TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF PURE AND APPLIED SCINCES

DEPARTMENT OF MATHS PHYSICS

UNIVERSITY EXAMINATION FOR:
DIPLOMA IN ANALYTICAL CHEMISTRY [YEAR 1 SEM 2]

AMA 2103 CALCULUS FOR SCIENCE

END OF SEMESTER EXAMINATION
MAY SERIES

MAY 2016

TIME: 2HRS

<u>**Instructions to Candidates**</u>
You should have the following for this examination
-Answer Booklet, examination pass and student ID
This paper consists of FIVE questions. **ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**
Do not write on the question paper.

QUESTION ONE (30MKS)

a) Determine the equation of a straight line passes through $Q(4, 1)$ and is Perpendicular to line

$y = x - 2$ [3mks]

b) Determine if f(x) is continuous at $x = 2$ given that $f(x) = \frac{8x}{2-x}$ [5mks]

c) Evaluate $\lim_{x \to 4} \frac{x^2 - 16}{x - 4}$ [4mks]

d) Determine the equation of a straight line through' A(8 2) and B(6, 4) [3mks]

e) Determine the maximum value of y if $y = -0.01x^2 + 10x + 20$ [5mks]

QUESTION TWO

a. Determine the equation of perpendicular to curve $y = 2x^2 + 2\ at\ x = 1$ [5mks]

b. Find the equation of a normal to the curve $y = 2x^3 - 24x + 4$ at x=1   [5mks]

c. find g_0f given $g(x) = 2x - 2$ and $f(x) = 3x^2 + 2x + 2$ hence find $g_0f(1)$ [5mks]

d. Given that the $p = x^3 - 9x^2 + 1000$; determine the minimum and maximum values of p   [5mks]

QUESTION THREE

a) Determine the value of x where the gradient of the curve y=x^2-27x+18 is equal to 1   [4mks]

b) Use Simpson rule to evaluate $\int_2^5 x^2 dx$ with n= 6   [6mks]

c) Find the inverse of the function $h0h(1)$ given that $h(x) = 2x - 4$ [6mks]

d) Find the area under the curve $y = x^2$ from between $x = 2\ to\ x = 4$ [4mks]

QUESTION FOUR

a. A straight line passes through A(1 2) B(4 6) and C (x, 4) find the value of x [5mks]

b. Determine f^{-1} (1) given $f(x) = \frac{x}{2x+4}$ [5mks]

c. Find the value of x and y where the gradient of the curve y= x^3-4x is equal to 23 [5mks]

d. Determine the maximum value of y if y= .001x^2-0.8x+10   [5mks]

QUESTION FIVE

a) Find the second derivatives of the following curves

     i. $y = 3x^3 + 2x^2 + 10x$ [3mks]

     ii. $y = (x^2 + 1)^2$ [4mks]

     iii. $2y = 2x^2 + 3x + 4$ [3mks]

b) Find the area under the curve $y = x + 3$ between x=-2 and x=2 [5mks]

c) Investigate the continuity of the curve $y = \frac{x^2-16}{x-4}$ at $x = 4$ [5mks]