Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF PURE AND APPLIED SCIENCES
UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF
TECHNOLOGY IN INDUSTRIAL MICROBIOLOGY AND BIOTECHNOLOGY
BTMBT 12J

ABT 4208 : BASIC METABOLISM II

SEMESTER EXAMINATION

<u>DECEMBER 2013 SERIES</u>   2 HOURS

Instructions to candidates:

This paper consist of **FIVE** questions
Answer question **ONE** (compulsory) and any other **TWO** questions

QUESTION ONE

a) Define the following terms   **(10marks)**

    (i)   Catabolism

    (ii)   Metabolic disorder

    (iii)   β-oxidation

    (iv)   Ketogenesis

    (v)   Amphipathic

b) Which is the most commited step in fatty acid synthesis. Discuss this step and give the overall equation for the reactions at this step   **(6marks)**

c) Discuss the citrate regulation of Acetyl CoA carboxylase   **(4marks)**

d) With the aid of a well labelled diagram, discuss the carntine shuttle during fatty acid degradation   **(6marks)**

e) Outline FOUR fates of cholesterol **(4marks)**

QUESTION TWO

Discuss the metabolic reactions and enzymes involved in fatty acid synthesis. **(20marks)**

QUESTION THREE

State and explain FIVE functions of lipids giving relevant examples in each case. **(20marks)**

QUESTION FOUR

(i)   Use a well labelled diagram to illustrate and explain the formation of known ketone bodies **(15marks)**

(ii)   Name and discuss a disorder associated with ketone bodies build up in the body
(5marks)

QUESTION FIVE

(i)   Illustrate palmitic acid (16carbon) complete oxidation in the fatty acid spiral. **(8marks)**

(ii)   Give the overall equation for this reaction **(3marks)**

(iii)   If one turn yields one acetyl coA (2c), one FAD and one NAD, how many turns will be used for the complete oxidation of palmtoyl CoA **(1mark)**

(iv)   If acetylcoA's proceed to TCA cycle where each Acetyl CoA yields 12ATPs. What is the number of acelyl coa from this degradation?

        How many ATPs were released from all the Aceltyl-CoAs that got into the TCA cycle
(3marks)

(v)   If NAD and FAD proceed to electron transport chain, each yielding 3ATPs and 2 ATPs respectively. How many NAD and FAD were released from complete oxidation. What is the amount of ATPs Produced by these reducing agents? **(3marks)**

(vi)   What is the grand total of ATPs released from the complete oxidation of palmitic acid. Explain. **(2marks)**