



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)
(A Centre of Excellence)

Faculty of Applied & Health Sciences

DEPARTMENT OF MEDICAL SCIENCES

BACHELOR OF TECHNOLOGY IN MEDICAL LABORATORY SCIENCES

AML 4210: BASIC METABOLISM

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2012

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **TWO** sections **A & B**

Answer **ALL** questions in this paper

Section **A** is multiple choice questions

Circle the correct response and avoid guesswork half a mark will be deducted for any wrong response

Section **B** has essay questions. Attempt **ALL** questions in this section in the answer booklet provided

This paper consists of **FIVE** printed pages

SECTION A (ANSWER ALL QUESTIONS – 1 MARK EACH)

1. Which of the following metabolic pathways is common in aerobic and anaerobic organism?
 - a) Oxidative phosphorylation
 - b) Glycolysis
 - c) The citric acid cycle
 - d) None of the choices are correct
2. Which of the following is a result of glycolysis?
 - a) Net loss of TWO ATPs per glucose molecule

- b) Conversion of FAD to FADH₂
 - c) Conversion of glucose to two three-carbon compounds
 - d) Production of CO₂
3. Glycolysis
- a) Does not occur in bacterial cells
 - b) Takes place in virtually all cells
 - c) Does not occur in yeast cells
 - d) Does not occur in animal cells
4. Pyruvate
- a) Is the molecule that starts the citric acid cycle
 - b) Is the end product of oxidative phosphorylation
 - c) Is a six-carbon molecule
 - d) Forms at end of glycolysis
5. The end products of the citric acid cycle include all the following except.
- a) CO₂
 - b) Pyruvic acid
 - c) FADH₂
 - d) ATP
6. In the electron transport chain, the final electron acceptor is:
- a) A molecule of water
 - b) A molecule of carbon dioxide
 - c) ATP
 - d) An oxygen atom
7. The two strands of a DNA molecule are held together through base-pairing. Which of the following best describes the base-pairing in DNA?
- a) Adenine forms two hydrogen bonds with thymine
 - b) Adenine forms two hydrogen bonds with uracil
 - c) Cytosine forms two hydrogen bonds with guanine
 - d) Cytosine forms two hydrogen bonds with thymine
8. Which of the following is an example of denaturation?
- a) Water freezing
 - b) Sugar dissolving in water
 - c) Egg white forming a solid when heated
 - d) Batter changing from a solid to a liquid
9. The bonding of unit molecules to produce a polysaccharide is called:
- a) Hydrolysis
 - b) Translation
 - c) Cellular respiration
 - d) Dehydration synthesis
10. Which of the following is made up of glucose molecules?
- a) Fats

- b) DNA
 - c) Proteins
 - d) Glycogen
11. Un saturated fat can be changed into a saturated fat if:
- a) Peptide bonds were broken
 - b) Hydrogen atoms were added
 - c) Glycerol molecules were added
 - d) Fatty acid chains were shortened
12. Fatty acids containing double bonds are found in:
- a) Proteins
 - b) Saturated lipids
 - c) Polysaccharides
 - d) Unsaturated lipids
13. Which of the following is composed of nucleotides?
- a) Fat
 - b) RNA
 - c) Starch
 - d) Protein
14. Which of the following represent the structure of a nucleotide?
- a) Salt-lipid-base
 - b) Glucose-glucose-glucose
 - c) Phosphate-sugar-nitrogenous base
 - d) Amino acid-amino acid-amino acid
15. The bonding of a glucose molecule and a maltose molecule would result in a:
- a) Triglyceride
 - b) Disaccharide
 - c) Phospholipids
 - d) Polysaccharide
16. A characteristic of unsaturated fats is that they:
- a) Denature as they cool
 - b) Are made up of a glucose and fructose
 - c) Are made up of amino acids and glycerol
 - d) Have double bonds in their carbon chains
17. A lipid molecule is produced when:
- a) Fatty acids bond to glycerol
 - b) Amino acids bond to glycerol
 - c) Monosaccharides bond to glycogen
 - d) Have double bonds in their carbon chains
18. Lipids are composed of:
- a) Nucleotides
 - b) Amino acids

- c) Monosaccharides
- d) Glycerol and fatty acids

19. Which of the following is not a part of a nucleotide?

- a) Sugar
- b) Glycerol
- c) Phosphate
- d) Nitrogen base

20. Which of the following lists the purine nucleotides?

- a) Adenine and cytosine
- b) Guanine and thymine
- c) Cytosine and thymine
- d) Adenine and guanine

21. 1. Catalysts 2. Building block of DNA 3. Structural components of cell membrane 4. Main source of energy in cellular respiration proteins act as:

- a) 1 and 2
- b) 1 and 3
- c) 2 and 3
- d) 3 and 4

22. In human body the optimum temperature for enzymatic activities is:

- a) 37°C
- b) 40°C
- c) 25°C
- d) 30°C

23. The enzymes are sensitive to:

- a) Changes in PH
- b) Changes in temperature
- c) Changes in altitude
- d) None of the above

24. The “lock and key” model of enzyme action illustrates that a particular enzyme molecule.

- a) Forms a permanent enzyme-substrate complex
- b) May be destroyed and resynthesized several times
- c) Interacts with a specific type of substrate molecule
- d) Reacts at identical rates under all conditions

25. Consider this reaction $A + B \rightarrow C + D + \text{Energy}$

- a) This reaction is exergonic
- b) An enzyme could still speed the reaction
- c) A and B are reactants; C and D are products
- d) All of these are correct.

26. An enzyme that hydrolyses protein will not act upon starch. This fact is an indication that enzymes are:

- a) Hydrolytic
- b) Specific
- c) Catalytic
- d) Synthetic

27. At high temperature the rate of enzyme action decreases because the increased heat:

- a) Changes the pH of the system
- b) Alters the active site of the enzyme
- c) Neutralize acids and bases in the system
- d) Increases the concentration of enzymes

28. Which one is not attribute of enzyme:

- a) Specific in nature
- b) Protein in chemistry
- c) Consumed in reaction
- d) Increases rate of reaction

29. _____ occurs when the inhibitory chemical, which does not have to resemble the substrate, binds to the enzyme other than at the active site.

- a) Noncompetitive inhibition
- b) Competitive inhibition
- c) Uncatalysed reaction
- d) All A, B and C

30. If an enzyme solution is saturated with substrate, the most effective way to obtain an even yield of products could be:

- a) Add more of the enzymes
- b) Add more substrate
- c) Add as allosteric inhibitor
- d) Add a non-competitive inhibitor

SECTION B (Attempt ALL questions in this section in the answer booklet provided – 40 MARKS)

1. Explain the preparatory phase of glycolysis. **(10 marks)**
2. Describe the classes of enzymes. **(10 marks)**
3. Describe the process of gluconeogenesis in animal cells. **(10 marks)**
4. Discuss the importance of the pentose phosphate pathway. **(10 marks)**