POLITEKNIK
MALAYSIA

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN MATEMATIK, SAINS & KOMPUTER

PEPERIKSAAN AKHIR

SESI DISEMBER 2017

DBM1042 : MATHEMATICS

TARIKH : 09 APRIL 2018
MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)

Kertas ini mengandungi **SEBELAS (11)** 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)

PART 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) $\dfrac{a^2-1}{2a-2}$

[2 marks]

[2 markah]

ii) $\dfrac{1}{x-2}+\dfrac{1}{x+2}$

[4 marks]

[4 markah]

iii) $\dfrac{a-4}{2b+2}\div\dfrac{4a}{5b+5}$

[4 marks]

[4 markah]

CLO1
C3

(b)   Solve the following equations using the given method below.

Selesaikan persamaan yang berikut dengan menggunakan kaedah yang dinyatakan.

    i) $2x^2 + 13x = -6$ (Factorization Method)

                                      (*Kaedah Pemfaktoran*)

                                                                  [4 marks]

                                                                [*4 markah*]

    ii) $x(2x - 3) = 5 - 6x$ (Factorization Method)

                                        (*Kaedah Pemfaktoran*)

                                                                   [5 marks]

                                                                 [*5 markah*]

    iii) $3y^2 = 3 - 2y$ (Quadratic Formula)

                                        (*Formula Kuadratik*)

                                                                  [6 marks]

                                                                 [*6 markah*]

QUESTION 2
SOALAN 2

CLO1
C2

(a)   Based on Figure 2(a), the area of the unshaded region is 84 m^2. Determine:

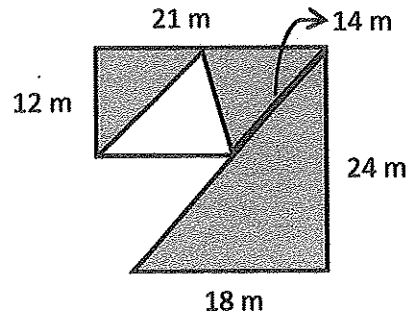*Berdasarkan rajah 2(a) luas kawasan yang tidak berlorek adalah 84 m^2. Tentukan:*

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

i)   Perimeter of the combined shape

Ukurlilit kombinasi bentuk

[6 marks]
[*6 markah*]

ii)   Area of the shaded region

Luas kawasan berlorek

[4 marks]
[*4 markah*]

CLO1
C3

(b) Figure 2(b) shows an object formed by a combination of a cuboid and a cylinder. Given the width and length of cuboid A are 3 cm and 4 cm respectively while the diameter of cylinder B is 14 cm. Calculate:

Rajah 2(b) menunjukkan satu objek yang terbentuk daripada gabungan kuboid dan silinder. Diberi lebar dan panjang kuboid masing-masing adalah 3 cm dan 4 cm manakala diameter silinder adalah 14 cm. Kirakan:
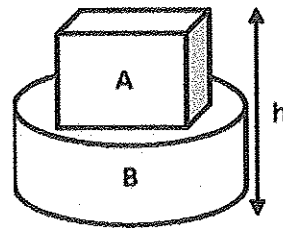
Figure 2(b)/ *Rajah 2(b)*

i) Height of the object, h if the volume of cuboid A and cylinder B are 132 cm^3 and 1848 cm^3 respectively.

Ketinggian objek, h jika isipadu kuboid A dan silinder B masing-masing adalah 132 cm^3 dan 1848 cm^3.

[7 marks]

[*7 markah*]

ii) Surface area of the object if the height of cuboid A and cylinder B are 11 cm and 12 cm respectively.

Luas permukaan objek jika ketinggian kuboid A dan silinder B masing-masing adalah 11 cm dan 12 cm.

[8 marks]

[*8 markah*]

QUESTION 3
SOALAN 3

CLO1
C3

(a) Calculate the angles, θ between $0° \leq \theta \leq 360°$ for the following functions:

Kira semua sudut, θ dalam julat $0° \leq \theta \leq 360°$ untuk fungsi berikut:

    i) $\sin \theta = 0.3584$

[3 marks]
[3 markah]

    ii) $\cos \theta = -0.4226$

[3 marks]
[3 markah]

    iii) $\tan \theta = 1.3270$

[3 marks]
[3 markah]

    iv) $\cot \theta = -0.6$

[4 marks]
[4 markah]

    v) $\operatorname{cosec} \theta = -2$

[4 marks]
[4 markah]

    vi) $\sec \theta = 7$

[4 marks]
[4 markah]

    vii) $4 \operatorname{cosec} \theta = 9$

[4 marks]
[4 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 struktur. Jawab **DUA (2)** soalan sahaja.*

QUESTION 4

SOALAN 4

CLO2
C2

(a)   Integrate the following functions:

Kamirkan fungsi yang berikut.

i) $\int (x-3)(x+5)\,dx$

[4 marks]
[*4 markah*]

ii) $\int \left(\dfrac{1}{x^2} + \dfrac{6}{x^3} - \dfrac{3}{x^4} - 5 \right) dx$

[5 marks]
[*5 markah*]

iii) $\int \dfrac{6}{(3x-1)^4}\,dx$

[4 marks]
[*4 markah*]

iv) $\int_{1}^{2} x(x^2 + 3x)\,dx$

[6 marks]
[*6 markah*]

