

**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**SCHOOL OF MATHEMATICS AND ACTUARIAL SCIENCE**

**UNIVERSITY EXAMINATION FOR DEGREE OF MASTER OF SCIENCE**

**IN APPLIED MATHEMATICS**

**1ST YEAR 1ST SEMESTER 2016 ACADEMIC YEAR**

**KISUMU LEARNING CENTRE**

**COURSE CODE: SMA 839**

**COURSE TITLE: NUMERICAL ANALYSIS I**

**EXAM VENUE: STREAM: (BSc. Actuarial)**

DATE: EXAM SESSION:

TIME: 3.00 HOURS

**Instructions:**

1. **Answer ANY 3 questions**
2. **Candidates are advised not to write on the question paper.**
3. **Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**QUESTION ONE (20 MARKS)**

1. Given



verify that  passes exactly through the data point  (6 marks )

1. Consider the six points table which satisfy the function 

|  |
| --- |
|  |
|  |

1. Give the degree Lagrange polynomial  which passes through  points. Hence use it to find . (7 marks )
2. Form six-place difference table for the above data points and use it to calculate by the Newton backward-difference polynomial. (7 marks )

**QUESTION TWO (20 MARKS)**

1. Give Gauss elimination procedure in a format suitable forcomputer programming. (8 marks)
2. Solve the following system of linear algebraic equations by applying the Doolittle LU factorization method



(12 marks)

**QUESTION THREE (20 MARKS)**

Find the solution of the following matrix equation using Successive Over-Relaxation method for  with initial guess of :



(*Conduct four iterations*)

**QUESTION FOUR (20 MARKS)**

1. Give the step by step procedure of direct power method in a format suitable forcomputer programming (8 marks)
2. Solve for the largest (in magnitude) eigenvalue of matrix  and the corresponding eigenvector by the direct power method with , using four iterations:



(12 marks)

**QUESTION FIVE (20 MARKS)**

1. Use the contiuous Fourier series to approximate the square or rectangular wave function:



(10 marks)

1. Given  Generate  discrete values for the function at intervals of for the range  to  Use this information to evatuate the coefficient of  (10 marks)