SULIT

POLITEKNIK MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN MATEMATIK, SAINS & KOMPUTER

PEPERIKSAAN AKHIR

SESI JUN 2017

DBM1042 : MATHEMATICS

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

Kertas ini mengandungi **TIGA BELAS (13)** halaman bercetak.
Bahagian A: Struktur (3 soalan)
Bahagian B: Struktur (3 soalan)
Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SECTION A : 50 MARKS

BAHAGIAN A : 50 MARKAH

INSTRUCTION:

This section consists of **THREE (3)** structured questions. Answer **TWO (2)** questions only.

ARAHAN :

*Bahagian ini mengandungi **TIGA (3)** soalan berstruktur. Jawab **DUA (2)** soalan sahaja.*

QUESTION 1

SOALAN 1

CLO1
C2

(a) Simplify the following algebraic fractions:

Permudahkan persamaan pecahan algebra berikut:

i. $\dfrac{8x^3y^4}{2x^2y}$

[3 marks]

[*3 markah*]

ii. $\dfrac{5}{2y-3}-\dfrac{1}{y+2}$

[3 marks]

[*3 markah*]

iii. $\dfrac{2x+6y}{p-q}\div\dfrac{x+3y}{p^2-q^2}$

[4 marks]

[*4 markah*]

CLO1
C3

(b)

i. Given that $3mx=4p+2x$, express x in term of p and m.

Diberi $3mx=4p+2x$, *nyatakan nilai* x *dalam sebutan* p dan m.

[3 marks]
[*3 markah*]

ii. Given that $x=\frac{mN+y}{N}$, expess N in term of x, y and m.

Diberi $x=\frac{mN+y}{N}$, *nyatakan nilai* N *dalam sebutan* x, y dan m.

[3 marks]
[*3 markah*]

iii. Solve the following equations using the given method.

Selesaikan persamaan yang berikut dengan menggunakan kaedah yang dinyatakan.

a. $7y^2-42=-35y$ (Factorization Method)
(*Kaedah pemfaktoran*)

[4 marks]
[*4 markah*]

b. $2y^2+y=3$ (Quadratic Formula)
(*Formula Kuadratik*)

[5 marks]
[*5 markah*]

QUESTION 2
SOALAN 2

CLO1
C2

(a) Based on Figure 2(a), identify:
Berdasarkan Rajah 2(a), carikan:

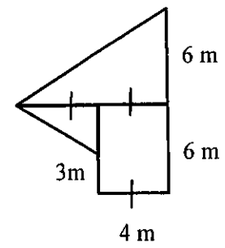


Figure 2(a)/ *Rajah 2(a)*

i. Perimeter of the combined shape
Ukurlilit kombinasi bentuk

[5 marks]
[*5 markah*]

ii. Area of the combined shape
Luas kombinasi bentuk

[5 marks]
[*5 markah*]

CLO1
C3

(b) Figure 2(b) shows an object formed by a combination of a hemisphere and a cylinder. Given the diameter of the hemisphere and the cylinder are 14 cm and 21 cm respectively. Calculate: (Given : $\pi = \frac{22}{7}$)

Rajah 2(b) menunjukkan satu objek yang terbentuk daripada gabungan hemisfera dan silinder. Diberi diameter hemisfera dan silinder masing-masing adalah 14 cm dan 21 cm. Kira: (Diberi : $\pi = \frac{22}{7}$)

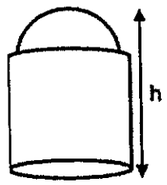


Figure 2(b)/ *Rajah 2(b)*

i. Height of the object, h if the volume of the cylinder is 3465 cm^3
Ketinggian objek, h jika isipadu silinder adalah 3465 cm^3.

[5 marks]
[5 *markah*]

ii. The volume of the hemisphere.
Isipadu hemisfera.

[2 marks]
[2 *markah*]

iii. Surface area of the object if the height of the cylinder is 10 cm.
Luas permukaan objek jika ketinggian silider adalah 10 cm.

