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 II**

DAY: **SATURDAY**

TIME: **9.00 – 11.00 A.M.**

DATE: **10/04/2010**

INSTRUCTIONS:

1. Answer question ONE and any other TWO questions
2. Begin each question on a separate page
3. Show your workings clearly and neatly.

PLEASE TURN OVER

QUESTION ONE (30 MARKS) COMPULSORY

(a) i) $\int 3e^{x} + 5\cos x - 10\sec^{2} x dx$ (4 mks)

ii) $\int 2\sec w \tan w + \frac{1}{6w} dw$ (4 mks)

(b) Use the simpsons Rule with n=4 to estimate

$\int_0^1 5x^4 dx$ and compare with exact value of the integral (4 mks)

(c) Evaluate the following integrals by substitution method

(i) $\int \cos(4x+5)dx$ (3 mks)

(iii) $\int xe^{-x^2}$ dx (3 mks)

(d) Integrate $\int x^4 e^{\frac{x}{2}}$ dx by parts (4 mks)

(e) (e) Find the area of the region enclosed by y = x^2 and y = $\sqrt{x}$ (4 mks)

(f) Determine the volume of the solid obtained by rotation the region bounded by $y = \sqrt[3]{x}$ $x = 8$ and the x-axis about the x-axis (4 mks)

QUESTION TWO (20 MARKS)

(a) Integrate the following by parts

(i) $\int e^{\theta} \cos\theta d\theta$ (6 mks)

(ii) $\int w^2 \sin(10w)dx$ (6 mks)

(b) Evaluate $\int \frac{x^2 - 29x + 5dx}{(x-4)^2(x^2+3)}$ (5 mks)

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

QUESTION THREE (20 MARKS)

(a) Determine the reduction formula for $I_m = \int \cos^m x dx$

Use the result to determine I_7 (10 marks)

(b) Approximate $\int_0^2 \frac{1}{x^2+1}$ with n = 4 using

(i) Trapezoidal Rule (5 mks)

(ii) Simpson's Rule (5 mks)

QUESTION FOUR (20 MARKS)

(a) Evaluate $\int \frac{1}{2x^2 - 12x + 21} dx$ (10 mks)

(b) Evaluate the following integrals

(i) $\int 3x^2 \sqrt{x+4}\, dx$ (6 mks)

(ii) $\int \sqrt{\tan x}\, \sec^2 x dx$ (4 mks)

QUESTION FIVE (20 MARKS)

(a) Determine the area of the region bounded by $y = 2x^2 + 10$, $y = 4x + 16$, $x = -2$ and $x = 5$

(b) Find the length of the curve $y = (\left(\frac{x}{2}\right)^{\frac{2}{3}}$ from x = 0 to x = 2 (5 mks)

(c) Evaluate the following

(i) $\int \cos^5 \theta d\theta$ (8 mks)

(ii) $\int \cos^2 \theta d\theta$