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**University Examinations 2014/2015**

THIRD YEAR, SPECIAL/SUPPLEMENTARY EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE INFORMATION TECHNOLOGY AND BACHELOR OF SCIENCE COMPUTER TECHNOLOGY

**SMA 2102: CALCULUS II**

**DATE: OCTOBER, 2015 TIME: HOURS**

**INSTRUCTIONS:** *Answer questions* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE - (30 MARKS)**

1. Find the function that satisfies and (4 Marks)
2. Find dx by using the substitution (4 Marks)
3. Find the tangent to the curve at the point (3,3). (4 Marks)
4. Evaluate the integral. (3 Marks)
5. Use the trapezoidal rule with n=5 to approximate the integral.  (4 Marks)
6. Express in polar form. (4 Marks)
7. Given the function where a is a constant and, find in terms of x only.

(4 Marks)

1. Find the general solution of the given differential equation by separation of variables.

(3 Marks)

**QUESTION TWO (20 MARKS)**

1. (i) Express  in partial fraction. (4 Marks)

(ii) Hence evaluate:  (2 Marks)

1. Find  by the technique of integration by parts. (5 Marks)
2. Determine;

(i) . (2 Marks)

(ii) dx (2 Marks)

(iii)  (2 Marks)

e) Given that , determine the approximate change in y if x changes from 2.50 to 2.51. (3 Marks)

**QUESTION THREE (20 MARKS)**

a) Evaluate the definite integrals;

1.  (3 Marks)
2.  (3 Marks)
3.  (3 Marks)

b) (i) Simplify :  (3 Marks)

(ii) Let and show that (4 Marks)

c) Given the parametric equations and , Determine (4 Marks)

**QUESTION FOUR (20 MARKS)**

1. A particle moves with acceleration where t. If at time t = 0, the position and velocity of the particle are S(0)= 2 and V(0)= -12, find the position function S(t) of the particle. (4 Marks)
2. Using the substitution , find  (3 Marks)
3. Prove that - Sin = 1 (3Marks)
4. Use Simpson’s rule with n= 10 to approximate  (5Marks)
5. Find the length of the arc of the semi-cubical parabola = between the points (1, 1) and (4, 8) (5 Marks)

**QUESTION FIVE (20 MARKS)**

1. Find  (2 Marks)

b) Integrate (i) + (1 Mark)

(ii (1 Mark)

(iii) (2 Marks)

(iv)  (1 Mark)

(v)  (2 Marks)

c) Sketch the curve from. Hence evaluate the area enclosed by the curve, the x-axis and the ordinates to (6 Marks)

d) By letting prove that where a,b,c and n are constants. (5 Marks)