

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS, STATISTICS AND ACTUARIAL SCIENCE

SCHOOL BASED

UNIT CODE: BMA 1208

UNIT TITLE: ANALYTICAL GEOMETRY 1

TAKE AWAY ASSIGNMENT

17<sup>TH</sup> DEC 2015

ANSWER ALL QUESTIONS

1. A circle which passes through the origin cuts off intercepts of lengths 4 and 6 on the positive x and y axes. Find the equation to the circle and the equation of the tangents of the circle at the points (other than the origin) where it cuts the axes. (10mks)
2. Two parallel lines AP, BQ passes through the points A(5,0) and B(-5,0) respectively. Find the slopes of these lines if they meet the line  $4x+3y=25$ . In the points P and Q such that the distance PQ is 5 units. (10 mks)
3. Find the equations of the tangents at the end points of the latus rectum of the parabola  $y^2 + 6y - 20x + 49 = 0$  (6 Marks)
4. One focus of a hyperbola is at (1, -3) and the corresponding directrix is the line  $y=2$ . Find the equation of the hyperbola if the eccentricity is  $\frac{3}{2}$  (4 mks)
5. Find the parametric equation of the parabola  $y^2 + 20y + 4x - 60 = 0$  (4 Marks)  
Determine the equation of the ellipse with centre (1, 4), vertex at (1, 7) and eccentricity  $e = \frac{2}{3}$ . Sketch the graph. (6mks)

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CAT 1

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ANSWER ALL QUESTIONS

1. A hyperbola has equation  $4y^2 - 9x^2 - 18x - 8y - 41 = 0$ . Find
  - i. The coordinates of the centre, foci and vertices
  - ii. Find the equation of the asymptotes
  - iii. Sketch the curve (10mks)
2. The points A and B have coordinates (-2,6) and (4,-1) respectively. Given that AB is the diameter of circle C,
  - i. Find the coordinates of the centre of C.
  - ii. Show that C has the equation  $x^2 + y^2 - 2x - 5y - 14 = 0$
3. A parabola has equation;  
 $4y^2 - 8x - 12y + 1 = 0$  find its vertex and directrix and axis of symmetry. (5 Marks)
4. Find the equation of the ellipse that has its vertices at (-3, 0) and (7, 0) foci at (0, 0) and (4, 0). (5 Marks)