

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF  
SCIENCE IN BIOMEDICAL TECHNOLOGY

**BMET 316: METABOLISM OF LIPIDS AND NITROGENOUS COMPOUNDS**

**STREAMS: BSC. BMET**

**TIME: 2 HOURS**

**DAY/DATE: MONDAY 14/04/2025**

**11.30 A.M. – 1.30 P.M.**

**INSTRUCTIONS**

- Answer Question ONE and any other TWO questions
- Do not write on the question paper

**QUESTION ONE: (30 Marks)**

- (a) Using specific examples, explain the meaning of the following;
- |                             |          |
|-----------------------------|----------|
| (i) Lipid peroxidation      | [1 mark] |
| (ii) Catabolic reaction     | [1 mark] |
| (iii) Oxidative deamination | [1 mark] |
- (b) Describe mechanism of action of aminotransferases. What is the role of pyridoxal phosphate (PLP) in this reaction? [6 marks]
- (c) Why are unsaturated fats preferable to saturated fats for an individual whose caloric intake must be limited? [4 marks]
- (d) Describe how the fumarate produced by the purine nucleotide cycle could be catabolized to CO<sub>2</sub>. [4 marks]
- (e) List six examples of non-essential amino acids and highlight their fundamental roles in the body. [9 marks]
- (f) Why does von Gierke's glycogen storage disease cause symptoms of gout? [4 marks]

**QUESTION TWO: (20 Marks)**

- (a) Describe the oxidation of a branched-chain fatty acid found in fish, green vegetables and dairy products. [8 marks]
- (b) Discuss the pathophysiology of atherosclerosis. [8 marks]
- (c) What are the clinical manifestations of a child suffering from Lesch-Nyhan syndrome? [4 marks]

**QUESTION THREE: (20 Marks)**

Using illustrative diagrams, describe the following processes of lipid metabolism:

- (a)  $\beta$ -Oxidation of margaric acid (C-17), hence calculate Kcal of energy produced. [12 marks]
- (b) Explain how  $\beta$ -Oxidation differs from fatty acid biosynthesis. [8 marks]

**QUESTION FOUR: (20 Marks)**

- (a) Describe Kynurenine-anthranilate pathway for tryptophan catabolism. [8 marks]
  - (b) List major functions of tryptophan in the body. [6 marks]
  - (c) In the degradation pathway for isoleucine, outline the reactions that convert tiglyl-CoA to acetyl-CoA and propionyl-CoA. [6 marks]
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