TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN TECHNOLOGY IN ELECTRICAL AND ELECTRONIC ENGINEERING

AMA 2151: ENGINEERING MATHS II.

END OF SEMESTER EXAMINATION

SERIES: AUGUST, 2019

TIME: 2 HOURS

DATE: AUGUST, 2019

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of FIVE questions. Answer Question ONE and any other TWO.

Do not write on the question paper.

Question ONE

(a) Show that $\lim_{x-0} \frac{\sin x}{x} = 1$ **[13 marks]**

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(b) (i) Given that y = $e^{\sin x}$, determine $\frac{dy}{dx}$

(ii) Find the stationary points on the graph of the function

y = $\frac{x^3}{3} - \frac{x^2}{2} - 2x + 5$ **[13 marks]**

(c) Evaluate $\int \frac{x}{1+x^4} dx$ **[4 marks]**

Type equation here.

Question TWO

(a) Evaluate $\int_4^9 \frac{\sqrt{x}}{\left((30-x_2^3)^2\right)}\,dx$ **[9 marks]**

(b) Given that $x = \frac{2-3t}{1+t}$; $y = \frac{3+2}{1+t}$

Determine $\frac{dy}{dx}$ **[7 marks]**

(c) Evaluate cosh2.156 **[4 marks]**

Question THREE

(a) Determine $\lim_{x-0}(\frac{sinhx-sinx}{x^3})$ **[6 marks]**

(b) Find the volume of a circular cone of radius a and height h which is formed after rotating the line $y = \frac{a}{h}x$ about the x-axis **[3 marks]**

(c) Find $\frac{dy}{dx}$ given $y = \ln\frac{x^2+1}{\sqrt[3]{x^3+1}}$ **[5 marks]**

(d) Evaluate $\int \frac{10^{\sqrt{x}}}{\sqrt{x}}\,dx$ **[6 marks]**

Question FOUR

(a) Integrate by partial fractions $\int \frac{3x}{1+x-2x^2}\,dx$ **[10 marks]**

(b) Evaluate $\frac{dy}{dx}$ given that $y = sin^{-1}x$ **[6 marks]**

(c) Integrate the function $\int \frac{x}{\sqrt{x^2+1}}\,dx$ **[4 marks]**

Question FIVE

(a) Find the length of the curve $y = 10cosh\frac{x}{10}$ between $x = -1$ and $x = 2$ **[10 marks]**

(b) Sketch and calculate the area bounded by the curve $y = -6x^2 + 24x + 10$, the axis and the ordinates $x = 0\ and\ x = 4$ **[10 marks]**