

**INSTRUCTION:**

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

**ARAHAN:**

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

**QUESTION 1****SOALAN 1**CLO1  
C2

a) Convert the following:

*Tukarkan yang berikut:*i.  $375_{10}$  to octal number. *$375_{10}$  kepada nombor perlapanan.*

[2 marks]

[2 markah]

ii.  $10110_2$  to decimal number. *$10110_2$  kepada nombor persepuluhan.*

[2 marks]

[2 markah]

iii.  $2894.25_{10}$  to hexadecimal number. *$2894.25_{10}$  kepada nombor perenambelasan.*

[3 marks]

[3 markah]

iv.  $643.1_8$  to hexadecimal number. *$643.1_8$  kepada nombor perenambelasan.*

[3 marks]

[3 markah]

CLO1  
C3

b) Calculate the following:

*Kirakan yang berikut:*

i.  $10110_2 + 75_8$  (Give your answer in binary number)

 $10110_2 + 75_8$  (*Berikan jawapan anda dalam nombor perdua*)

[4 marks]

[4 markah]

ii.  $534_{10} - 2D_{16}$  (Give your answer in decimal number)

 $534_{10} - 2D_{16}$  (*Berikan jawapan anda dalam nombor persepuluhan*)

[5 marks]

[5 markah]

iii.  $111101_2 + 643_8$  (Give your answer in decimal number)

 $111101_2 + 643_8$  (*Berikan jawapan anda dalam nombor persepuluh*)

[6 marks]

[6 markah]

QUESTION 2

SOALAN 2

CLO1  
C2

- a) i. In Diagram 2a(i), ROS is a straight line. O is the centre of the circle. Find the value of  $x$  and  $y$ .

*Dalam Rajah 2a(i), ROS adalah suatu garis lurus. O ialah pusat bulatan. Dapatkan nilai  $x$  dan  $y$ .*

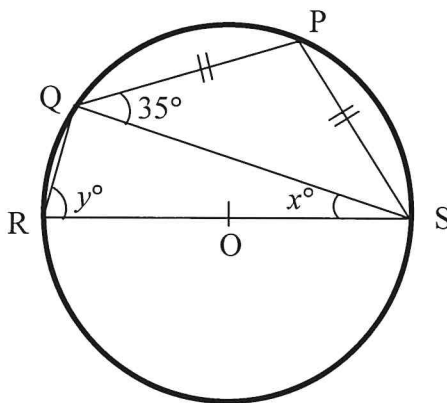


Diagram 2a(i) / Rajah 2a(i)

[4 marks]

[4 marks]

- ii. In Figure 2a(ii), PQU is a tangent to a circle QRST with center O. QOS and RTU are straight lines. Calculate the value of  $x$  and  $y$ .

*Dalam Rajah 2a(ii), PQU adalah tangen kepada bulatan QRST dengan O sebagai titik tengah. QOS dan RTU adalah garis lurus. Kira nilai bagi  $x$  dan  $y$ .*

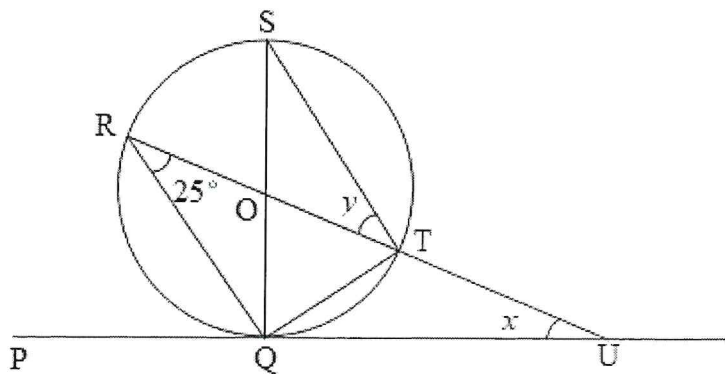


Figure 2a(ii) / Rajah 2a(ii)

[6 marks]

[6 markah]

CLO2  
C3

- b) Figure 2b shows a right-angled triangle ABC. The arc BD is drawn with A as the centre and AB as radius. Given  $AB = 12\text{cm}$ ,  $BC = 14\text{ cm}$  and  $\angle BAC = 60^\circ$ , calculate:

*Rajah 2b menunjukkan segitiga bersudut tegak ABC. Lengkung BD dilukis dengan A sebagai titik tengah dan AB adalah jejari. Diberi  $AB = 12\text{cm}$ ,  $BC = 14\text{ cm}$  dan  $\angle BAC = 60^\circ$ , kirakan:*

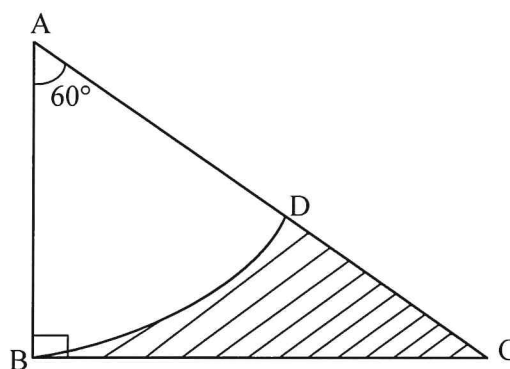


Figure 2b / Rajah 2b

- i. The area of triangle ABC.