[8 marks]
[8 *markah*]

QUESTION 3
SOALAN 3

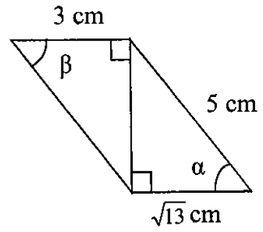


Figure 3(a) / *Rajah 3(a)*

CLO1
C3

(a) Based on the Figure 3(a) above, calculate the values of:
Berdasarkan Rajah 3(a) di atas, kira nilai-nilai bagi:

i. tan α

[3 marks]
[3 *markah*]

ii. cos α

[2 marks]
[2 *markah*]

iii. sin α

[2 marks]
[2 *markah*]

iv. cosec α

[3 marks]
[3 *markah*]

v. cot α

[3 marks]
[3 *markah*]

vi. sec α

[3 marks]

[*3 markah*]

vii. sin β

[3 marks]

[*3 markah*]

viii. cot β

[3 marks]

[*3 markah*]

CLO2
C2

ix. sec β

[3 marks]

[*3 markah*]

SECTION B: 50 MARKS

BAHAGIAN B: 50 MARKAH

INSTRUCTION:

This section consists of **THREE (3)** structured questions. Answer **TWO (2)** questions only

ARAHAN:

*Bahagian ini mengandungi **TIGA (3)** soalan berstruktur. Jawab **DUA (2)** soalan sahaja.*

QUESTION 4

SOALAN 4

(a) Integrate the following functions below:

Kamirkan setiap fungsi di bawah:

i. $\int\left(16x^3-\frac{9x^2}{2}\right)dx$

[4 marks]

[*4 markah*]

ii. $\int x^2(4-3x)\,dx$

[4 marks]

[*4 markah*]

iii. $\int\frac{15}{(6-x)^4}dx$

[4 marks]

[*4 markah*]

iv. $\int_2^4\left(x^3-\frac{8}{x^2}\right)dx$

[6 marks]

[*6 markah*]

v. $\int_{-1}^{2}(x+3)(3x+5)dx$

[7 marks]

[*7 markah*]

QUESTION 5
SOALAN 5

CLO2 C2 (a) Determine the value of y in the Figure 5(a) if ABC is a straight line.
Tentukan nilai y pada Rajah 5(a) jika ABC adalah garis lurus.

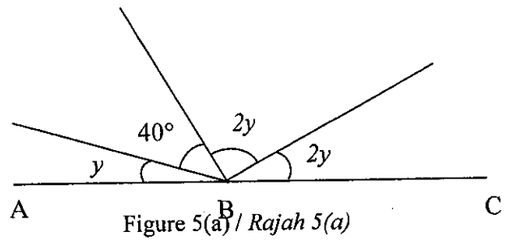


Figure 5(a) / *Rajah 5(a)*

[4 marks]
[*4 markah*]

CLO2 C3 (b)

i. Calculate each of angle for the figure below:
Kirakan setiap sudut bagi rajah di bawah:

a.

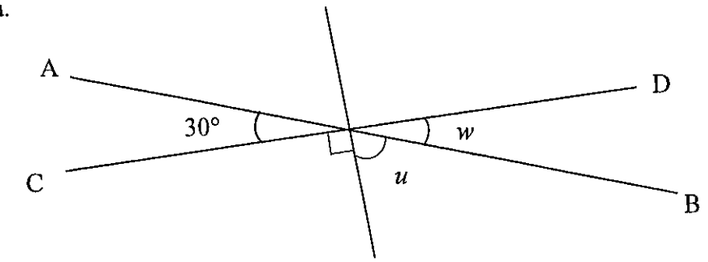


Figure 5(b)i(a) / *Rajah 5(b)i(a)*

[5 marks]
[*5 markah*]

b.

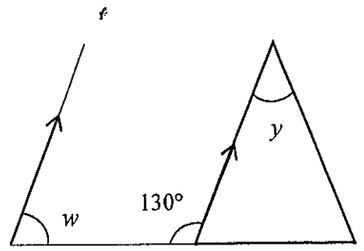


Figure 5(b)i(b) / *Rajah 5(b)i(b)*

[5 marks]
[*5 markah*]

c.

