

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS
RESIT/SPECIAL EXAMINATIONS**

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE

BIOC 404: METABOLIC REGULATION AND INTERGRATION

STREAMS:

TIME: 2 HOURS

DAY/DATE: WEDNESDAY 25/07/2018

11.30 A.M – 1.30 P.M

INSTRUCTION:

- **Answer question one and any two questions**
- **Do not write anything on the question paper**

1. (a) Describe the role of the following enzymes in metabolic regulation and integration.
 - (i) Carbomyl phosphate synthetase 1 [2marks]
 - (ii) Phospofructokinase 1 [2marks]
 - (iii) Fatty acid synthase complex [2marks]
 - (iv) Pyruvate kinase [2marks]

(b) Describe regulation of pyrimidine nucleotide biosynthesis in the liver. [7marks]

(c) Explain metabolic derangements in ketoacidosis. [6marks]

(d) List and describe key junctions in integration of metabolism. [7marks]

(e) Describe ethanol brain toxicity. [3marks]
2. (a) Using structural and chemical formulae discuss the urea cycle, highlighting its regulatory mechanism. [10marks]
- (b) Describe mechanisms that affect ketose body production by the liver. [10marks]

3. Excessive ethanol consumption can result in fatty liver, alcohol-induced hepatitis and cirrhosis:
- (a) What is the biochemical basis of above health problems? [7marks]
 - (b) Describe three pathways of ethanol metabolism in the live and hence elucidate amount of ATP produced during ethanol metabolism. [9marks]
 - (c) List other diseases associated with alcohol abuse. [4marks]
4. (a) Briefly describe the role of the following hormones in regulation of fuel metabolism:
- (i) Insulin [4marks]
 - (ii) Epinephrine [3marks]
 - (iii) Cortisol [3marks]
- (b) Discuss mechanism of **leptin** signal transduction in the hypothalamus highlighting its anorexigenic activity. [10marks]
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