CHUKA UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF MASTERS IN APPLIED MATHEMATICS

CHEM 803: ADVANCED MATHEMATICS FOR CHEMISTS

STREAMS: MSC **TIME: 3 HOURS**

DAY/DATE: WEDNESDAY 07/8/2019 **8.30 A.M. – 11.30 A.M**

INSTRUCTIONS: Answer any FOUR questions

QUESTION ONE

(a) Determine the domain and range of the functions below [2 marks]

(b) Evaluate the following limits [2 marks]

(c) Given that find from first principles [3 marks]

(d) Differentiate at the point [4 marks]

(e) Given that find [4 marks]

QUESTION TWO

(a) Find the volume of revolution bounded by the region and about [3 marks]

(b) Evaluate the angle between the two vectors [2 marks]

(c) Find the area enclosed between the curves [3 marks]

[3 marks]

(d) Verify whether the vectors and are coplanar [2 marks]

(e) Evaluate the following integral

[4 marks]

QUESTION THREE

(a) Solve the differential equation [3 marks]

(b) State the order, linearity and degree of the following differential equations

(i) [2 marks]

(ii) [2 marks]

(c) Determine whether is a solution of the differential equation

[2 marks]

(d) The half-life of a radioactive substance is 2 days. Find the time required for a given amount of the material to decay to 1/10 of its original mass. [3 marks]

(e) Find the equations of lines normal to the curve . At the point .

[3 marks]

QUESTION FOUR

(a) Given that evaluate [4 marks]

(b) Find the length of the curve , joining the origin to the point [4 marks]

(c) Solve the system of equations by the cofactor expansion method and Cramers rule

[7 marks]
