CONFIDENTIAL

Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER I
SESI 2016/2017

TERBUKA

COURSE NAME	:	MATHEMATICS I
COURSE CODE	:	BBM 10303
CODE PROGRAMME	:	BBA/BBB/BBF/BBG
DATE	:	DECEMBER 2016/JANUARY 2017
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

CONFIDENTIAL

Q1

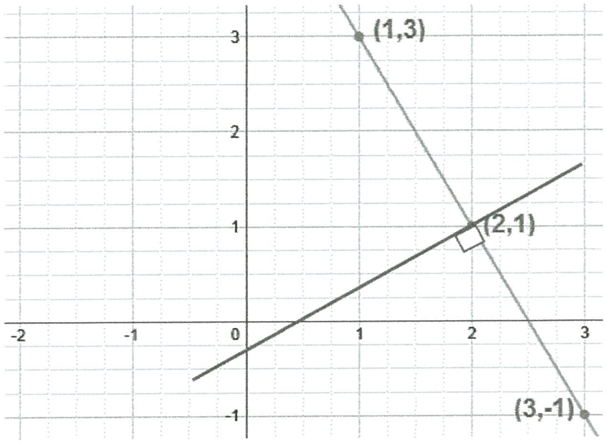

Figure Q1

(a) Find the midpoint of the line segment from point (1, 3) and point (2, 1).
(2 marks)

(b) Find the length of the line segment with the point (1, 3) and point (3, -1).
(2 marks)

(c) Find the slope of the line by going from point (1, 3) and point (2, 1).
(2 marks)

(d) Find the equation of the straight line from point (1, 3) and point (3, -1).
(4 marks)

(e) Find the equation of the straight line that passes through the point (2, 1) and is perpendicular to the straight line from point (1, 3) and point (3, -1).
(4 marks)

(f) Graph the equation of $y = \frac{1}{4}x + 5$ for domain $-2 \leq x \leq 2$.

(6 marks)

Q2 (a) Find the factors for the following quadratic equations:

(i) $x^2 - 81 = 0$

(ii) $x(2x - 5) = 12$

(iii) $2t^2 - 5t = 3$

(9 marks)

(b) Graph the quadratic equation for $y = -3x^2 - 3x - 3$.

(5 marks)

(c) Graph the equation of $y = -2x^2 + 5x - 1$ and $x = \frac{5}{4}$.

(6 marks)

Q3 (a) Solve each of the following inequalities:

(i) $4x + 3 \geq 2(3x - 1)$

(ii) $|-3x - 1| \geq 5$

(6 marks)

(b) Express $\frac{2x+16}{x^2+x-6}$ in partial fractions.

(4 marks)

(c) If $Q(3,-4)$ be a point on the terminal side of an angle θ. Find the value of the following:

(i) $\sin\theta$

(ii) $\cos\theta$

(iii) $\tan\theta$

(6 marks)

(d) Prove that $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \tan\theta + \cot\theta$.

(4 marks)

Q4 (a) If $A=\begin{bmatrix}7 & 1 & 3\\ 8 & -2 & 7\\ 9 & 3 & 6\end{bmatrix}$, then find the inverse of A.

(4 marks)

(b) Solve the following equation using Gauss Elimination method:

$$x+2y+3z=0$$
$$2x+5y+3z=0$$
$$x+8z=0$$

(6 marks)

(c) Simplify $(2+i)(3-4i)$ in the form of $a+ib$.

(2 marks)

(d) Rewrite the quotient $\dfrac{3-7i}{2+6i}$ in standard form.

(3 marks)

(e) If $z=\sqrt{8}\left(\cos\dfrac{7\pi}{4}+i\sin\dfrac{7\pi}{4}\right)$, by using De Moivre's Theorem, find z^8.

(5 marks)

Q5 (a) Given **u** = $i-3j+7k$ and **v** = $8i-2j-2k$, determine the following expressions:

(i) **u . v**

(ii) **u** × **v**

(iii) the angle between **u** and **v**

(6 marks)

(b) Given **a** = $3i-2j+3k$, **b** = $j-4k$ and **c** = $2i+4j+6k$. Find:

(i) **a . (b** × **c)**

(ii) **(a** × **b)** × **(b** × **c)**

(4 marks)

(c) Sketch the graph of $\dfrac{(x-1)^2}{64}+\dfrac{(y-8)^2}{25}=1$ and locate the foci.

(5 marks)

-END OF QUESTIONS-

LIST OF FORMULA

Linear equations:

$$d=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

$$(\bar{x},\bar{y})=\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$$

$$slope=\frac{y_2-y_1}{x_2-x_1},x_2\neq x_1$$

$$y=mx+c$$

$$y-y_1=m(x-x_1)$$

Quadratic equation:

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

Trigonometry:

$$\sin^2\theta+\cos^2\theta=1$$

$$\tan^2\theta+1=\sec^2\theta$$

$$\cot^2\theta+1=\csc^2\theta$$

$$\sin 2\alpha=2\sin\alpha\cos\alpha$$

$$\cos 2\alpha=\cos^2\alpha-\sin^2\alpha$$

$$\sin(\alpha\pm\beta)=\sin\alpha\cos\beta\pm\cos\alpha\sin\beta$$

$$\cos(\alpha\pm\beta)=\cos\alpha\cos\beta\mp\sin\alpha\sin\beta$$

$$\tan(\alpha\pm\beta)=\frac{\tan\alpha\pm\tan\beta}{1\mp\tan\alpha\tan\beta}$$

$$\tan 2\alpha=\frac{2\tan\alpha}{1-\tan^2\alpha}\quad AA^{-1}=A^{-1}A=I$$

Solution of Systems of linear:

$$A_{ij}=(-1)^{i+j}M_{ij}$$

$$x_1=\frac{|D_{x1}|}{|D|},x_2=\frac{|D_{x2}|}{|D|},\ x_3=\frac{|D_{x3}|}{|D|}$$

Complex Numbers:

$$i^2=-1$$

$$z=re^{i(\theta+2k\pi)}$$

$$e^{i\theta}=\cos\theta+i\sin\theta$$

Vectors:

$$|v|=\sqrt{v_1^2+v_2^2+v_3^2}$$

$$\cos\theta=\frac{a\cdot b}{|a||b|}$$

Conic sections:

Circle:

$$x^2+y^2=r^2$$

$$(x-h)^2+(y-k)^2=r^2$$

Parabola:

$$x^2=4py$$

Vertical: $(x-h)^2=4p(y-k)$

Horizontal: $(y-k)^2=4p(x-h)$

Ellipse:

$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$$

$$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$$

Hyperbola:

$$\frac{(y-k)^2}{a^2}-\frac{(x-h)^2}{b^2}=1$$

$$\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$$