KABARAK UNIVERSITY

UNIVERSITY EXAMINATIONS

2009/2010 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE

COURSE CODE: **MATH 121**

COURSE TITLE: **CALCULUS II**

STREAM: **SESSION I**

DAY: **MONDAY**

TIME: **2.00 – 4.00 P.M.**

DATE: **30/11/2009**

INSTRUCTIONS:

1. Answer Question **ONE** and any other **TWO** Questions
2. Show **ALL** your workings.

PLEASE TURN OVER

QUESTION ONE (30 MARKS) COMPULSORY

a) $\int_0^2 10x^2 + 10\ dx$ (4 mks)

(b) Integrate the following functions

(i) $\int \left(3\sqrt[4]{x^3} + \frac{7}{x^5} + \frac{1}{6\sqrt{x}}\right) dx$ (3 mks)

(ii) $\int \left(x^8 + x^{-8}\right) dx$ (3 mks)

(iii) $\int \text{Cos}\frac{x}{2} dx$ (2 mks)

(c) Solve the following by substitution method

(i) $\int \tan\theta \ \text{d}\theta$

(ii) $\int \frac{1}{\sqrt{1-x^2}} dx$ (3 mks)

(d) Evaluate $\int$ in xdx (3 mks)

(e) Find the area of the region enclosed by $y = x^2$ and $y = \sqrt{x}$ (3 marks)

(f) The region between the curve $y = \sqrt{x}$, $0 \leq x \leq 4$, and the x-axis is resolved about the x-axis to generate a solid. Find its volume. (3 mks)

(g) Evaluate $\int_0^1 \int_y^1 (3 - x - y)\ dxdy$ (3 mks)

QUESTION TWO (20 MARKS)

(a) Evaluate I, m, n + $\int_0^{x/2} \text{Cos}^m\theta \,\text{Sin}^n\theta \,d\theta$ (15 mks)

(b) Integrate the following by substitution method

$\int x^2$ Sinx³dx (5 mks)

QUESTION THREE (20 MKS)

(a) Integrate the following by parts

(i) $\int x^4 e^{\frac{x}{2}} dx$ (6 mks)

(ii) $\int \cos^2 x \, dx$ (6 mks)

(b) Evaluate $\int \frac{(x-1)^2}{\sqrt{x+4}}$ dx (5 mks)

(c) Find $\frac{df}{dy}$ if f(x $_1$y) = y Sin xy (3 mks)

QUESTION FOUR (20 MKS)

(a) Evaluate I= $\int \frac{xdx}{(x=2)^2(x-1)}$ (8 mks)

(b) Evaluate $\int_0^{0.8} \sqrt{1+x^2}$ dx using n=4 by

(i) Trapexium Rule (4 mks)

(ii) Simpson's Rule (4 mks)

(c) Find the area enclosed by y =2x ^{2} +10 and y = 4x + 16 (4 mks)

QUESTION FIVE (20 MARKS)

(a) Evaluate $\int \sin^5 x dx$ (8 mks)

(b) Evaluate $\int \frac{3x+11}{x^2-x-6} dx$ (6 mks)

(c) If $f(x_1 y) = 3x^2+x^3y+4y^2$ find

(i) $\frac{df}{dx}$ (ii) $\frac{df}{dy}$ (iii) $\frac{d^2f}{dx^2}$ (6 mks)