TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN MARINE ENGINEERING

EMR 2201 : ENGINEERING MATH 3

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates
You should have the following for this examination
  -*Answer Booklet, examination pass and student ID*
This paper consists of Choose No questions. Attempt Choose instruction.
Do not write on the question paper.

Question ONE

a)Given Z=X+jy find the locus defined as arg Z=$\frac{\pi}{4}$ (5marks)

b)Evaluate $\sinh^{-1} 2.364$ (6marks)

c)Find the four fourth roots of Z=6(cos288°+jsin288°) (5marks)

d)Determine the sum of the series 6.5, 8, 9.5, 11………..32 (4marks)

Question TWO

a)Solve the simultaneous equation (7marks)

3x+2y-z = 19

4x-y+2z = 4

2x+4y-5z = 32

b)The sum of 7 terms of an AP is 35 and common difference is 1.2. Determine the first term of the series (3marks)

c)Use binomial theorem to determine $(2.01)^9$ correct to 5 significant figures (6marks)

d)Express -3+j4 in polar form (4marks)

Question THREE

a)The radius 0f cylinder is reduced by 4% and its height is increased by 2%. Determine the approximate percentage change in

i)its volume

ii)its curved surface area (neglect products of small quantities) (7marks)

b)Evaluate $\frac{2}{(1+j)^4}$ (4marks)

c)Express (4, 32°) into Cartesian coordinates (3marks)

d)Prove that $\frac{tanx+secx}{secx(1+\frac{tanx}{secx})}=1$

Question FOUR

a)Three numbers are in arithmetic progression. Their sum is 9 and their product is $20\frac{1}{4}$. Determine the three numbers (6marks)

b)Determine $(-2+j3)^6$ in polar form (6marks)

c)Determine the sum to infinite of series $2\frac{1}{2}, -1\frac{1}{4}, \frac{5}{8}$ (3marks)

d)Solve the logarithmic equation x^{logx} -10x^{-logx} = 9

QUESTION 5

a)Evaluate $\cosh^{-1} 2.364$ (6marks)

b)Find the three cube roots of $z=(cos225^\circ+jsin225^\circ)$ (5marks)

c)If z=x+jy find the locus defined as |z|=5 (3marks)

d) Determine sum of the series 3.5, 6, 8.5, 11,….36 (6marks)