CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BIOC 221: BASIC METABOLISM II

STREAMS: BSC BIOCHEMISTRY **TIME: 2 HOURS**

DAY/DATE: WEDNESDAY 18/04/2018 **11.30 A.M. – 1.30 P.M.**

INSTRUCTIONS:

- **Answer question ONE and any other TWO questions.**

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 no 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 reaction 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)

(a) Describe the biosynthesis of purine nucleotides and its regulation. (10 marks)

(b) Describe the pathogenesis of the following metabolic diseases. (10 marks)

(i) Tangier disease.
(ii) Sitosterolemia
