

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI**

JABATAN MATEMATIK, SAINS & KOMPUTER

**PEPERIKSAAN AKHIR
SESI JUN 2017**

DBM1033 : MATHEMATICAL COMPUTING

**TARIKH : 25 OKTOBER 2017
MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)**

Kertas ini mengandungi **SEMBILAN (9)** halaman bercetak.
Struktur (5 soalan)
Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN
(CLO yang tertera hanya sebagai rujukan)

SULIT

INSTRUCTION:

This paper consists of **FIVE (5)** structured questions. Answer **FOUR (4)** questions only.

ARAHAN:

Kertas ini mengandungi **LIMA (5)** soalan berstruktur. Jawab **EMPAT (4)** soalan sahaja.

QUESTION 1**SOALAN 1**CLO1
C1

- (a) Computer works with some specific number of bits. List **FIVE (5)** most common collections.

*Komputer berfungsi dengan beberapa bit tertentu. Senaraikan **LIMA (5)** koleksi yang paling biasa.*

[5 marks]

[5 markah]

CLO1
C2

- (b) Convert the following:

Tukarkan yang berikut:

- i. 11100011_2 to decimal.

11100011_2 kepada perpuluhan

[2 marks]

[2 markah]

- ii. 62_8 to binary.

62_8 kepada perduaan

[2 marks]

[2 markah]

- iii. 444_8 to hexadecimal.

444_8 kepada perenambelasan

[2 marks]

[2 markah]

- iv. 2017_{10} to octal.

2017_{10} kepada perlapanan

[2 marks]

[2 markah]

- v. 33_{10} to binary.
 33_{10} kepada perduaan

[2 marks]

[2 markah]

CLO1
C3

(c) Calculate the following:

Kirakan yang berikut:

- i. $1101_2 + DAD_{16}$ (Give your answer in octal)
(Berikan jawapan anda dalam *perlapanan*)

[5 marks]

[5 markah]

- ii. $246_8 - 59_{10}$ (Give your answer in hexadecimal)
(Berikan jawapan anda dalam *perenambelasan*)

[5 marks]

[5 markah]

QUESTION 2

SOALAN 2

CLO1
C2

(a)

- i. A sector of radius 12 cm has an arc length of 30.6 cm. Identify the angle subtended at the center of the circle by the arc. (Express the answer in degree).

Sebuah sektor yang berjari 12 cm mempunyai panjang lengkok 30.6 cm. Nyatakan sudut yang dicangkum pada pusat bulatan oleh lengkok tersebut. (Ungkapkan jawapan dalam unit darjah).

[4 marks]

[4 markah]

- ii. Figure 2 (a) (ii) shows triangle PQS and RST. Compute the value of X.

Rajah 2 (a) (ii) menunjukkan segitiga PQS dan RST. Kira nilai X.

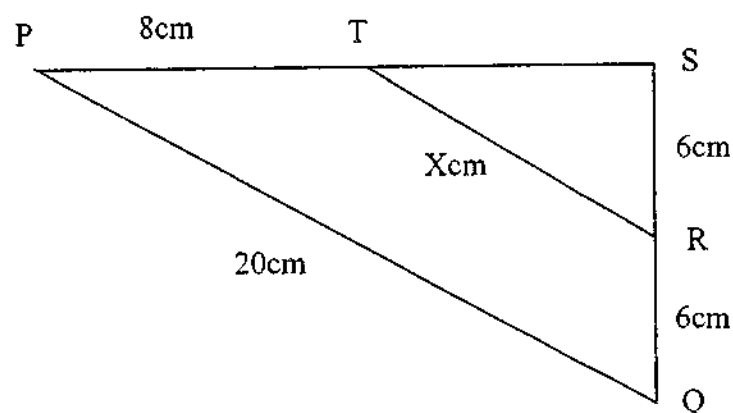


Figure 2 (a) (ii) / Rajah 2 (a) (ii)

[6 marks]

[6 markah]

CLO2
C3

(b)

- i. Figure 2 (b) (i) below shows a solid made up of a hemisphere and a cylinder. Calculate the volume of the solid.

Rajah 2 (b) (i) ialah pepejal yang terdiri daripada hemisfera dan silinder. Kira isipadu pepejal di bawah.

