TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MEDICAL ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MEDICAL ENGINEERING

AMA2351: ENGINEERING MATHEMATICS VI

END OF SEMESTER EXAMINATION

SERIES: AUGUST2016

TIME: 2HOURS

DATE: 9Aug2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attemptquestion ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

Question ONE

(a) Evaluate f (15), given the following table of values:

x	10	20	30	40	50
f(x)	46	66	81	93	101

(10 marks)

(b)

(i) Determine the Maclaurin series for the functions e^x and $\sin x$ hence expand the $e^{\sin x}$ up to the term in fourth power

(ii) Using the series in (a) above evaluate $\int_0^1 e^{sinx}\,dx$ **(10 marks)**

(b) Evaluate the following

i) $\int_1^3 \int_0^{\ln y} dydx.$

ii) $\int_0^2 \int_1^3 \int_1^2 xy^2 dzdydx$ **(10 marks)**

Question TWO

(a) Using Newton-Raphson iterative formula, determine the cube root of 123 correct to five decimal places **(10 marks)**

(b) Express $\sin(x + h)$ as a series of powers of h hence evaluate $\sin 44^o$ correct to five decimal places **(10 marks)**

Question THREE

(a) Given the polynomial $x^4 - x^3 - 2x - 34 = 0$ determine

i) the best approximation

ii) root of the equation correct to four significant figures taking $x_o = 3$

(10 marks)

(b) Using Newton's method determine the positive roots of the quadratic equation $5x^2 + 11x - 17 = 0$ correct to **three** significant figures

(10 marks)

Question FOUR

(a) Determine the first **four** Taylor series terms for the following

i) $(x - 1)e^x$

ii) $x^2 + x - 2$

.

(10 marks)

(b) Determine the volume of the solid that lies below the surface given by $z = 16xy + 200$ and lies above the region in the xy-plane bounded by $y = x^2$ and $y = 8 - x^2$.

(10 marks)

Question FIVE

(a) Determine the Maclaurin series for the following.

(i) $sin^2 x$

(ii) $\frac{x}{1-x^2}$

(10 marks)

(b) Evaluate

(i) $\int_0^1 \int_3^2 \int_{1-y}^{y+2} 2xy \, dxdydz$

(ii) $\int_0^{\frac{\pi}{3}} \int_0^{2acos\theta} r \, drd\theta$ **(10 marks)**