KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2015/2016

SECOND SEMESTER EXAMINATIONS FOR THE DEGREE OF BACHELOR OF SCIENCE, BACHELOR OF EDUCATION, BACHELOR OF ARTS

SMA 201 : CALCULUS III

DATE: Tuesday 29th March 2016

TIME: 2.00p.m – 4.00p.m

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~`

INSTRUCTIONS

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

**Question One (30marks)**

1. State Green’s Theorem. (1mark)
2. Compute for , , (3marks)
3. (i) State Rolle’s Theorem. (2marks)

(ii) Hence find a number that satisfies Rolle’s Theorem for the function (3marks)

1. Evaluate the following limits:
2. (4marks)
3. (4marks)
4. Find and for , , (4marks)
5. Evaluate the following integrals:
6. (3marks)

Page 1 of 3

1. (3marks)
2. Find for (3marks)

**Question two (20 marks)**

1. Given and , find in terms of derivatives with respect to r and s.
2. Find the shortest distance from the origin to the hyperbola ,.
3. Find the relative maxim and minima of
4. A rectangular water tank, open at the top is to contain . Find the dimensions so that the total surface area is a minimum.

**Question three (20 marks)**

1. If , evaluate from (0,0,0) to (1,1,1) along the straight line (0,0,0) to (0,0,1), then to (0,1,1) and then to (1,1,1). (5marks)
2. Verify Green’s Theorem in the plane for: where C is the closed curve of the region bounded by the curves and (7marks)
3. Verify Stoke’s Theorem for where S is the surface of the paraboloid bounded by and C is the boundary.

Page 2 of 3

**Question four (20marks)**

1. For what values of a, m and b does the function satisfy the hypothesis of the Mean Value Theorem on the interval [0, 2]? (6marks)
2. The ordering and transportation cost c of components used in a manufacturing process is approximated by , where C is measured in thousands of dollars and x is the order size in hundreds.
3. Verify that C(3)= C(6) (2marks)
4. According to Rolle’s Theorem, the rate of cost of change must be zero for some order size in the interval [3,6]. Find the order size. (3marks)
5. Evaluate the following limits
6. (3marks)
7. (3marks)
8. (3marks)

**Question five (20marks)**

1. Expand as a series of ascending powers of up to the term containing and use it to evaluate 1.01. (7marks)
2. The equation defines x a differentiable function of two independent variables y and z. Find and at (1,-1,-3). (6marks)
3. Find the equation of the tangent plane and the normal to the curve

, at . (7marks)

Page 3 of 3