

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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**University Examinations 2014/2015**

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

**ICS 2207: SCIENTIFIC COMPUTING**

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

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

**QUESTION ONE - (30 MARKS)**

1. Solve the following linear system of equations by determinants: (5 Marks)

7x + 4y 3z = 19

1. Prove that (1 + = 1 (4 Marks)
2. Obtain an estimate of Sin(0.55) by linear interpolation of over the interval using the data; (4 Marks)

|  |  |  |
| --- | --- | --- |
| x | 0.5 | 0.6 |
|  | 0.47943 | 0.56464 |

1. Find the value of  correct up to 3s.f taking 6 subintervals by trapezoidal rule.

(6 Marks)

1. Prove that (4 Marks)
2. The number 7.36 is a correctly rounded approximation to the number a. Obtain as accurate as possible an approximation to (4 Marks)
3. Construct a difference table for the series 8,12,19,29,42. Hence by taking the second order differences as constant, find the sixth term of the series. (3 Marks)

 **QUESTION TWO (20 MARKS)**

1. Evaluate by interpolation using the following table. (8 Marks)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | 0.00 | 0.10 | 0.20 | 0.30 | 0.40 |
|  | 1.000 | 1.2214 | 1.4918 | 1.8221 | 2.255 |

1. Solve the system;

 using matrix inversion.(7 Marks)

1. Find the value of dx by taking six intervals correct to 5 s.f by Simpson’s one third rule. (5 Marks)

**QUESTION THREE (20 MARKS)**

1. Compute the root of to 2d.p by bisection method. (9 Marks)
2. Find the root of by iteration method given that the root lies near 1.(6 Marks)
3. Use Simpson’s three-eighths rule to obtain an approximate value of;

 by taking 5 ordinates. (5 Marks)

**QUESTION FOUR (20 MARKS**)

1. Find the lagrange interpolating polynomial of degree three relevant to the following data.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | -1 | 0 | 1 | 2 |
|  | 1 | 1 | 1 | -3 |

1. Find the inverse of the following matrix with the help of the adjoint matrix. (8 Marks)

**QUESTION FIVE (20 MARKS)**

1. Using Newton-Raphson method, find correct to 4 d.p the root between 0 and 1 of the equation.

 (10 Marks)

1. Find an approximate value of the root of the equation near x = 0 using the method of false position. (10 Marks)