

**CHUKA**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**RESIT EXAM**

**EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR  
OF SCIENCE IN BIOCHEMISTRY**

**BIOC221: BASIC METABOLISM II**

**STREAM: BSC (BIOC)**

**TIME: 2 HOURS**

**DAY/DATE: MONDAY 16/11/2020**

**8.30 A.M. – 10.30 A.M.**

**INSTRUCTIONS: Answer question ONE and any other TWO.**

**QUESTION ONE (30 MARKS)**

- Outline shared reaction patterns in  $\beta$ -Oxidation and the TCA cycle. (5 marks)
- Odd-numbered fatty acids yield one molecule of propionyl-CoA as the final degradation product. Describe the degradative pathway of this metabolite. (5 marks)
- Using examples, explain the difference between glucogenic and ketogenic amino acids. (5 marks)
- Explain how nitrogen that accrues in the degradation of amino acids in muscle tissue is transported to the liver. (5 marks)
- Describe the metabolic effects of Protein Kinase A. (10 marks)

**QUESTION TWO (20 MARKS)**

- Carbon contained in fatty acids cannot be utilized efficiently for gluconeogenesis, since there is no straightforward pathway to convert the acetyl-CoA that results from their breakdown into TCA cycle intermediate. Interestingly, however, plants have a straightforward pathway to do this, describe this pathway. (10 marks)

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- b. The role of ketone body metabolism is to convert free fatty acids into morewater-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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