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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018

COURSE NAME	:	MATHEMATICS I
COURSE CODE	:	BBM 10303
PROGRAMME CODE	:	BBA/BBB/BBD/BBE/BBF/BBG
EXAMINATION DATE	:	JUNE / JULY 2018
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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THIS QUESTION PAPER CONSISTS OF **SEVEN (7)** PAGES

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Q1

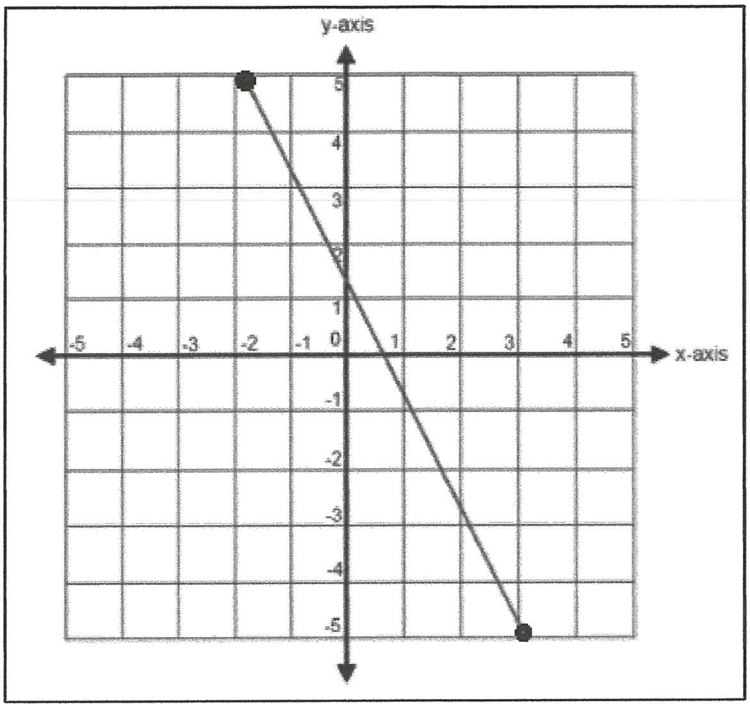

DIAGRAM Q1 (a)

(a) Find the midpoint of the straight line with point (-2, 5) and (3, -5).

(3 marks)

(b) Find the length of the straight line in **DIAGRAM Q1 (a)**.

(3 marks)

(c) Sketch the graph of equation y = 5x.

(4 marks)

(d) Sketch the graphs of $y = \frac{1}{2}x$ and $y = \frac{1}{2}x - 4$ on the same set of coordinate axes.

(5 marks)

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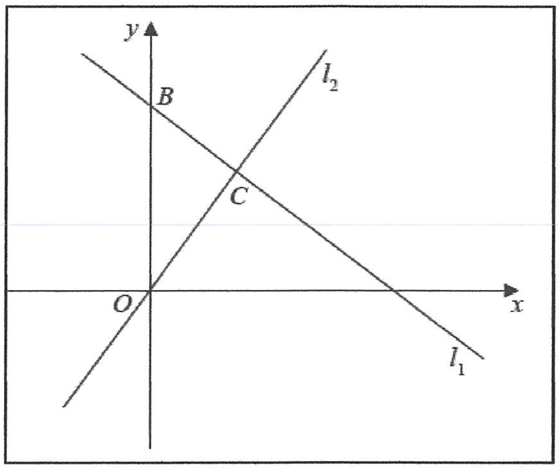

DIAGRAM Q1 (e)

(e) The first linear equation (l_1) is 2x + 3y = 26 and the second linear equation is perpendicular to first linear equation passes through the origin *O* in **DIAGRAM Q1 (e)**. Find an equation for the second straight line (l_2) if point C (2 , 1).

(5 marks)

Q2 (a) State the following quadratic equation in standard form:

(i) $\frac{2}{u} = \frac{3}{u^2} + 1$

(ii) $(3m+2)^2 = -4$

(4 marks)

(b) If 2 and 4 are the roots of the quadratic equation $x^2 + 2px + q = 0$, find the values of p and q.

(6 marks)

(c) Solve the equation $9s = 12s - 2$ by using quadratic formula.

(4 marks)

(d) By using factorization method, solve the equation $-3x^2 + 6x = 3$. Hence, sketch the graph.

(6 marks)

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Q3 (a) Solve each of the following inequalities:

(i) $-3x + 5 \leq -16$

(ii) $2\,(1 - x) + 5 \leq 3\,(2x - 1)$

(iii) $|3 - 2z| \leq 5$

(6 marks)

(b) Express the equation $\frac{9x+25}{x^2+6x+9}$ in partial fractions form.

(4 marks)

(c) If $P(-3, 4)$be a point on the terminal side of an angle . Find the value of the following without using calculator:

(i) $\sec\theta$

(ii) $\csc\theta$

(iii) $\cot\theta$

(6 marks)

(d) Prove that $\frac{cos^2\theta - sin^2\theta}{cos^2\,\theta} = 1 - tan^2\,\theta$.

(4 marks)

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Q4

(a) Evaluate the determinant of $\begin{vmatrix} 2 & 1 & -1 \\ -2 & -3 & 0 \\ -1 & 2 & 1 \end{vmatrix}$ by expanding by:

(i) the first row

(ii) the third column

(4 marks)

(b) By using Gauss Elimination method, solve the following system of linear equation:

$$\begin{aligned} 3x_1 + 5x_2 - x_3 &= -7 \\ x_1 + x_2 + x_3 &= -1 \\ 2x_1 + \quad\; + 11x_3 &= 7 \end{aligned}$$

(6 marks)

(c) Find the values of p and q if $(2p+qi)+(5+3i)=(3-10i)^2$.

(4 marks)

(d) Solve $z = \dfrac{1+2i}{3+i}$ and find the conjugate, $\bar{z}$. Hence, express $\bar{z}$ in form of Polar Form.

(6 marks)

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Q5 (a) Given **u** = $-3i - j$ and **v** = $2i - 4j + k$, determine the following expressions:

(i) **u . v**

(ii) **u × v**

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

(6 marks)

(b) Given **a** = $-i + j - 2k$, **b** == $3i + 4j$ and **c** == $-3i + 11j - 7k$, find the value of:

(i) **a . (b × c)**

(ii) **(a × c) . b**

(4 marks)

(c) Sketch the graph of $\frac{y^2}{0.25} - \frac{x^2}{9} = 1$ and locate the foci, vertices and asymptote.

(5 marks)

(d) Sketch the graph of $\frac{x^2}{4} + \frac{y^2}{9} = 1$ and locate the foci.

(5 marks)

-END OF QUESTIONS-

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FINAL EXAMINATION FORMULA

SEMESTER/SESSION: SEM II / 2017/2018
COURSE NAME : MATHEMATICS 1
PROGRAM CODE: BBA/BBB/BBD/BBE/BBF/BBG
COURSE CODE : BBBM10303

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:

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

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

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