CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS.

SECOND YEAR EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN BIOCHEMISTRY

BIOC 221: BASIC METABOLISM II

STREAMS: BS.c (BIOCHEMISTRY) **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 10/04/2019 **8.30 A.M - 10.30 A.M.**

INSTRUCTIONS:

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

QUESTION ONE: [30 MARKS]

(a) Outline shared reaction patterns in β -Oxidation and the TCA cycle. [5 Marks]

(b) Odd-numbered fatty acids yield one molecule of propionyl-CoA as the final degradation product. Describe the degradative pathway of this metabolite. [5 Marks]

(c) Using examples, explain the difference between glucogenic and ketogenic amino acids. [5 Marks]

(d) Explain how nitrogen that accrues in the degradation of amino acids in muscle tissue is transported to the liver. [5 Marks]

(e) Describe the metabolic effects of Protein Kinase A. [10 Marks]

QUESTION TWO: [20 MARKS]

(a) Carbon contained in fatty acids cannot be utilized efficiently for gluconeogenesis, since there is not straightforward pathway to convert the acetyl-CoA that result from their breakdown into TCA cycle intermediate. Interestingly, however, plants have a straightforward pathway to do this, describe this pathway. [10 Marks]

(b) The role of ketone body metabolism is to convert free fatty acids into more water-soluble substrates that are easier to transport and to metabolize. Outline this pathway. [10 Marks]

QUESTION THREE: [20 MARKS]

(a) Describe the reactions in the urea cycle. [10 Marks]

(b) Urea cycle defects primarily become symptomatic due to the accumulation of ammonia, which impairs brain function. Explain the pathogenesis and treatment of urea cycle enzyme defects. [10 Marks]

QUESTION FOUR: [20 MARKS]

Describe the pathogenesis of the following metabolic diseases;

(a) Tangier disease
(b) Sitosterolemia

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