KABARAK  **UNIVERSITY**

SUPPLEMENTARY/SPECIAL EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE

COURSE CODE: MATH 121

COURSE TITLE: **CALCULUS II**

STREAM: SESSION I

DAY: **WEDNESDAY**

TIME: **2.00 – 4.00 P.M.**

DATE: **18/03/2009**

INSTRUCTIONS TO CANDIDATES:

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

PLEASE TURN OVER

QUESTION ONE (30 MARKS) COMPULSORY

(a) Find the domain and range of the following functions.

(i) $y=\sqrt{2x+6}$ (2 mks)

(ii) $y = \sqrt{4-x}$ (2 mks)

(b) Integrate the following functions

(i) $\int\left(3e^{-5t}+\sqrt{t}\right)dt$ (3 mks)

(ii) $\int \left(2x^5+8x^3-3x^2+5\right)dt$ (3 mks)

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

(c) Solve the following by substitution method

(i) $\int \tan\theta \, d\theta$ (3 mks)

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

(d) Evaluate $\int \ln x dx$ (3 mks)

(e) Find the area of the region bounded by the curve
$y = -x^2 + 4x - 3$ and the x axis (3 mks)

(f) The region between the curve $y = \sqrt{x}$, $0 \le x \le 4$, 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 $I_{m,n} \int_0^{\Pi/2} \text{Cos}^m\theta \, \text{Sin}^n\theta \, d\theta$ (15 mks)

(b) Integrate the following by substitution method
$\int x^2 \, \text{Sin}x^3 dx$ (5 mks)

QUESTION THREE (20 MKS)

(a) Integrate the following by parts

(i) $\int t^2 e^{2t}\,dt$ (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 $\frac{\partial f}{\partial y}$ if f(x,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) Trapezium Rule (4 mks)

(ii) Simpson's Rule (4 mks)

(c) Find the area enclosed by $y=4x-x^2$ from x=1 to x=2 and x-axis (4 mks)

QUESTION FIVE (20 MARKS)

(a) Evaluate $\int Cos^5\,\theta\,d\theta$ (8 mks)

(b) Evaluate $\int \frac{2}{x^2-4x+9}\,dx$ (6 mks)

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

(i) $\frac{\partial f}{\partial x}$ (2 mks)

(ii) $\frac{\partial f}{\partial y}$ (2 mks)

(iii) $\frac{\partial^2 f}{\partial x^2}$ (2 mks)