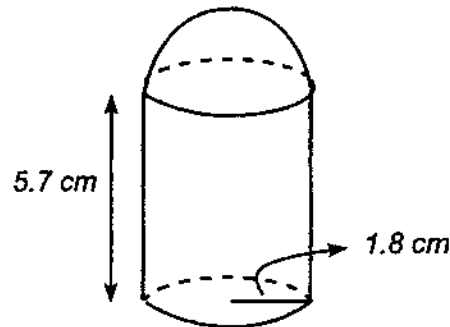


Figure 2 (b) (i) / Rajah 2 (b) (i)

[5 marks]

[5 markah]

- ii. Cans of sardine at Sabasun Hypermarket are packed in boxes as shown in Figure 2 (b) (ii). Calculate the surface area that is wasted in between all of the cans.

Tin sardin di Pasaraya Sabasun dibungkus dalam kotak seperti ditunjukkan dalam Rajah 2 (b) (ii). Kirakan luas permukaan kawasan yang dibazirkan di antara semua tin.

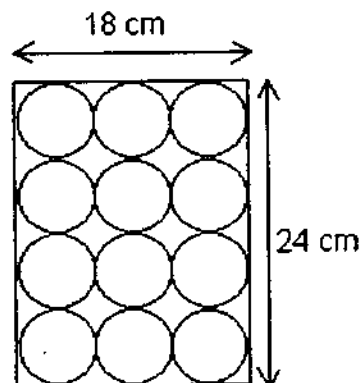


Figure 2 (b) (ii) / Rajah 2 (b) (ii)

[5 marks]

[5 markah]

- iii. Calculate the area of shaded region for Figure 2 (b) (iii):

Kira luas kawasan yang berlorek dalam Rajah 2 (b) (iii) di bawah:

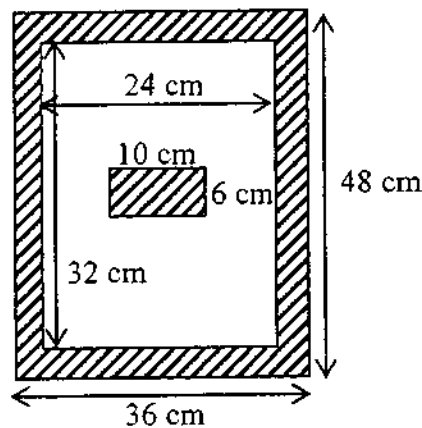


Figure 2 (b) (iii) / Rajah 2 (b) (iii)

[5 marks]

[5 markah]

QUESTION 3

SOALAN 3

CLO1
C2

- (a) Determine the following expressions in the form of $a + bi$.
Tentukan ungkapan-ungkapan berikut dalam bentuk $a + bi$.

i. $-8i(-7 - 2i)$

[2 marks]

[2 markah]

ii. $(2 + 6i)(1 + 3i)$

[3 marks]

[3 markah]

iii. $\frac{4}{6+7i}$

[5 marks]

[5 markah]

CLO2
C3(b) Given $Z_1 = 5 + 5i$ and $Z_2 = -1 + i$:*Diberi $Z_1 = 5 + 5i$ dan $Z_2 = -1 + i$:*i. Solve $Z_1 - Z_2$ in terms of $a + bi$ form*Selesaikan $Z_1 - Z_2$ dalam bentuk $a + bi$*

[3 marks]

[3 markah]

ii. Illustrate $Z_1 - Z_2$ in an Argand Diagram.*Gambarkan $Z_1 - Z_2$ dalam Rajah Argand.*

[2 marks]

[2 markah]

iii. Calculate the modulus and argument of $Z_1 + Z_2$.*Kira modulus dan argument bagi $Z_1 + Z_2$.*

[7 marks]

[7 markah]

iv. Express $Z_1 + Z_2$ to exponential form and trigonometric form*Ungkapkan $Z_1 + Z_2$ kepada bentuk eksponen dan trigonometri*

[3 marks]

[3 markah]

QUESTION 4

SOALAN 4

CLO2
C2

(a) Differentiate the following functions:

Bezakan fungsi-fungsi berikut:

i. $y = 3x^3(8x + 2)$

[5 mark]

[5 markah]

ii. $y = (x^5 - 6x + 2)^{2/3}$

[5 marks]

[5 markah]

CLO3
C3

(b) Solve each of the following :

Selesaikan setiap yang berikut:

i. $\int (16t^7 - t^2 - t + 3)dt$

[3 marks]

[3 markah]

ii. $\int (10w^4 + 9w^2 + 4w)dw$

[3 marks]

[3 markah]

iii. $\int (2x + \sqrt{x^3})(6 - x^2)dx$

[4 marks]

[4 markah]

CLO3
C4(c) Differentiate the function $y = \frac{3}{\sqrt{5x-2}}$ to x by using chain rule.*Bezakan fungsi $y = \frac{3}{\sqrt{5x-2}}$ terhadap x dengan menggunakan petua rantai.*

[5 marks]

[5 markah]

QUESTION 5

SOALAN 5

CLO3
C2

(a)

- i. Express $\begin{bmatrix} 3 & 7 \\ -2 & 4 \\ 1 & -3 \end{bmatrix} + 4 \begin{bmatrix} -1 & -2 \\ 2 & 6 \\ 5 & 0 \end{bmatrix}$ in one single matrix.