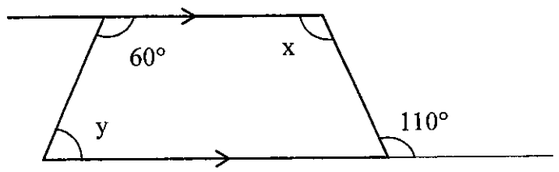


Figure 5(b)i(c) / *Rajah 5(b)i(c)*

[5 marks]
[*5 markah*]

CLO2 C3 ii. In the Figure 5(b)(ii), O is the centre of the circle. Calculate the value of x and y.
Pada Rajah 5(b)(ii), O ialah pusat bulatan. Kira nilai x dan y.

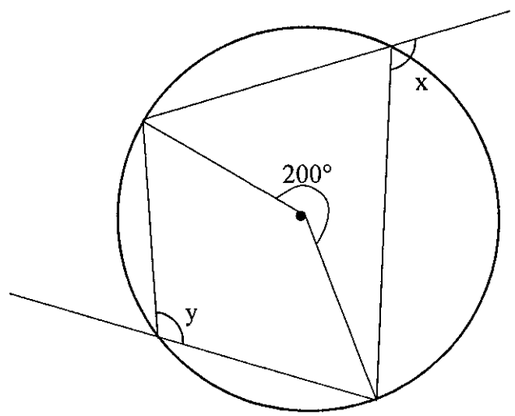


Figure 5(b)(ii) / *Rajah 5(b)(ii)*

[6 marks]
[*6 markah*]

QUESTION 6

SOALAN 6

CLO2
C2

(a) Based on Figure 6(a), VY=16 cm where VW=WY. Determine:

Berdasarkan Rajah 6(a), VY=16 cm di mana VW=WY. Tentukan:

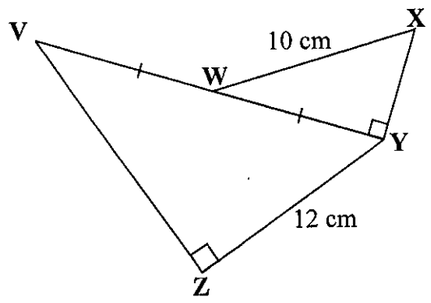


Figure 6(a) / *Rajah 6(a)*

i. The length of *XY*

Panjang sisi XY

[5 marks]

[*5 markah*]

ii. The length of *VZ*

Panjang sisi VZ

[5 marks]

[*5 markah*]

CLO2
C3

(b)

i. In Figure 6(b)(i), T is the midpoint of QR. STU and SRV are straight lines where ST is 7 cm. Given RV=1.5 cm, UV=5 cm and PS=8 cm, calculate:

Dalam Rajah 6(b)(i), T adalah titik tengah bagi QR. STU dan SRV adalah garis lurus di mana ST adalah 7 cm. Diberi RV=1.5 cm, UV=5 cm dan PS=8 cm, kira:

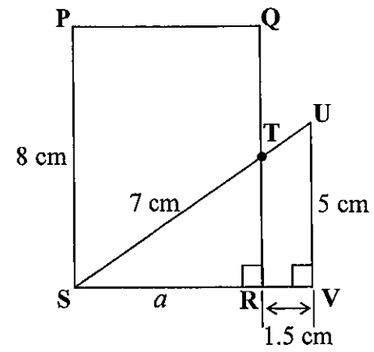


Figure 6 (b)(i) / *Rajah 6 (b)(i)*

a. Value of *a*.

Nilai a.

[4 marks]

[*4 markah*]

b. Length of *TU*.

Panjang TU.

