

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BIOC 220: BASIC METABOLISM I

STREAMS: B.SC BIOCHEMISTRY

TIME: 2 HOURS

DAY/DATE: TUESDAY 04/12/2018

11.30 A.M. – 1.30 A.M.

INSTRUCTIONS:

- **Answer question one and any other two questions**

QUESTION ONE (30 MARKS)

- a Name the pathways involved in glucose utilization and summarize their functions. (4 marks)
- b Explain how the NADH that accumulates in the glyceraldehyde-3-dehydrogenase reaction is oxidized under anaerobic conditions in humans and in *Saccharomyces cerevisiae* (5 marks)
- c Explain the three enzyme deficiencies that are subsumed under galactosemia and the respective metabolites that accumulate as a result. (6 marks)
- d Outline the four functional stages in the respiratory chain. (4 marks)
- e Explain how alcohol degradation interferes with gluconeogenesis. (6 marks)
- f Explain how substrate carbon derived from muscle glycogen may be made available to bolster blood glucose levels. (5 marks)

QUESTION TWO (20 MARKS)

- a Explain how fructose is degraded, and the causation of fructose intolerance and of fructosemia. (10 marks)

- b Describe how pyruvate dehydrogenase is regulated by allosteric effectors and by phosphorylation. (10 marks)

QUESTION THREE (20 MARKS)

- a Describe the Leloir pathway for utilization of galactose. (10 marks)
- b Explain the hormonal control of glycogen synthase and phosphorylase. (10 marks)

QUESTION FOUR (20 MARKS)

- a Describe the reactions in the oxidative stage of the hexose monophosphate shunt. (10 marks)
- b Explain the causation and significance of favism. (10 marks)
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