TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF APPLIED AND HEALTH SCIENCES

DEPARTMENT OF PURE & APPLIED SCIENCES

UNIVERSITY EXAMINATION FOR:

BACHELOR OF TECHNOLOGY IN INDUSTRIAL MICROBIOLOGY & BIOTECHNOLOGY

ABT 4205: **BASIC METABOLISM I**

END OF SEMESTER EXAMINATION

SERIES: 2016

TIME:2HOURS

DATE: Pick DateDec2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attemptquestion ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

a) Illustrate the irreversible reactions of glycolysis (3marks)

b) Outline the Cori cycle (6marks)

c) Identify the TWO phases of HMP pathway and name their products (2marks)

d) State the catalytic role of the following;
   (i) Glucose 6-phosphate dehydrogenase (1mark)
   (ii) Ribulose 5-phosphate isomerase (1mark)

e) Identify reactions in which the following molecules take part
   (i) Uridinediphosphate glucose (1mark)
   (ii) α -ketoglutarate (1mark)

f) Outline galactose metabolism (4marks)

g) State the implication of aldolase B deficiency in a human being. (3marks)

h) Differentiate between;
   (i) Gluconeogenesis and glycogenolysis (2marks)

(ii) Enthalpy and entropy (2marks)

i) Outline steps in the TCA cycle in which decarboxylation reactions occurs (4marks)

Question TWO

With the aid of relevant illustrations, describe the fate of pyruvate in aerobic organisms (20marks)

Question THREE

Discuss the process of photosynthesis in higher plants. (20marks)

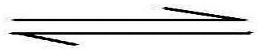
Question FOUR

(a) Describe the Hexose monophosphate pathway (10marks)

(b) Discuss the process of glycogenesis in the liver cells. (10marks)

Question FIVE

Consider the following interconversion, which occurs in glycolysis

Fructose 6-phosphate  glucose 6-phosphate K'eq = 1.97

R = 8.315 J/mol . K

(a) Calculate the$\Delta G'^{o}$ for the reaction (K'eq measured at 25 ^{O}C). (5 marks)

(b) If the concentration of fructose 6-phosphate is adjusted to 1.5 M and that of glucose 6-phosphate is adjusted to 0.50 M, calculateΔG. (6 marks)

(c) Explain why$\Delta G'^{o}$ and ΔG are different. (4 marks)

(d) Discuss the reactions of gluconeogenesis that lead to conversion of glyceraldehyde 3-phosphate to glucose. (5 marks)