[5 marks]

[*5 markah*]

ii. Figure 6(b)(ii) shows two sectors OAB and OCD with common circle center at O. Calculate the area of the shaded region:

Rajah 6(b)ii menunjukkan dua sektor OAB dan OCD dengan pusat bulatan sepunya di O. Kirakan luas rantau berlorek:

[6 marks]
[*6 markah*]

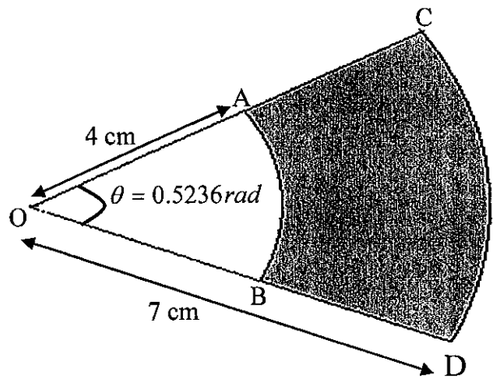


Figure 6 (b)(ii) / *Rajah 6 (b)(ii)*

SOALAN TAMAT

FORMULA SHEET FOR MATHEMATICS –DBM1042

SOLVING QUADRATIC EQUATION

$$ax^2 - bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

SURFACE AREA AND VOLUME

Cylinder :

$$A = 2\pi r h + 2\pi r^2$$

$$V = \pi r^2 h$$

Cone:

$$A = \pi r s + \pi r^2$$

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

Sphere:

$$A = 4\pi r^2$$

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

Pyramid:

$$A = Area\ of\ four\ triangles + area\ of\ base$$

$$V = \frac{1}{3} \times Area\ of\ base \times height$$

Prism

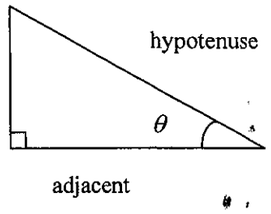
$$A = Area\ of\ 3\ rectagular\ faces + area\ of\ 2\ trigular\ faces$$

$$V = Area\ triangle \times length$$

Area Triangle

$$Area\ of\ triangle = \frac{1}{2} ab \sin C$$

TRIGONOMETRY



$$\tan\theta = \frac{opposite}{adjacent}$$

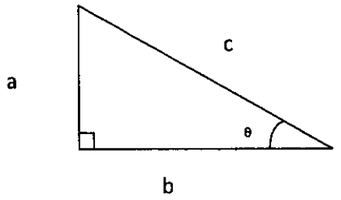
$$\sin\theta = \frac{opposite}{hypotenuse}$$

$$\cos\theta = \frac{adjacent}{hypotenuse}$$

$$\cos ec\,\theta = \frac{1}{\sin\theta}$$

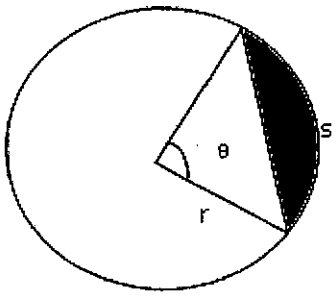
$$\cot\theta = \frac{1}{\tan\theta}$$

$$\sec\theta = \frac{1}{\cos\theta}$$



$$c^2 = a^2 + b^2$$

MEASUREMENT



$Arc\ length\ of\ a\ circle, s = r\theta$

$Area\ of\ a\ \text{sector}, A = \frac{1}{2}r^2\theta$

$Area\ of\ segment, A = \frac{1}{2}r^2\theta - \frac{1}{2}r^2\sin\theta$

INTEGRATION

INDEFINITE INTEGRAL

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

$$\int ax^n dx = \frac{ax^{n+1}}{n+1} + C, n \neq -1$$

$$\int (ax+b)^n dx = \frac{(ax+b)^{n+1}}{a(n+1)} + C, n \neq -1$$

DEFINITE INTEGRAL

$$\int_a^b f(x)\,dx = \left[F(x)\right]_a^b = F(b) - F(a)$$

AREA UNDER A CURVE

Along x-axis

$$A = \int_a^b y\,dx$$

Along y-axis

$$A = \int_c^d x\,dy$$

VOLUME OF SOLID OF REVOLUTION

Along x-axis

$$V = \int_a^b \pi y^2\,dx$$

Along y-axis

$$V = \int_c^d \pi x^2\,dy$$