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University Examinations 2015/2016

FIRST YEAR FIRST SEMESTER EXAMINATION FOR CERTIFICATE IN BRIDGING
MATHEMATICS

SMB 0002: GEOMETRY

DATE: NOVEMBER 2015

TIME: 1½ HOURS

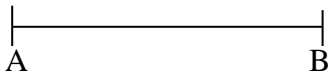
INSTRUCTIONS: Answer question *one* and any other *three* questions

QUESTION ONE (30 MARKS)

- a) Define the following terms as applied in mathematics:
- (i) A vector (1 Mark)
 - (ii) Area (1 Mark)
 - (iii) An angle (1 Mark)
- b) Find the area of the quadrilateral ABCD below (4 Marks)
- c) Given the points A(3,-2) and B(0,3). Find $|\overrightarrow{2AB}|$ (3 Marks)

- d) Given $\sin \theta = 0.45$, find without using tables or calculators; $\cos \theta$ and $\tan \theta$. (3 Marks)
- e) State with a reason, the value of angles marked x, y and z (3 Marks)

- f) Solve: $2 \cos(x - 10) = 0.897, 0^\circ \leq x \leq 360^\circ$ (3 Marks)
- g) The angle of elevation at the top of a vertical tower is 38.5° . Find the height of the tower if a worth is 5m from the foot of the tower. (3 Marks)
- h) Solve the triangle ABC, whose sides are 8cm by 10 cm by 7 cm. (4 Marks)
- i) Find the distance between two places $A(30^\circ E, 70N)$ and $B(60^\circ W, 70^\circ N)$ (3 Marks)
- j) Bisect line AB below (5 Marks)



QUESTION TWO (10 MARKS)

- a) Using a ruler and a pair of compasses only, construct triangle ABC, such that $AB = 6\text{CM}$,
 $\angle ABC = 67\frac{1}{2}^\circ$ and $\angle BAC = 45^\circ$ (4 Marks)
- b) Drop a perpendicular from C to AB, hence calculate the area of triangle ABC in M^2 . (4 Marks)
- c) Given $OA = 2i + 3j$ and $\overrightarrow{OB} = 3i + j$, Find \overrightarrow{AB} (2 Marks)

QUESTION THREE (10 MARKS)

- a) Three towns A, B and C are such that town B is on a bearing of 110° from A on a distance of 200km. c is 150km from B on a bearing of 230° by scale drawing:
- (i) Show the position for the three towns. (4 Marks)

- (ii) What is the distance between A and C? (2 Marks)
- (iii) What is the bearing of A from C? (2 Marks)
- (iv) Find the shortest distance between A and B from C. (2 Marks)

QUESTION FOUR (10 MARKS)

In a triangle ABC, $\vec{AB} = \vec{a}$ and $\vec{BC} = \vec{b}$. N is on AC such that AN:NC=1:2 while M is on AB such that AM = $\frac{2}{5}$ AB. BN and CM intersect at X. Find in terms of \vec{a} and \vec{b} only.

- a) (i) \vec{AC} (1 Mark)
- (ii) \vec{BN} (2 Marks)
- (iii) \vec{CM} (1 Mark)
- b) Given that $\vec{BX} = h\vec{BN}$ and $\vec{CX} = k\vec{CM}$, express \vec{CX} in two ways, hence find the values of h and k. (6 Marks)

QUESTION FIVE (10 MARKS)

- a) Find the values of angles a, b and c with a reason. O is the centre of the circle. (6 Marks)

- b) Find the area of the segment below: (4 Marks)

QUESTION SIX (10 MARKS)

- a) Define the following terms/explain their meaning:
- (i) Collinear points. (1 Mark)
 - (ii) Loms of a point (1 Mark)
 - (iii)Tangent line (1 Mark)
- b) (i) Construct a circle, radious 4cm. (2 Marks)
- (ii) On the circle in b (i) above, construct an external tangent to the circle. (2 Marks)
- (iii) Find the area of the circle in b (i) above. (1 Mark)
- (iv) Join the radius of the circle to the tangent line, where the tangent line is at 4 cm and calculate the area of the triangle formed. (2 Marks)