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**UTHM**  
Universiti Tun Hussein Onn Malaysia

**UNIVERSITI TUN HUSSEIN ONN MALAYSIA**

**FINAL EXAMINATION  
(ONLINE)  
SEMESTER II  
SESI 2019/2020**

COURSE NAME : MATHEMATICS I  
COURSE CODE : BBM 10303  
PROGRAMME CODE : BBE  
EXAMINATION DATE : JULY 2020  
DURATION : 3 HOURS  
INSTRUCTION : ANSWERS **FIVE (5)** FROM  
**EIGHT (8)** QUESTIONS

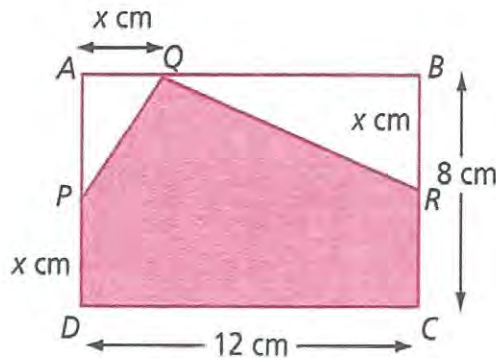
THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

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**TERBUKA**

- Q1.** a) Find the distance between the points:  
 i) (3,2) and (8,14)  
 ii) (0,4) and (-9,1)  
 (4 marks)
- b) The distance point A (6,3t) and point B (12,-t). Find the possible value of t.  
 (6 marks)
- c) The straight line  $y = 4 - x$  and  $2x + 11 = 3y$  intersect at point M. Find the equation of the straight line which passes through the point M and point N(5,2).  
 (10 marks)

- Q2.** a) Find the factors for  $x^2 - 3x - 10 = 0$  using factorizing methods.  
 (2 marks)
- b) **Diagram Q2(b)** shows a rectangle ABCD of length 12cm and of breadth 8cm. The points P,Q and R lie on the sides AD, AB and BC respectively such that PD=AQ=BR= x cm. If the area of the shaded region is  $76\text{cm}^2$ , show that  $x^2 - 10x + 20 = 0$ .



**Diagram Q2(b)**

(8 marks)

- c) Given quadratic equation  $x^2 + 4(3x + v) = 0$ , with the value of v is constant having roots are w and 2w,  $w \neq 0$ . Find the value of v and w.  
 (10 marks)

- Q3.** a) Solve the equation below:
- i)  $3x - 1 < 2x + 7$  (2 marks)
  - ii)  $x - 10 < 2x - 2 < x$  (4 marks)
  - iii)  $2(8 - p) \leq 3(p + 7)$  (4 marks)
- b) Solve the inequality  $\frac{x + |3 + x|}{2 + x} > 1$  (10 marks)

- Q4.** a) Given  $\sin A = 4/5$ ,  $\sin B = 5/13$  and A is acute angle and B is obtuse angle. Without using calculator, find the values for the following.
- (i)  $\sin(A+B)$
  - (ii)  $\tan(A+B)$  (6 marks)
- b) If  $\sin \theta = -2/5$  and  $180 < \theta < 270$ , find the value of  $\cos 2\theta$  (6 marks)
- c) Prove that,
- $$\frac{\cos \theta}{1 + \sin \theta} + \frac{1 + \sin \theta}{\cos \theta} = 2 \sec \theta$$
- (8 marks)

- Q5.** a) Find the inverse of the matrix  $A = \begin{bmatrix} 2 & 4 \\ - & \end{bmatrix}$  (2 marks)
- b) Show that the inverse matrix of  $A = \begin{bmatrix} -1 & 1 \\ -2 & 0 \end{bmatrix}$  is  $B = \frac{1}{2} \begin{bmatrix} 0 & -1 \\ 2 & -1 \end{bmatrix}$  (4 marks)
- c) Calculate the sum of equations A+B

$$\text{i) } A = \begin{bmatrix} 1 & -3 & 0 \\ 4 & 2 & -1 \end{bmatrix}, B = \begin{bmatrix} 6 & 3 & -3 \\ 7 & -2 & 5 \end{bmatrix}$$

$$\text{ii) ii) } A = \begin{bmatrix} 2 & 5 & 0 \\ -7 & 4 & 1 \\ 3 & -4 & 2 \end{bmatrix}, B = \begin{bmatrix} -2 & 2 & 1 \\ 7 & 9 & -2 \\ 3 & -4 & 8 \end{bmatrix}$$

(4 marks)

- d) Solve the equation using appropriate method.

$$\begin{cases} x + 2y - 4z = 5 \\ 2x + y - 6z = 8 \\ 4x - y - 12z = 13 \end{cases}$$

(10 marks)

- Q6. a) State the modulus and the argument of the following complex number.

$$\text{i) } z = 5e^{j\pi/4}$$

$$\text{ii) } z = 0.01e^{0.02j}$$

(4 marks)

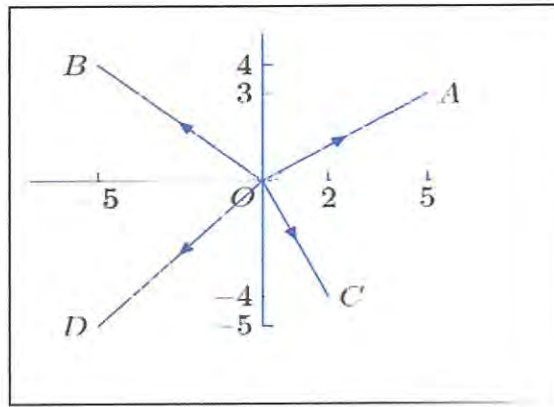
- b) Find the 10<sup>th</sup> power of  $3 - 2i$  using De Moiré's theorem and write the answer in the form  $a + bi$ .

(8 marks)

- c) Find the four fourth roots of  $-8 + 8i\sqrt{3}$ .

(8 marks)

- Q7. a) From the **Diagram Q7(a)** write down the component form of the following vectors.



**Diagram Q7(a)**

- i)  $\overrightarrow{OA}$
- ii)  $\overrightarrow{OB}$
- iii)  $\overrightarrow{OC}$
- iv)  $\overrightarrow{OD}$

(4 marks)

- b) If  $\overrightarrow{AB} = 2i+2j$  and  $\overrightarrow{BC} = i+2j$  prove that the magnitude of  $\overrightarrow{AC}$  is 5.

(6 marks)

- c) Determine the area of the triangle whose vertices are the points  $A=(1,1,3)$ ,  $B=(2,-1,5)$  and  $C=(-3,3,1)$ .

(10 marks)

- Q8. a) Find the equation of the circle with centre (0,2) and radius 2.

( 6 marks)

- b) Determine the vertex and axis of symmetry for the graph of  $y = -x^2 - 4x - 8$ . Describe the graph without draw it.

(14 Marks)

- END OF QUESTIONS -