**JOMO KENYATTA UNIVERSITY**

 **OF**

**AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 2017/2018**

**FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN ENGINEERING**

**SMA 2171: GEOMETRY**

**DATE: JANUARY 2018 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPUSORY) AND ANY OTHER TWO QUESTIONS**

**Question one (30 marks)**

1. Is A and B are acute angles such that sin A= and tan B= find the value of (A+ B) by means of add addition formula for sin (A+ B) [5 marks]
2. Find the values of x between 00 and 3600 satisfying the equation. 6sin2x + 5cosx + 7 [5 marks]
3. Prove that the points A(5,1) B(6,9) and C(-1,5) are the vertices of an isosceles triangle.[5 marks]
4. If tan-1 a+ tan-1 b + tan-1 c = prove that a + b + c =abc [5 marks]
5. Verify that = cot [4 marks]
6. If tan x =cosec x –sin x, prove that tan2x = -2 [6 marks]

**Question Two (20 marks)**

1. The line joining the points (-1, 7) and (23, 17) are taken as the diameters of a circle. Find the equation of a circle, the length of its radius and the co-ordinates of the centre. [7 marks]
2. Find the angel between 0o and 360o satisfying the equation 12cos x – 5sin x + 3 =0 [8 marks]
3. If tan = ,tan = , tan = show ,without evaluating the angles that =45o

**Question Three (20 marks)**

1. A triangle has sides a, b and c with semi perimeter s , so that 2s= a + b+ c . show that its area is [5 marks]
2. Show that cos + cos 3 +cos 5 +cos 7 =4 cos [5 marks]
3. Show that 2tan-1 – tan-1 = [4 marks]
4. A ship P is 15.7 km from the harbor, H on a bearing of 0480 and a ship Q is 24.3 km from H on bearing of 1120. Calculate the bearing of P from Q and the distance PQ. [6 marks]

**Question Four (20 marks)**

1. Discuss and sketch the following curves indicating all the important features.
2. 4x2 + 9y2- 16x -54y +61 =0 [9 marks]
3. 16x2+ 96x – 4y2+ 16y + 64 =0 [7 marks]
4. Find the centre and radius of the circle x2 + y2 – 6x - 12y – 55 =0 [4 marks]