*Luas segitiga ABC.*

[2 marks]

[2 markah]

- ii. The area of sector ABD.

*Luas sektor ABD.*

[4 marks]

[4 markah]

- iii. The shaded area.

*Luas kawasan berlorek.*

[2 marks]

[2 markah]

- iv. The length of arc BD.  
*Panjang lengkung BD.*

[2 marks]

[2 markah]

- v. The perimeter of the shaded region.  
*Perimeter kawasan berlorek.*

[5 marks]

[5 markah]

## QUESTION 3

## SOALAN 3

CLO1  
C2a) Solve the following expressions in the form of  $a + bi$ .*Selesaikan ungkapan-ungkapan berikut dalam bentuk  $a + bi$ .*

i.  $3i(-5 + 8i)$

[2 marks]

[2 markah]

ii.  $(-2 + 4i)(3 + 5i)$

[3 marks]

[3 markah]

iii.  $\frac{5 + i}{4 - 3i}$

[5 marks]

[5 markah]

CLO2  
C3b) i. Calculate the modulus and argument for  $z = -3 + 5i$  and sketch an Argand Diagram. Express the answer in the Trigonometric form.*Kira modulus dan argumen bagi  $z = -3 + 5i$  dan lakarkan rajah Argand.**Ungkapkan jawapan dalam bentuk trigonometri.*

[7 marks]

[7 markah]

ii. Given  $z_1 = 3(\cos 60^\circ + i \sin 60^\circ)$  and  $z_2 = 5e^{0.785i}$ .

*Diberi  $z_1 = 3(\cos 60^\circ + i \sin 60^\circ)$  dan  $z_2 = 5e^{0.785i}$ .*

a. Express to  $z_2$  Trigonometric form.

*Ungkapkan  $z_2$  kepada bentuk Trigonometri.*

[2 marks]

[2 markah]

b. Express to  $z_1$  Exponential form.

*Ungkapkan  $z_1$  kepada bentuk Exponen.*

[2 marks]

[2 markah]

c. Calculate the value of  $z_1 \times z_2$  and  $\frac{z_1}{z_2}$  in Polar form.

*Hitung nilai  $z_1 \times z_2$  dan  $\frac{z_1}{z_2}$  dalam bentuk Polar.*

[4 marks]

[4 markah]

## QUESTION 4

## SOALAN 4

CLO2  
C2

a) Differentiate the following:

*Bezakan yang berikut:*

i.  $y = x^3 - 4x + 7$

[2 marks]

[2 markah]

ii.  $y = (x^2 + 3)(2 - x)$

[3 marks]

[3 markah]

CLO3  
C3

b) Solve each of the following functions:

*Selesaikan setiap fungsi yang berikut:*

i.  $\int (7m^5 - 2m^3 + m) dm$

[3 marks]

[3 markah]

ii.  $\int \frac{9t^3 - 3t^2 + 5t}{t} dt$

[3 marks]

[3 markah]

iii.  $\int (s - 3)(2s + 8) ds$

[4 marks]

[4 markah]



CLO3  
C4

c) Calculate the value of the following integral:

*Kira nilai bagi pengamiran berikut:*

i. 
$$\int_{-1}^2 \frac{x^3 + 5}{x^2} dx$$

[5 marks]

[5 markah]

ii. 
$$\int_0^1 \frac{2}{(x+5)^3} dx$$

[5 marks]

[5 markah]

**QUESTION 5****SOALAN 5**CLO3  
C2a) Given that matrix  $P = \begin{bmatrix} -1 & 5 \\ 6 & -4 \end{bmatrix}$ ,  $Q = \begin{bmatrix} 0 & -2 \\ 1 & 3 \end{bmatrix}$  and  $R = \begin{bmatrix} 4 & 1 \\ 1 & 3 \end{bmatrix}$ . Calculate:*Diberi matrik  $P = \begin{bmatrix} -1 & 5 \\ 6 & -4 \end{bmatrix}$ ,  $Q = \begin{bmatrix} 0 & -2 \\ 1 & 3 \end{bmatrix}$  dan  $R = \begin{bmatrix} 4 & 1 \\ 1 & 3 \end{bmatrix}$ . Kira:*

i.  $3R + P$

[2 marks]

[2 markah]

ii.  $-2(Q - 4R)$

[3 marks]

[3 markah]

CLO3  
C3

- b) i. Given that matrix  $A = \begin{bmatrix} 4 & 5+x & -1 \\ 6 & 7 & 3 \end{bmatrix}$ , calculate the value of  $x$  if  $a_{12} = a_{23}$ .

