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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2016/2017 ACADEMIC YEAR
BRIDGING IN MATHEMATICS

Date: 3rd August, 2016.
Time: 2.00pm – 4.00pm

KMA 0102 - VECTOR AND GEOMETRY

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

- a) Define the following terms;
- Segment
 - Vector
 - Angle
- b) Construct a regular hexagon of sides 5cm. (3 Marks)
- c) Calculate the number of sides of a regular polygon whose interior angle is 135° . (4 Marks)
- d) A chord RP subtends an angle to the center of the circle and to a point Q on the major arc. Given that angle PQR is 55° and QRO is 20° , determine the size of angles QPR and ORP. (3 Marks)
- e) Given that $\overrightarrow{PQ} = \begin{pmatrix} 4 \\ 6 \end{pmatrix}$ and $\overrightarrow{QR} = \begin{pmatrix} -3 \\ 4 \end{pmatrix}$, work out;
- $\overrightarrow{PQ} - 2\overrightarrow{RQ}$ (2 Marks)
 - Given $X = (2,8)$ and $Y = (-1,3)$ compute \overrightarrow{XY} and \overrightarrow{YX} (3 Marks)
- f) In a right angled triangle MNP with MP being the hypotenuse, $M = 20^\circ$ and $m = 3.2\text{cm}$. Find the length of the hypotenuse. (2 Marks)
- g) Calculate the height of the tree if a person is 1.48m tall, the angle of elevation to the top of a building is 30° and is standing 22m away from the foot of the tree. (4 Marks)
- h) Solve for θ given that $\sin(3\theta + 30^\circ) - \cos(\theta + 20^\circ) = 0$ (4 Marks)

QUESTION TWO (20 MARKS)

- a) Without using a protractor, construct triangle ABC with $AC = 5\text{cm}$, $BAC = 75^\circ$ and $ACB = 67.5^\circ$. Measure angle ABC, length BC and AB. (8 Marks)
- b) Use a scale of 1:4000 to draw a triangular farm with sides 100m, 250m and 280m. (4 Marks)
- c) Construct triangle XYZ which is such that $XY = 4.6\text{cm}$, $XZ = 6.8\text{cm}$ and angle $YXZ = 65^\circ$. Drop a perpendicular from Z to XY. (5 Marks)
- i) Measure YZ (1Mark)
- ii) Calculate the area of the triangle (3 Marks)

QUESTION THREE (20 MARKS)

- a) Calculate all the angles in a triangle whose lengths are 5.5cm, 4.2cm and 3.8cm. (10 Marks)
- b) A triangle ABC has $AB = 12\text{cm}$, $AC = 15\text{cm}$ and $A = 120^\circ$. Calculate the remaining two angles and distance BC. (10 Marks)

QUESTION FOUR (20 MARKS)

- a) Given $M = (2, -4)$ and $N = (4, -2)$, obtain \overrightarrow{MN} and it's length (5 Marks)
- b) ABCD is a quadrilateral with $A(2,1)$, $B(5,3)$, $C(7,8)$, $D(4,6)$. Show that ABCD is a parallelogram (10 Marks)
- c) If $\begin{pmatrix} 4a + 2b \\ 2a \end{pmatrix}$ and $\begin{pmatrix} 6 \\ 2 - 2a \end{pmatrix}$ are equal, find the value of a and b . (5 Marks)

QUESTION FIVE (20 MARKS)

ABCDEFGH is a cuboid with $AB=8\text{cm}$, $BC=10\text{cm}$ and $CG=11\text{cm}$. calculate;

- i) The angle between the lines AH and HC (12 Marks)
- ii) The angle between planes ABGH and DCGH (4 Marks)
- iii) The angle between lines AG and plane DCGH (4 Marks)