THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Applied & Health Sciences

DEPARTMENT OF PURE & APPLIED SCIENCE

AMA 2103: CALCULUS FOR SCIENCE

END OF SEMESTER EXAMINATION

SERIES: AUGUST/SEPTEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:
Answer questions **ONE** which is **(COMPULSORY)** and any other **TWO** questions
Calculators may be used
This paper consist of **THREE** printed pages

Question One

a) i) (5 marks)

ii) Given

Find the velocity and acceleration of the projectile at (6 marks)

b) i) Differentiate by first principals

$y = x^2 + 2x + 1$

(6 marks)

ii) Differentiate with respect to x

$y = InxCosx$

(4 marks)

iii) Determine the turning point s of the curve

$y = 4x^3 - 48x + 2$

(9 marks)

Question Two

a) Differentiate with respect to x to determine $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ (10 marks)

$x^2 + y^2 - 2x - 6y + 5, \quad x = 3,\ y = 2$

at

b) Given $x = \frac{4-3t}{2+t},\ y = \frac{5+2t}{2+t},$ Determine $\frac{dy}{dx}$ (10 marks)

Question Three

a) Find the equation of the tangent and normal to the curve

$x^3 + y^2y + y^3 - 8 = 0,$

at (1,0) (10 marks)

b) (i) Find the length of the curve

$y^2 = x^3$

Between $x = 0$ and $x = 4$ (5 marks)

(ii) Find the area bounded by the curve

$y = x^2 - 9$

and the *x- axis* and between $x = -3$ and $x = 3$ (5 marks)

Question Four

$$Z = \frac{2x - y}{x + y}$$

a) If

Find;

$$\frac{\partial z}{\partial x}$$

(i) (3 marks)

$$\frac{\partial z}{\partial y}$$

(ii) (3 marks)

$$\int \frac{x+1}{x^2 - 3x + 2} dx$$

b) (i) (9 marks)

$$\int \sin^3 x dx$$

(ii) (5 marks)

Question Five

a) Given the data

x	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34
f	4	9	16	12	6	3

Determine;

i) Mean (4 marks)
ii) Mode (3 marks)
iii) Median (3 marks)
iv) Standard Deviation (3 marks)

b) It has been established that 16% of all glass ware received by a certain organization are defective.

Determine;

i) The probability that any one item is defective (1 mark)

ii) The probability that any one item is acceptable (1 mark)

iii) If at one time 5050 items were received, how many were likely to be acceptable

(2 marks)

iv) If the cost of an item is Ksh. 425.50, find the likely loss the organization will occur when 5050 items are received. (3 marks)[;’