Diberi matrik  $A = \begin{bmatrix} 4 & 5+x & -1 \\ 6 & 7 & 3 \end{bmatrix}$ , kira nilai  $x$  jika  $a_{12} = a_{23}$ .

[2 marks]

[2 markah]

- ii. Calculate the value of  $x$  and  $y$  if,

*Kira nilai  $x$  dan  $y$  jika,*

$$\begin{bmatrix} y & 6 \\ 10 & -2x \end{bmatrix} + 4 \begin{bmatrix} x & 7 \\ 3 & y \end{bmatrix} = \begin{bmatrix} 23 & 34 \\ 22 & 2 \end{bmatrix}$$

[8 marks]

[8 markah]

CLO3  
C4

- c) Solve the following simultaneous equation by using Cramer's Rule.

*Selesaikan persamaan serentak berikut menggunakan Petua Cramer.*

$$3p + 5q - r = -7$$

$$p + q + r = -1$$

$$2p + 11r = 7$$

[10 marks]

[10 markah]

SOALAN TAMAT

**FORMULA SHEET FOR DBM 1033 – MATHEMATICAL COMPUTING**

<p><b>CIRCLE</b>  <u>Length of an arc</u>                      1. <math>s = r\theta</math>  <u>Area of a sector</u> , <u>Area of a segment</u>                      1. <math>A = \frac{1}{2}r^2\theta</math>      1. <math>A = \frac{1}{2}r^2(\theta - \sin\theta)</math></p> <p><b>AREA AND VOLUME</b>                      1. Cylinder : <math>V = \pi r^2 h</math>                      2. Cone : <math>V = \frac{1}{3}\pi r^2 h</math>                      3. Sphere : <math>V = \frac{4}{3}\pi r^3</math>                      4. Pyramid : <math>V = \frac{1}{3} \times \text{area of base} \times \text{height}</math>                      5. Triangular Prism : <math>V = A \times l</math>, note: <math>A = \text{area}</math>                      6. Parallelogram : <math>A = h \times b</math>                      7. Triangle : <math>A = \left(\frac{1}{2}\right) \times b \times h</math>                      8. Trapezium : <math>A = h \times \left(\frac{a+b}{2}\right)</math></p>	
<p><b>COMPLEX NUMBER</b>  <u>Modulus</u>      <u>Argument</u>                      1. <math> z  = \sqrt{a^2 + b^2}</math>      1. <math>\arg z = \tan^{-1} \frac{b}{a}</math></p> <p><u>Complex no. In other form</u>                      1. Polar form : <math> z  \angle \theta</math>                      2. Exponential form : <math> z  e^{i\theta}</math>                      3. Trigonometric form : <math> z  (\cos \theta + i \sin \theta)</math></p> <p><u>Multiplication &amp; Division</u>                      1. <math>(a \angle \theta_a) \cdot (b \angle \theta_b) = (a)(b) \angle (\theta_a + \theta_b)</math>                      2. <math>\frac{(a \angle \theta_a)}{(b \angle \theta_b)} = \left(\frac{a}{b}\right) \angle (\theta_a - \theta_b)</math></p>	<p><b>DIFFERENTIATION</b>  <math>y = ax^n</math>      <math>y = (ax + b)^n</math>                      1. <math>\frac{dy}{dx} = anx^{n-1}</math> , 2. <math>\frac{dy}{dx} = an(ax + b)^{n-1}</math>                      3. Chain Rule : <math>\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}</math>                      4. Product Rule : <math>y = u \times v</math>  <math>y' = uv' + vu'</math>                      5. Quotient Rule : <math>y = \frac{u}{v}</math>  <math>y' = \frac{vu' - uv'}{v^2}</math></p>
<p><b>MATRIX</b>  <u>Inverse Matrix</u>                      1. <math>A^{-1} = \frac{1}{ A } \text{adj}A</math></p> <p><u>Cramer's Rule</u>                      1. <math>x = \frac{ A_1 }{ A }</math>   <math>y = \frac{ A_2 }{ A }</math>   <math>z = \frac{ A_3 }{ A }</math></p>	<p><b>INTEGRATION</b>  <u>Indefinite Integration</u>                      1. <math>\int x^n dx = \frac{x^{n+1}}{n+1} + C</math>                      2. <math>\int (ax + b)^n dx = \frac{(ax + b)^{n+1}}{a(n+1)} + C</math></p> <p><u>Definite Integration</u>                      1. <math>\int_a^b f(x) dx = F(b) - F(a)</math></p>