The Management University of Africa

Sponsored by the Kenya Institute of Management

## UNDERGRADUATE UNIVERSITY EXAMINATIONS

## SCHOOL OF MANAGEMENT AND LEADERSHIP

## DEGREE OF BACHELOR OF EDUCATION ARTS

**MTH 424: ORDINARY DIFFERENTIAL EQUATION**

**DATE: 2ND DECEMBER 2024**

**DURATION: 2 HOURS**

**MAXIMUM MARKS: 70**

## INSTRUCTIONS:

1. Write your registration number on the answer booklet.
2. **DO NOT** write on this question paper.
3. This paper contains **SIX (6)** questions.
4. Question **ONE** is compulsory.
5. Answer any other **THREE** questions.
6. Question **ONE** carries **25 MARKS** and the rest carry **15 MARKS** each.
7. **Write all your answers in the Examination answer booklet provided**

## QUESTION FIVE

a) Determine whether the functions

$f1(t) = 1,\ f2(t) = 2 + t,\ f3(t) = 3 - t^2, and\ f4(t) = 4t + t^2$

are linearly independent or dependent on any interval I **(7marks)**

b) Find the general solutions of $y^{(4)} + 2y'' + y = 0$ **(8 marks)**

## QUESTION SIX

a) Determine a lower bound for the radius of convergence of series solutions of the differential equation

$(1+x^2)y''+2xy' + 4x^2y = 0$ about the point $x = 0$, about the point $x = -\frac{1}{2}$

**(7marks)**

b) Solve $x^2y'' + 5xy' + 4y = 0, x > 0$

**(8marks)**