CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

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

BIOC 404: METABOLIC REGULATION AND INTERGARATION

STREAMS:BSC BIOCHEM Y4S2 **TIME: 2 HOURS**

DAY/DATE: TUESDAY 10/04/2018 **11.30 A.M - 1.30 P.M**

INSTRUCTION:

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

1. (a) Describe the role of the following enzymes in metabolic regulation and integration.

   (i) Carbomyl phosphate synthetase II [2marks]

   (ii) Phosphofructokinase I [2marks]

   (iii) Fatty acid synthase complex [2marks]

   (iv) ∝-Ketoglutarate dehydrogenase complex. [2marks]

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

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

   (d) List and describe key junctions in integration of metabolism. [6marks]

   (e) Describe ethanol brain toxicity. [3marks]

2. (a) Using structural and chemical formulae discuss the urea cycle, highlighting its regulatory mechanism. [11marks]

   (b) Describe mechanisms that affect ketone body production by the liver. [9marks]

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 liver and hence elucidate amount of ATP produced during ethanol metabolism. [8marks]

(c) Explain why blood levels of ethanol are normally higher for women than for men after consuming beer. [5marks]

4. (a) Briefly describe the role of the following hormones in regulation of fuel metabolism:

(i) Glucagon [4marks]

(ii) Gherlin [3marks]

(iii) Cortisol [4marks]

(b) Discuss the JAK-STAT mechanism of leptin signal transduction in the hypothalamus highlighting its anorexigenic activity. [9marks]
