(University of Choice)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

UNIVERSITY MAIN EXAMINATIONS

2021/2022 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN GEOSPATIAL INFORMATION

COURSE CODE: MAT 126 COURSE TITLE: CALCULUS II

DATE: FRIDAY 29TH APRIL, 2022 TIME: 8.00AM-10.00AM

INSTRUCTIONS TO CANDIDATES

Answer question **ONE** (COMPULSORY) and any other **TWO** questions

Time: 2 hours

(c) Decompose $\frac{5x+2}{3x^2+x-4}$ into partial fractions and hence evaluate $\int \frac{5x+2}{3x^2+x-4}dx$ (5 marks)

(d) Determine $\int x\cos xdx$ (5 Marks)

(e) Show that $\int_0^{\frac{\pi}{2}} \sin^4 xdx = \frac{\pi}{16}$ (5 marks)

QUESTION FOUR (20 MARKS)

(a) Use prismoidal rule to evaluate $\int_1^5 \left(3x - \frac{1}{3}x^2\right)dx$ (5 marks)

(b) Separate the variables and integrate $(x+1)dy = x(y^2+1)dx$ (3 marks)

(c) Find $\int_0^{\pi/2} \cos^2 x \sin xdx$ (4 Marks)

(d) Find the slope of the circle $x^2 + y^2 = 25$ at (3,-4) (4 marks)

(e) Evaluate $\int_0^1 Sinh^2 xdx$ (4 marks)

QUESTION FIVE (20 MARKS)

(a) Determine the line of asymptote for the curve $y = \frac{5x^2+8x-3}{3x^2+2}$ (4 marks)

(b) Evaluate *cosh 2.156* (3 marks)

(c) Find the tangent and normal to the curve $x^3 + y^3 - 9xy = 0$ at the point (2, 4) (4 marks)

(d) Solve for x if $2\log_a x - \log_a(x-1) = \log_a(x-2)$ (5 Marks)

(e) Find the length of the arc traced in the first quadrant by a curve whose equation is given by $x = \cos^3 t, y = \sin^3 t, 0 \le t \le 2\pi$ (4 Marks)