TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF PURE AND APPLIED SCINCES

DEPARTMENT OF MATHS AND PHYSICS

UNIVERSITY EXAMINATION FOR:
UPGRADING MATHS

AMA 1003 CALCULUS

END OF SEMESTER EXAMINATION
MAY SERIES YR1 SEM1

TIME: 2HRS   MAY 2016

Instructions to Candidates
You should have the following for this examination
-Answer Booklet, examination pass and student ID
This paper consists of 5 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

$y = x - 2$ [4mks]

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

c) What is the gradient and y-intercept of the following lines;

I.   Evaluate $\lim\limits_{x \to 4} \frac{x^2-16}{x-4}$ [5mks]

II.   Determine the equation of a straight line thro' A(8 2) and parallel to line $y = 0.5x + 3$ [

                                                                  5mks]

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

IV.   Find the equation of a normal to the curve $y = 2x^3 - 24x + 4$ at x=1   [6mks]

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QUESTION TWO

a. Determine the equation of perpendicular to curve $y = 2x^2 + 2$ at $x = 1$ [6mks]

b. find g_0f given $g(x) = 2x - 2$ and $f(x) = 3x^2 + 2x + 2$ hence find $g_0f(1)$ [6mks]

c. Given that the $p = x^3 - 9x^2 + 1000$; determine the minimum and maximum values of p [6mks]

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],

   Hence show that the error is $\frac{1}{3}$ [4mks]

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

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. Find the area under the curve $y = 3x^2$ between $x = 2$ to $x = 4$ [4mks]

c. Find the values of x and y where the gradient of the curve $y=\frac{1}{3}x^3-7x$ is equal to 9 [5mks]

d. Determine the maximum value of y if $y= 0.001x^2-0.8x+10$ [6mks]

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 $y = 2x + 3$ between $x = -2$ and $x = 2$ [5mks]

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

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