UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Sekolah Pendidikan Profesional dan Pendidikan Berterusan (UTMSPACE)

DDPB 1

FINAL EXAMINATION / *PEPERIKSAAN AKHIR*
SEMESTER 1 – SESSION 2016 / 2017
PROGRAM KERJASAMA

COURSE CODE *KOD KURSUS*	:	DDWS 1012 / DDPS 1012
COURSE NAME *NAMA KURSUS*	:	ENGINEERING MATHEMATICS 1 *MATEMATIK KEJURUTERAAN 1*
YEAR / PROGRAMME *TAHUN / PROGRAM*	:	1 / DIPLOMA IN ENGINEERING *1/ DIPLOMA KEJURUTERAAN*
DURATION *TEMPOH*	:	2 HOURS *2 JAM*
DATE *TARIKH*	:	OCTOBER 2016

INSTRUCTION :
ARAHAN

1. **ANSWER ALL SIX (6) QUESTIONS .**
   JAWAB SEMUA ENAM (6) SOALAN.

2. **A LIST OF TRIGONOMETRIC FORMULAE IS GIVEN ON THE LAST PAGE.**
   SATU SENARAI RUMUS TRIGONOMETRI DIBERIKAN PADA MUKASURAT TERAKHIR.

(You are required to write your name and your lecturer's name on your answer script)
(Pelajar dikehendaki tuliskan nama dan nama pensyarah pada skrip jawapan)

NAME / *NAMA PELAJAR*	:	muham .....
I.C NO. / *NO. K/PENGENALAN*	:	.....
YEAR / COURSE *TAHUN / KURSUS*	:	.....
COLLEGE NAME *NAMA KOLEJ*	:	.....
LECTURER'S NAME *NAMA PENSYARAH*	:	.....

This examination paper consists of .....**6**.... pages including the cover
Kertas soalan ini mengandungi .....6.... muka surat termasuk kulit hadapan

1. (a) **Simplify :**

Ringkaskan:

(i) $(x^6y^2)^{-\frac{1}{2}}$ (ii) $\frac{2+\sqrt{5}}{2-\sqrt{5}}$

(b) **Find the values of x, if :**

Dapatkan nilai-nilai bagi x, jika :

(i) $2^x = 8^{x+1}$

(ii) $\log_8 x + \log_8(x+12) = 2$

(10 M)

2. (a) **If** $f: x \to x^2 + 4$, $x \in R$ **and** $g: x \to \sqrt{x-1}$, $x \geq 1$.

Jika $f: x \to x^2 + 4$, $x \in R$ *dan* $g: x \to \sqrt{x-1}$, $x \geq 1$.

(i) **Find** $(f \circ g)(x)$ and $(g \circ f)(x)$.

Dapatkan $(f \circ g)(x)$ *dan* $(g \circ f)$.

(ii) **Find** x **if** $(f \circ g)(x) = (g \circ f)(x)$.

Dapatkan x *jika* $(f \circ g)(x) = (g \circ f)(x)$.

(b) **Solve the system of equation below for x and y .**

Selesaikan sistem persamaan berikut untuk x dan y .

$$9x - 3y - 13 = 0$$

$$2x + y - 4 = 0$$

(10 M)

3. (a) **The roots of the quadratic equation** $x^2 + 2x + 4 = 0$ **are** α **and** β.

Find the values of:

Punca-punca persamaan kuadratik $x^2 + 2x + 4 = 0$ *ialah* α *dan* β.

Dapatkan nilai-nilai bagi:

(i) $(\alpha + 2)(\beta + 2)$ (ii) $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$

(b) **Solve the following inequalities:**

Selesaikan ketaksamaan berikut:

$$\left|\frac{x-1}{3}\right| > 2$$

(10 M)

4. (a) Prove the following identity :

Buktikan identiti berikut :

$$\frac{\cos 2\theta}{1+\sin 2\theta} = \frac{\cot\theta - 1}{\cot\theta + 1}$$

(b) Given $\sin\alpha = \frac{3}{5}$ in the first quadrant and $\cos\beta = -\frac{5}{13}$ in the second quadrant. Find the following expression without the use of calculator.

Diberi $\sin\alpha = \frac{3}{5}$ dalam sukuan pertama dan kos $\beta = -\frac{5}{13}$ dalam sukuan kedua. Dapatkan ungkapan berikut tanpa menggunakan kalkulator.

(i) $\sin 2\alpha$ (ii) $\tan(\alpha - \beta)$

(10 M)

5. (a) Solve the following equation for $0^\circ \le x \le 360^\circ$.

Selesaikan persamaan berikut untuk $0^\circ \le x \le 360^\circ$.

$$\cos 3x = 1$$

(b) Express $4\sin\theta - 3\cos\theta$ in the form $R\sin(\theta - \alpha)$ whereby $R > 0$ and $0^\circ \le \alpha \le 90^\circ$. Hence, solve the equation $4\sin\theta - 3\cos\theta = 2$ for the values of θ between $0^\circ \le \theta < 360^\circ$.

Nyatakan $4\sin\theta - 3kos\,\theta$ dalam bentuk $R\sin(\theta - \alpha)$ di mana $R > 0$ dan $0^\circ \le \alpha \le 90^\circ$. Seterusnya, selesaikan persamaan $4\sin\theta - 3kos\,\theta = 2$ untuk nilai-nilai θ di antara $0^\circ \le \theta < 360^\circ$.

(10 M)

6. (a) **Find the Cartesian coordinates for the point** $\left(\sqrt{2}, -\frac{3\pi}{4}\right)$.

Dapatkan koordinat Cartesan bagi titik $\left(\sqrt{2}, -\frac{3\pi}{4}\right)$.

(b) **Convert the polar equation** $r^2 \sin 2\theta = 10$ **to Cartesian equation.**

Tukarkan persamaan kutub $r^2 sin\, 2\theta = 10$ *ke persamaan Cartesan.*

(c) **Copy and complete the following table and sketch the graph of the curve** $r = 4 - 2\cos\theta$ **for** $0^\circ \leq \theta \leq 360^\circ$.

(Hint: Use symmetrical properties of the graph).

Salin dan lengkapkan jadual berikut dan lakarkan graf lengkung $r = 4 - 2kos\,\theta$ *untuk* $0^\circ \leq \theta \leq 360^\circ$.

(Panduan: Gunakan sifat simetri dalam graf tersebut).

θ	0°	30°	60°	90°	120°	150°	180°
$2cos\,\theta$							
r							

(10 M)

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

APPENDIX

1. Trigonometric Identities

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

$$\sin 2A = 2\sin A \cos A$$

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

$$\tan 2A = \frac{2\tan A}{1 - \tan^2 A}$$

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

$$\tan(A \pm B) = \frac{\tan A \pm \tan B}{1 \mp \tan A \tan B}$$

$$\sin A + \sin B = 2\sin\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

$$\sin A - \sin B = 2\cos\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right)$$

$$\cos A + \cos B = 2\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

$$\cos A - \cos B = -2\sin\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right)$$

2. Polar Coordinates

$$x = r\cos\theta, \quad y = r\sin\theta, \quad \tan\theta = \frac{y}{x}, \quad r^2 = x^2 + y^2$$