TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Applied & Health Sciences

DEPARTMENT OF MATHEMATICS & PHYSISCS

DIPLOMA IN ELECTRICAL POWER ENGINEERING (DEPE IV)

AMA 2251: ENGINEERING MATHEMATICS IV

END OF SEMESTER EXAMINATION
SERIES: AUGUST 2014
TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Drawing Instruments*

This paper consist of **FIVE** questions
Answer question **ONE (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

Question One (Compulsory)

a) Find $L\{\sin t\}$ **(7 marks)**

b) Find the Maclaurins series for $f(x) = \sin x$ **(7 marks)**

c) Find the Taylor's series for $fx = x^3 - 10x^2 + 6$ about x = 3 **(8 marks)**

d) Calculate the mean and standard deviation for:

x	12	11	10	9	8	7	6
f	4	5	8	13	9	6	3

(8 marks)

Question Two

a) The probability that machine A will be performing an usual function in 5 years time is ¼, while the probability that machine B will still be operating usefully at the end of the same period is 1/3

Find the probability in the foll cases in 5 years time:

(i) Both machines will be performing an usual function
(ii) Neither will be operating
(iii) Only machine B will be operating
(iv) At least one of the machines will be operating **(8 marks)**

b) Calculate the mean, median and the standard deviation of the following distribution.

Marks	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80 – 89	90 – 99
No. of Students	5	12	15	20	18	10	6	4

(12 marks)

Question Three

a) Get a Maclaurin's series for $\ln(1+x)$ and use it to approximate the value of ln 1.5 to the 5th term. **(10 marks)**

b) Determine the first for terms of the power series for sin 2x using Maclaurins series. **(10 marks)**

Question Four

a) Find $L\left\{3e^{-\frac{1}{2}x} \sin 2x\right\}$ **(12 marks)**

$$\sin^2 t = \frac{2}{s\left(s^2+4\right)}$$

b) Prove that **(8 marks)**

Question Five

a) Use Maclaurin's series to determine the expansion of $(3+2x)^4$ **(8 marks)**

b) Ten students got the following marks in Marketing & Business Statistics:

Roll No.	1	2	3	4	5	6	7	8	9	10
Marketing	78	36	98	25	75	82	90	62	65	39
B. Statistics	84	51	91	60	68	62	86	58	53	47

Calculate the coefficient of correlation **(12 marks)**