



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2020/2021
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
SCIENCE (MEDICAL LABORATORY SCIENCE)
HML 118: BASIC BIOCHEMISTRY

DATE: Monday 24th May 2021

TIME: 11.00a.m. - 1.00p.m.

INSTRUCTIONS:

SECTION A: ANSWER ALL QUESTIONS.

1. a) List two characteristics of the peptide bond. (2 marks)
b) Define protein denaturation (2 marks)
2. Distinguish between :
a) reducing and non-reducing sugar (2 marks)
b) an amino acid and an imino acid (2 marks)
3. Differentiate between water soluble and fat soluble vitamin and with an example, illustrate importance in the body. (4 marks)
4. List two purine and two pyrimidine bases, showing which is in what category. (4 marks)
5. List four clinical signs of essential fatty acid deficiency in humans. (4 marks)

SECTION B Answer Only ONE question

6. a) Discuss carbohydrate breakdown through the glycolytic pathway. (15 marks)
b) Discuss the factors that influence glycogen catabolism and anabolism. (5 marks)
7. a) Discuss Bilirubin metabolism and its importance. (10 marks)
b) Describe the amino acid breakdown through the urea cycle. (10 marks)

SECTION C: ANSWER ALL QUESTIONS BY CIRCLING THE RIGHT ANSWER.

EACH QUESTION IS ½ mark.

1. Which among the following is both glucogenic and ketogenic?
 - a) Isoleucine
 - b) Leucine
 - c) Lysine
 - d) Histidine

2. The factor which does not affect pK_a value of an amino acid is
 - a) The loss of charge in the α -carboxyl and α -amino groups
 - b) The interactions with other peptide R groups
 - c) Other environmental factors
 - d) Molecular weight

3. Which of the following is not the classified form of conjugated proteins?
 - a) Lipoproteins
 - b) Glycoproteins
 - c) Metalloproteins
 - d) Complete proteins

4. Which part of the amino acid gives it uniqueness?
 - a) Amino group
 - b) Carboxyl group
 - c) Side chain
 - d) None

5. Which of the following information is responsible to specify the three-dimensional shape of a protein?
 - a) The protein's peptide bond
 - b) The protein's amino acid sequence
 - c) The protein's interaction with other polypeptides
 - d) The protein's interaction with molecular chaperons

6. Unfolding of a protein can be termed as
- a) Renaturation
 - b) Denaturation
 - c) Oxidation
 - d) Reduction
7. The molecule which acts directly on an enzyme to lower its catalytic rate is
- a) Repressor
 - b) Inhibitor
 - c) Modulator
 - d) Regulator
8. 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
9. Identify the purine base of nucleic acids in the following
- a) Cytosine
 - b) Thymine
 - c) Uracil
 - d) Adenine
10. Which of the following are not the components of RNA?
- a) Thymine
 - b) Adenine
 - c) Guanine
 - d) Cytosine
11. What is the composition of nucleoside?
- a) a sugar + a phosphate
 - b) a base + a sugar
 - c) a base + a phosphate
 - d) a base + a sugar + phosphate

12. Building blocks of nucleic acids are

- a) Nucleotides
- b) Nucleosides
- c) Amino acids
- d) Histones

13. Glutamate is metabolically converted to α -ketoglutarate and NH_4^+ by a process

- a) Oxidative deamination
- b) Transamination
- c) Reductive deamination
- d) Deamination

14. Urea production occurs almost exclusively in

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

15. The first amino group entering into urea cycle is

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

16. 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

17. Gluconeogenesis responds to which of the following?

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

18. When blood sugar levels fall, glycolysis is halted in liver to allow

- a) Homeostasis
- b) Anaerobic respiration
- c) Aerobic respiration
- d) Gluconeogenesis

19. Which of the following statements is true about PFK-1?

- a) It is stimulated by AMP and ADP
- b) It is stimulated by citrate and ATP
- c) It is inhibited by AMP and ADP
- d) It is stimulated by citrate and ADP

20. The substrate used in the last step of glycolysis is

- a) Glyceraldehyde 3-phosphate
- b) Pyruvate
- c) Phosphoenolpyruvate
- d) 1, 3-bisphosphoglycerate