



(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR
FIRST YEAR FIRST SEMESTER EXAMINATIONS**

**FOR THE DEGREE
OF
MASTER OF SCIENCE IN INDUSTRIAL ENGINEERING AND
MANAGEMENT**

COURSE CODE: IEM 811

COURSE TITLE: NUMERICAL METHODS

DATE: 29/04/2022 TIME: 08:00 – 11:00 AM

INSTRUCTIONS TO CANDIDATES

Answer Any THREE (3) questions
Laptop or Desktop computer required
Solve ALL questions using Excel software in one workbook with;
Each Question in a separate sheet well labelled with the corresponding question number
Save Workbook with your 'Reg. No' ONLY and submit softcopy

TIME: 3 Hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over. ►

QUESTION ONE

(20 Marks)

The following data are taken from the steam table.

Temp °C	140	150	160	170	180
Pressure, kgf/cm ²	3.685	4.854	6.302	8.076	10.225

Find the pressure at temperature $t = 142^\circ\text{C}$ and 175°C

QUESTION TWO

(20 Marks)

The experimental data of a factor and response is as shown in the table below.

X	0	1	2	3	4
y	1	2.718	7.381	20.086	54.598

Compute, $f'(0)$ and $f''(4)$

QUESTION THREE

(20 Marks)

Solve the following equations by Gauss Jacobi's iteration method, $20x+y-2z=17$,
 $3x+20y-z=-18$, $2x-3y+20z=25$.

QUESTION FOUR

(20 Marks)

Using power method to find a dominant eigen value of a given matrix

$$A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix} \quad x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$