

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2015/2016**

**THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE**

 **SMA 2305: COMPEX ANALYSIS I**

**DATE: DECEMBER 2015 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

1. Evaluate
2. | (6 +7i) (4 - 2i)| [3 marks]
3.  where z1 = 1+2i , z2 = 2 - i [3 marks]
4.  [3 marks]
5. Show that for any z, z = x2 + y2 [3 marks]
6. Express w = z3 + 2z2 in the form

 w = U (x, y) + i V (x, y) [4 marks]

1. Find the derivative of the complex – valued function

f(Z) =  Z t , such that Z # 1 [4 marks]

1. Find

Arg  [4 marks]

1. Evaluate

 along a straight line joining z = i, and z = 2 + i [6 marks]

**QUESTION TWO (20 MARKS)**

1. (i) State a necessary and sufficient condition for

 f(z) = U (x, y) + i V (x, y) to be analytic in a region

 D of  hence,

(ii) Determine the analyticity of f(z) = 

 [10 marks]

1. Examine if  exists (z  0)

 [10 marks]

**QUESTION THREE (20 MARKS)**

1. (i) State Demoivre’s theorem, and

ii) Use it to evaluate  [10 marks]

1. Find all values of z if  = 1 [10 marks]

**QUESTION FOUR (20 MARKS)**

1. (i) State Canchy’s theorem for simply connected domains, hence [3 marks]

(ii) Evaluate

  where

 1. C: | Z | = 2

 2. C: | Z | = 100

 [7 marks]

1. Evaluate

 dz along the curve z = t2 + i t

 [10 marks]