KOLEJ YAYASAN PELAJARAN JOHOR
FINAL EXAMINATION / *PEPERIKSAAN AKHIR*

COURSE NAME /	:	**ENGINEERING MATHEMATICS 1/**
NAMA KURSUS		*MATEMATIK KEJURUTERAAN 1*
COURSE CODE /	:	**MAT 1012/**
KOD KURSUS		*MAT 1012*
SESSION /	:	**NOVEMBER 2020 /**
SESI		*NOVEMBER 2020*
DURATION /	:	**2 HOURS /**
TEMPOH		*2 JAM*

INSTRUCTION TO CANDIDATES /
ARAHAN KEPADA CALON

1. This examintaion 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 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 consist of: /
   Pastikan kertas soalan peperiksaan ini mengandungi:

   i. Question Paper /
      Kertas Soalan
   ii. Answer 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 **7** printed pages including front page
*Kertas soalan ini mengandungi **7** muka surat termasuk kulit hadapan*

This part consists of **FIVE(5)** questions. Answer **ALL** questions in the Answer Booklet.

*Bahagian ini mempunyai **LIMA (5)** soalan. Jawab **SEMUA** soalan di dalam Buku Jawapan.*

QUESTION 1/ *SOALAN 1*

a) Simplify:

   Ringkaskan:

   i. $\left(\dfrac{3x^5 y^3}{x^2 y^{-2}}\right)^2$ ii. $\dfrac{4}{3+\sqrt{2}}$

                                                    (4 marks/ 4 *markah*)

b) Find the values of x , if:

   Dapatkan nilai-nilai bagi x, jika:

   i. $49^{x-1}=7^{x-3}$ ii. $\log_2 x+\log_2(2x+3)=1$

                                                    (6 marks/ 6 *markah*)

QUESTION 2/ *SOALAN 2*

Given $f:x\rightarrow x-3$ and $g:x\rightarrow x^2+4$. Find:

Diberi $f:x\rightarrow x-3$ dan $g:x\rightarrow x^2+4$. Dapatkan:

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

   domain bagi $f(x)$ dan $g(x)$.

                                                    (2 marks/ 2 *markah*)

b) $f \circ g(x)$. Find value of x if $(f \circ g)(x) = 5$.

    $f \circ g(x)$. Dapatkan nilai x jika $(f \circ g)(x) = 5$.

                                                               (5 marks/ 5 *markah*)

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

    fungsi bagi $g^{-1}(x)$.   **(3 marks/ 3 *markah*)**

QUESTION 3/ *SOALAN 3*

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

    Tentukan jenis punca bagi persamaan berikut:
$$x^2 + 6x + 9 = 0$$

                                                               (2 marks/ 2 *markah*)

b)   Solve the simultaneous equation on the following equation:

    Selesaikan persamaan serentak bagi persamaan berikut:
$$x + 3y = 1$$
$$4x - y = -9$$

                                                               (3 marks/ 3 *markah*)

c)   The roots of the quadratic equation $6x^2 - 10x + 12 = 0$ are α and β . Find the values of:

    Punca-punca persamaan kuadratik $6x^2 - 10x + 12 = 0$ ialah α dan β . Dapatkan nilai-nilai bagi:

    i. $\alpha^2 + \beta^2$ ii. $\dfrac{1}{\alpha} + \dfrac{1}{\beta}$

                                                                (6 marks/ 6 *markah*)

d)   Solve the following inequalities:

Selesaikan ketaksamaan berikut :

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

(3 marks/ 3 *markah*)

QUESTION 4/ *SOALAN 4*

a)   Convert the angles $225°$ to radian.

Tukarkan sudut $225°$ kepada radian.

(2 marks/ 2 *markah*)

b)   Solve the equation for $0 \le \theta \le 360°$,

Selesaikan persamaan untuk $0 \le \theta \le 360°$,

$$\tan \theta = 0.5$$

(4 marks/ 4 *markah*)

c)   Given that A and B are acute angle with $\sin A = \frac{7}{25}$ and $\cos B = \frac{5}{13}$. Find the value of:

Jika diberi A dan B adalah sudut tirus dengan $\sin A = \frac{7}{25}$ dan $kosB = \frac{5}{13}$, dapatkan nilai bagi:

i. $kos(A-B)$ ii. $\tan(A+B)$

(10 marks/ 10 *markah*)

QUESTION 5/ *SOALAN 5*

a)   Find the Polar Coordinates for the point:

    Dapatkan Koordinat Kutub bagi titik:
$$(-4,-4)$$

                                                            (3 marks/ 3 *markah*)

b)   Find the Cartesian equation for,

    Dapatkan persamaan Cartesan bagi,
$$r = 4kos\theta$$

                                                            (3 marks/ 3 *markah*)

c)   Copy and complete the **Table 1** below and sketch the graph of the equation
    $r = 5 - 4\cos\theta$ for $0 < \theta < 360°$.
    (Hint: Use symmetrical properties of the graph)

    *Salin dan lengkapkan **Jadual 1** di bawah, seterusnya lakarkan graf persamaan*
    $r = 5 - 4kos\theta$ *untuk* $0 < \theta < 360°$.
    (Panduan: gunakan sifat simetri dalam graf tersebut)

θ	$0°$	$30°$	$60°$	$90°$	$120°$	$150°$	$180°$
$r = 5 - 4\cos\theta$							
(r,θ)							

Table 1/ *Jadual 1*

                                                            (4 marks/ *4 markah*)

                                                        [60 MARKS/ 60 *MARKAH*]

END OF QUESTION PAPER/ *KERTAS SOALAN TAMAT*

LIST OF FORMULA

SENARAI RUMUS

1 Index/ *Indeks*

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

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

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

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

2 Logarithm/ *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/
   Persamaan kuadratik
   Jenis-jenis punca

$$= b^2 - 4ac$$

4 Trigonometry/
   Trigonometri

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

$$\sin 2A = 2\sin A kosA$$

$$kos2A = kos^2 A - \sin^2 A$$

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

$$\sin(A \pm B) = \sin A \ kosB \ \pm \ kosA \ \sin B$$

$$kos(A \pm B) = kosA \ kosB \ \mp \ \sin A \ \sin B$$

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

5 Polar coordinates/
   Koordinat kutub

$$x = rkos\theta$$

$$y = r\sin\theta$$

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

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