

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

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

BIOC 425: METABOLIC REGULATION AND INTERGRATION

STREAMS: BSC (BIOC) Y4S2

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 15/04/2020

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

- Answer question ONE and any other TWO questions
- Do not write on the question paper

QUESTION ONE (30 MARKS)

- (a) Describe the role of the following enzymes in metabolic regulation and integration
- (i) Carbomyl phosphate synthetase II [2 marks]
- (ii) Fatty acids synthase complex [2 marks]
- (b) Describe regulation of de novo pyrimidine nucleotide biosynthesis in the liver [6 marks]
- (c) Describe metabolic changes that occur during diabetes mellitus highlighting possible danger. [8marks]
- (d) Fructose-2, 6-biphosphate is not an intermediate of either glycolysis or gluconeogenesis yet it is most important regulator of the two. Explain [7 marks]
- (e) Explain how gene transcription is regulated in eukaryotes [5 marks]

QUESTION TWO (20 MARKS)

- (a) Using structural and chemical formulae discuss the urea cycle, highlighting its role in amino acid metabolism. [10 marks]
- (b) Using clear illustrations, describe the composition and regulation of individual components of pyruvate dehydrogenase complex. [10 marks]

QUESTION THREE (20 MARKS)

- (a) The body maintains a relatively large free amino acid pool in the blood, even during fasting.
- (i) Give reasons for this observation [6 marks]
- (ii) Describe the mechanisms which maintains free amino acid pool in the blood [7 marks]
- (b) Discuss the Janus Kinase-signal transducers and activators of transcription mechanism of leptin signal transduction in the hypothalamus [7 marks]

QUESTION FOUR (20 MARKS)

- (a) Why are metabolic processes regulated? [4 marks]
- (b) Describe metabolic changes in the brain during well fed and fasting states. [16 marks]
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