature control
- d) Blood control

13. Which of the following is a potent regulator of glycolysis and gluconeogenesis?
- a) Fructose 2, 6-bisphosphate
 - b) Fructose 1, 6-bisphosphate
 - c) Fructose 6-phosphate
 - d) Glucose 1, 6-bisphosphate
14. Which of the following enzyme catalyzes the first step of glycolysis?
- a) Hexokinase
 - b) Pyruvate kinase
 - c) Glucokinase
 - d) Phosphofructokinase-1
15. The product formed in the first substrate level phosphorylation in glycolysis is
- a) Pyruvate
 - b) 3-phosphoglycerate
 - c) 1, 3-bisphosphoglycerate
 - d) 2-phosphoglycerate
16. Oxaloacetate is reduced to malate by
- a) Pyruvate carboxylase
 - b) Malate dehydrogenase
 - c) Pyruvate kinase
 - d) Phosphofructokinase-1
17. Which of the following statements is correct about oxidative pentose phosphate pathway?
- a) It generates NADH
 - b) It oxidizes NADPH to NADP+
 - c) The pathway supplies ribose 5-phosphate and NADPH in the quantities the cell requires
 - d) Glucose 6-phosphatase catalyzes the rate limiting reaction of the pathway
18. Heme is a tetrapyrrole structure consisting of Fe^{+2} ions in the center of the porphyrin ring. Which of the following proteins consist of heme?
- a) Myoglobin
 - b) Hemoglobin
 - c) Cytochrome
 - d) All of the above

What is the general mechanism of an enzyme?

- a) It acts by reducing the activation energy
- b) It acts by increasing the activation energy
- c) It acts by decreasing the pH
- d) It acts by increasing the pH

20. The first amino group entering into urea cycle is

- a) Carbomyl phosphate
- b) Ornithine
- c) Cituilline
- d) Argininosuccinate