



**KOLEJ YAYASAN PELAJARAN JOHOR
FINAL EXAMINATION**

COURSE NAME : ENGINEERING MATHEMATICS I
COURSE CODE : MAT1012
EXAMINATION : OCTOBER 2018
DURATION : 2 HOURS

INSTRUCTION TO CANDIDATES

1. Answer **ALL** Question
2. Candidates are not allowed to bring any material to examination room except with the permission from the invigilator.
3. Please check to make sure that this examination pack consist of:
 - i. Question Paper
 - ii. Answer Booklet

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

This examination paper consists of 6 printed pages including front page

Answer ALL question in Answer Booklet.

Jawab SEMUA soalan di dalam Buku Jawapan

QUESTION 1

a) Simplify:

Ringkaskan:

i. $\frac{(9mn^2)^2}{(m^3n^6)^{\frac{1}{3}}}$

ii. $\frac{2}{\sqrt{7}-\sqrt{3}}$

(4 marks)

b) Find the values of x , if:

Dapatkan nilai-nilai bagi x , jika:

i. $3^{x-14} = 27^{-2x}$

ii. $\log_2(x-3) - \log_2(x+5) = 2$

(6 marks)

10 marks

QUESTION 2

Given $f : x \rightarrow x-2$, $x \in \mathfrak{R}$ and $g : x \rightarrow \sqrt{x+1}$, $x \geq -1, x \in \mathfrak{R}$. Find:

Diberi $f : x \rightarrow x-2$, $x \in \mathfrak{R}$ dan $g : x \rightarrow \sqrt{x+1}$, $x \geq -1, x \in \mathfrak{R}$. Dapatkan:

a) domain and range of $g(x)$.

domain dan julat bagi $g(x)$.

(4 marks)

b) $f \circ g(x)$. Find value of x if $(f \circ g)(x) = 1$.

$f \circ g(x)$. Dapatkan nilai x jika $(f \circ g)(x) = 1$.

(4 marks)

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

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

(2 marks)

10 marks

QUESTION 3

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

Tentukan jenis punca bagi persamaan berikut:

$$2x^2 - 3x + 1 = 0$$

(2 mark)

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

Selesaikan persamaan serentak bagi persamaan berikut:

$$2x - 3y = 1$$

$$x + y = 3$$

(3 marks)

- c) The roots of the quadratic equation $2x^2 - 5x - 1 = 0$ are α and β .
Find the values of:

Punca-punca persamaan kuadratik $2x^2 - 5x - 1 = 0$ ialah α dan β .

Dapatkan nilai-nilai bagi:

i. $(1 + \alpha)(1 + \beta)$

ii. $\alpha^2 + \beta^2 - 4\alpha\beta$

(8 marks)

- d) Solve the following inequalities:

Selesaikan ketaksamaan berikut :

$$\frac{(x+3)(x-2)}{x-1} > 0$$

(4 marks)

17 marks

QUESTION 4

- a) Convert the angles 205° to radians.
Tukarkan sudut 205° kepada radian. (2 marks)

- b) Solve the equation for $0 \leq \theta \leq 360^\circ$,
Selesaikan persamaan untuk $0 \leq \theta \leq 360^\circ$,
$$2\cos\theta - 1 = 0$$
 (4 marks)

- c) Given $\sin\alpha = \frac{3}{5}$ in the first quadrant and $\cos\beta = -\frac{5}{13}$ in the second quadrant. Evaluate the following expression without using the calculator.

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

- i. $\tan(\alpha - \beta)$ ii. $\cos(\alpha + \beta)$ (7 marks)

13 marks

QUESTION 5

- a) Find the Cartesian coordinates for the point:

Dapatkan koordinat Cartesian bagi titik:

(3 marks)

$$\left(-2, \frac{3\pi}{2}\right)$$

- b) Find the Cartesian equation for,

Dapatkan persamaan Cartesian bagi,

$$r^2 = \frac{3kosek\theta}{kos\theta}$$

(3 marks)

- c) Copy and complete the table below and sketch the graph of the equation
- $r = 3 + 3\cos\theta$
- for
- $0 \leq \theta \leq 360^\circ$
- .

*(Hint: Use symmetrical properties of the graph)**Salin dan lengkapkan jadual berikut, seterusnya lakarkan graf persamaan $r = 3 + 3\cos\theta$ untuk $0 \leq \theta \leq 360^\circ$.**(Panduan: gunakan sifat simetri dalam graf tersebut)*

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

(4 marks)

10 marks

END OF QUESTION PAPER

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

$$x = r \cos \theta$$

$$y = r \sin \theta$$

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

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