Ungkapkan $\begin{bmatrix} 3 & 7 \\ -2 & 4 \\ 1 & -3 \end{bmatrix} + 4 \begin{bmatrix} -1 & -2 \\ 2 & 6 \\ 5 & 0 \end{bmatrix}$ sebagai satu matrik tunggal.

[3 marks]

[3 markah]

- ii. Calculate $\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ 2 & -2 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} -1 \\ 1 \end{bmatrix}$.

Hitungkan $\begin{bmatrix} 1 & 0 & -1 \\ 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ 2 & -2 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} -1 \\ 1 \end{bmatrix}$.

[3 marks]

[3 markah]

- iii. Given matrix $A = \begin{bmatrix} 1 & -2 \\ 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 3 & p \\ -1 & 5 \end{bmatrix}$ and $C = \begin{bmatrix} 5 & -6 \\ 7 & 22 \end{bmatrix}$.

If $A \cdot B = C$, determine the value of p .

Diberi matrik $A = \begin{bmatrix} 1 & -2 \\ 3 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 3 & p \\ -1 & 5 \end{bmatrix}$ dan $C = \begin{bmatrix} 5 & -6 \\ 7 & 22 \end{bmatrix}$.

Jika $A \cdot B = C$, tentukan nilai p .

[4 marks]

[4 markah]

CLO3
C3

- (b) Calculate the value of x , y and z by using the Cramer's Rule.

Kirakan nilai x , y dan z menggunakan kaedah Petua Cramer.

$$x + y + z = 2$$

$$3x + 2y - z = 8$$

$$2x - 3y - 4z = 0$$

[15 marks]

[15 markah]

SOALAN TAMAT

CIRCLELength of an arc

1. $s = r\theta$

Area of a sectorArea of a segment

1. $A = \frac{1}{2}r^2\theta$

1. $A = \frac{1}{2}r^2(\theta - \sin \theta)$

AREA AND VOLUME

1. Cylinder : $V = \pi r^2 h$

2. Cone : $V = \frac{1}{3}\pi r^2 h$

3. Sphere : $V = \frac{4}{3}\pi r^3$

4. Pyramid : $V = \frac{1}{3} \times \text{area of base} \times \text{height}$

5. Triangular Prism : $V = A \times l$, note: $A = \text{area}$

6. Parallelogram : $A = h \times b$

7. Triangle : $A = \left(\frac{1}{2}\right) \times b \times h$

8. Trapezium : $A = h \times \left(\frac{a+b}{2}\right)$

COMPLEX NUMBERModulusArgument

1. $|z| = \sqrt{a^2 + b^2}$

1. $\arg z = \tan^{-1} \frac{b}{a}$

Complex no. in other form

1. Polar form : $|z| \angle \theta$

2. Exponential form : $|z| e^{i\theta}$

3. Trigonometric form : $|z| (\cos \theta + i \sin \theta)$

Multiplication & Division

1. $(a \angle \theta_a) \cdot (b \angle \theta_b) = (a)(b) \angle (\theta_a + \theta_b)$

2. $\frac{(a \angle \theta_a)}{(b \angle \theta_b)} = \left(\frac{a}{b}\right) \angle (\theta_a - \theta_b)$

MATRIXInverse Matrix

1. $A^{-1} = \frac{1}{|A|} \text{adj}A$

Cramer's Rule

1. $x = \frac{|A_1|}{|A|}$ $y = \frac{|A_2|}{|A|}$ $z = \frac{|A_3|}{|A|}$

DIFFERENTIATION

$y = ax^n$

$y = (ax + b)^n$

1. $\frac{dy}{dx} = anx^{n-1}$

2. $\frac{dy}{dx} = an(ax + b)^{n-1}$

3. Chain Rule : $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$

4. Product Rule : $y = u \times v$

$y' = uv' + vu'$

5. Quotient Rule : $y = \frac{u}{v}$

$y' = \frac{vu' - uv'}{v^2}$

INTEGRATIONIndefinite Integration

1. $\int x^n dx = \frac{x^{n+1}}{n+1} + C$

2. $\int (ax + b)^n dx = \frac{(ax + b)^{n+1}}{a(n+1)} + C$

Definite Integration

1. $\int_a^b f(x) dx = F(b) - F(a)$