



**KOLEJ YAYASAN PELAJARAN JOHOR
FINAL EXAMINATION**

COURSE NAME : ENGINEERING MATHEMATICS I
COURSE CODE : MAT1012
SESSION : DECEMBER 2022
DURATION : 2 HOURS

**INSTRUCTION TO CANDIDATES /
ARAHAN KEPADA CALON**

1. This examination paper consists of **ONE (1)** part : / PART A (60 Marks) /
*Kertas soalan ini mengandungi **SATU (1)** bahagian: BAHAGIAN A (60 Markah)*
2. Candidates are not allowed to bring any material to the examination room except with the permission from the invigilator. The formula was attached at the back question paper. /
Calon tidak dibenarkan untuk membawa sebarang bahan/nota ke bilik peperiksaan tanpa arahan/kebenaran daripada pengawas. Rumus dilampirkan di belakang kertas soalan peperiksaan.
3. Please check to make sure that this examination pack consists of: /
Pastikan kertas soalan peperiksaan ini mengandungi:
 - i. Question Paper /
Kertas Soalan.
 - ii. Answering Booklet /
Buku Jawapan.

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO /
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

This examination paper consists of **6** printed pages including front page
*Kertas soalan ini mengandungi **6** muka surat termasuk kulit hadapan*

This part contains of **FIVE (5)** questions. Answer **ALL** questions in the answer sheet.
Bahagian ini mempunyai LIMA (5) soalan. Jawab SEMUA soalan di dalam buku jawapan.

QUESTION 1/ SOALAN 1

a) Simplify:

Ringkaskan:

i. $\frac{6u^2v^2 \times 4uv}{9uv^{-4} \times u^3v^8}$

ii. $\frac{1}{\sqrt{2} + \sqrt{3}}$

(4 marks / markah)

b) Find the values of x , if:

Dapatkan nilai-nilai bagi x , jika:

i. $3^{3x-1} = 27$

ii. $\log_3 5 + \log_3(x - 6) = 1$

(6 marks / markah)

QUESTION 2/ SOALAN 2

Given $f(x) = x + 2$ and $g(x) = \frac{4}{x} + 5$. Find :

Diberi $f(x) = x + 2$ dan $g(x) = \frac{4}{x} + 5$. Dapatkan:

a) Domain and range of (x) .

Domain dan julat bagi $g(x)$.

(4 marks / markah)

b) $g \circ f(x)$. Find value of $(g \circ f)(2)$.

$g \circ f(x)$. Dapatkan nilai $(g \circ f)(2)$.

(3 marks / markah)

c) the function of $g^{-1}(x)$.

fungsi bagi $g^{-1}(x)$.

(3 marks / markah)

QUESTION 3/ SOALAN 3

- a) Determine the type of the roots of the following equation:

Tentukan jenis punca bagi persamaan berikut:

$$x^2 - 6x + 9 = 0$$

(3 marks / markah)

- b) Solve the simultaneous equation of the following equation:

Selesaikan persamaan serentak bagi persamaan berikut:

$$3x + 4y = 2$$

$$x + 3y = -1$$

(3 marks / markah)

- c) The roots of the quadratic equation $x^2 - 6x + 5 = 0$ are α and β . Find the values of:

Punca-punca persamaan kuadratik $x^2 - 6x + 5 = 0$ ialah α dan β . Dapatkan nilai-nilai bagi:

i. $\alpha^2 + \beta^2$

ii. $\frac{5}{\alpha} + \frac{5}{\beta}$

(6 marks / markah)

- d) Solve the following inequalities:

Selesaikan ketaksamaan berikut :

$$(x - 6)(x + 1) \leq 0$$

(4 marks / markah)

- c) Copy and complete the **Table 1** below and sketch the graph of the equation
*Salin dan lengkapkan **Jadual 1** di bawah, seterusnya lakarkan graf persamaan*
 $r = 2 + 3 \sin \theta$ for .

(Hint: Use symmetrical properties of the graph)

(Panduan: gunakan sifat simetri dalam graf tersebut)

θ	0°	30°	60°	90°	120°	150°	180°
$r = 2 + 3 \sin \theta$							
(r, θ)							

Table 1/ Jadual 1

(4 marks / markah)

[60 MARKS / MARKAH]

END OF QUESTION PAPER/ KERTAS SOALAN TAMAT

LIST OF FORMULA
SENARAI RUMUS

1 Indeks

$$a^m a^n = a^{m+n}$$

$$\left(\frac{a^m}{a^n}\right) = a^{m-n}$$

$$(a^m)^n = a^{mn}$$

$$\left(\frac{1}{a^n}\right) = a^{-n}$$

2 Logaritma

$$\log_a(xy) = \log_a x + \log_a y$$

$$\log_a\left(\frac{x}{y}\right) = \log_a x - \log_a y$$

$$\log_a(x)^n = n \log_a x$$

$$\log_a a = 1$$

$$\log_a 1 = 0$$

3 Quadratic equation
Type of roots

$$= b^2 - 4ac$$

4 Trigonometry

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

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

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

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

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

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

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

5 Polar coordinates

$$x = r \cos \theta$$

$$y = r \sin \theta$$

$$\tan \theta = \frac{y}{x}$$

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