

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BIOC 418: COMPARATIVE ANIMAL BIOCHEMISTRY

STREAMS: BSC (BIOC)

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 15/04/2020

11.30 A.M. – 1.30 P.M.

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION 1 (COMPULSORY) – 30 MARKS

- (a) Alligators and crocodiles are normally sluggish animals. Yet when provoked they are capable of lightning fast charges and dangerous lashings of their powerful tails. Describe the energy metabolism during this fast movement and immediately after. [5 marks]
- (b) Describe how bony fishes, humans, birds and reptiles excrete their nitrogenous waste. [5 marks]
- (c) Describe the major volatile fatty acids products produced by ruminant animals and their metabolic fate of the products. [6marks]
- (d) Rotenone, a toxic natural product from plants, strongly inhibits NADH dehydrogenase of insect and fish mitochondria while Antimycin A, a toxic antibiotic, strongly inhibits the oxidation of ubiquinol
- (i) Explain why rotenone ingestion is lethal to some insect and fish species. [2 marks]
- (ii) Given that rotenone and antimycin A are equally effective in blocking their respective sites in the electron-transfer chain, which would be a more potent poison? Justify your answer. [3 marks]
- (e) Describe trehalose biosynthesis in insects and state its significance. [5 marks]
- (f) Explain the key differences between energy metabolism in fish and mammals.[4 marks]

QUESTION 2 (20 MARKS)

- (a) (i) Describe lipogenesis in ruminants. [10 marks]
- (ii) Highlight the key difference between the lipogenesis in ruminants and non-ruminants animals. [4 marks]
- (b) Describe unique larval hemolymph proteins in insects and their significance. [6 marks]

QUESTION 3 (20 MARKS)

- (a) Describe the products of protein catabolism in humans and the fate of the product. [10 marks]
- (b) Describe the energy requirement in migratory birds and highlight the main difference between energy requirement in such birds and running mammals. [10 marks]

QUESTION 4 (20 MARKS)

- (a) Describe fatty acid mobilization in insects. [10 marks]
- (b) Describe protein metabolism in ruminants. [10 marks]
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