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

[6 marks]
[*6 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
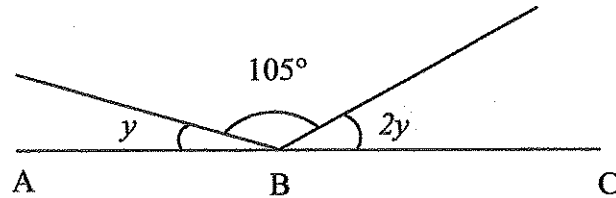
Figure 5(a) / *Rajah 5(a)*

[4 marks]

[*4 markah*]

CLO2
C3

(b)

i)   Calculate each of angle for the figure below if AB and CD are straight lines:

Kirakan setiap sudut bagi rajah di bawah jika AB dan CD adalah garis lurus:
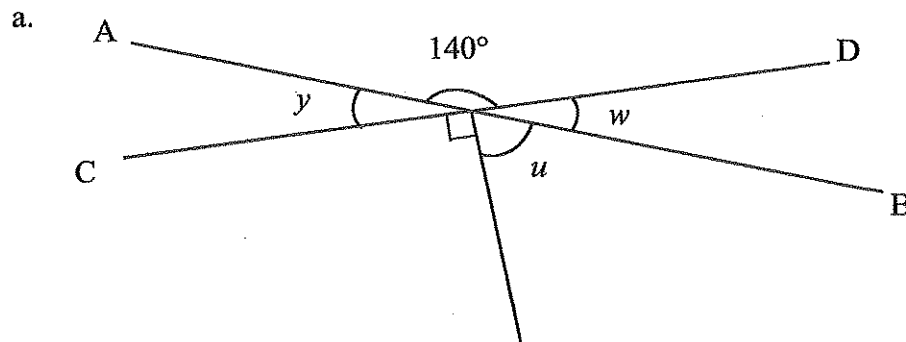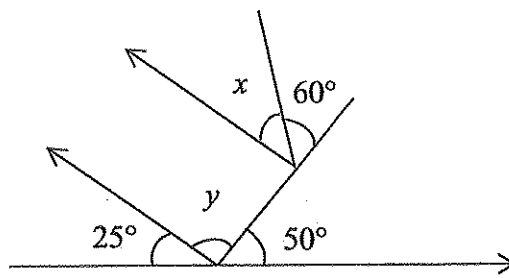

Figure 5(b) i.a / *Rajah 5(b)i.a*

[5 marks]

[*5 markah*]

b.

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

[5 marks]

[*5 markah*]

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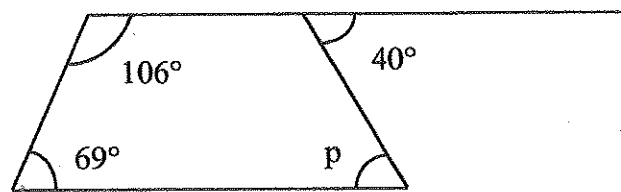
Figure 5(b) i.c / *Rajah 5(b)i.c*

[5 marks]

[*5 markah*]

ii) In Figure 5(b) ii , O is the centre of the circle. Calculate the value of x and y.

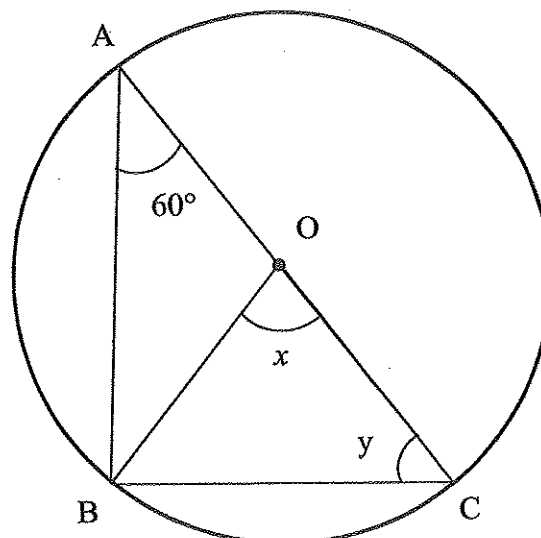*Pada Rajah 5(c), O ialah pusat bulatan. Kira nilai x dan y*

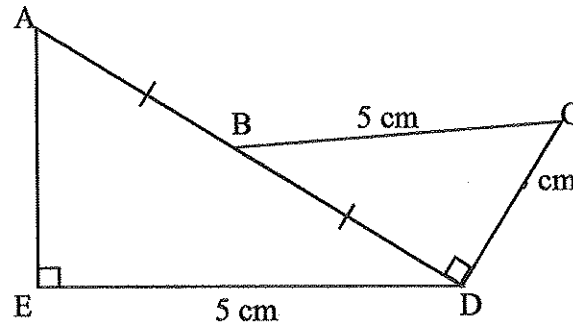Figure 5(b) ii / *Rajah 5(b)ii*

[6 marks]

[*6 markah*]

QUESTION 6
SOALAN 6

CLO2
C2

(a) In Figure 6(a) shown below, AB=BD. Determine the length of AE.

Dalam Rajah 6(a) yang ditunjukkan di bawah, AB=BD. Tentukan panjang AE.

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

[10 marks]

[*10 markah*]

CLO2
C3

(b)

i)   Figure 6 (b) shows two right triangles, ABC and DEC. BEC and ADC are straight lines. Given BE = 1 cm, EC = 5 cm, AD = 15 cm and DC = 8 cm. Calculate the perimeter of the shaded region.

    Rajah 6(b) menunjukkan 2 segitiga bersudut tepat ABC dan DEC. BEC dan ADC adalah garis lurus. Diberi BE = 1 cm, EC = 5 cm, AD = 15 cm dan DC = 8 cm. Kirakan perimeter kawasan berlorek.
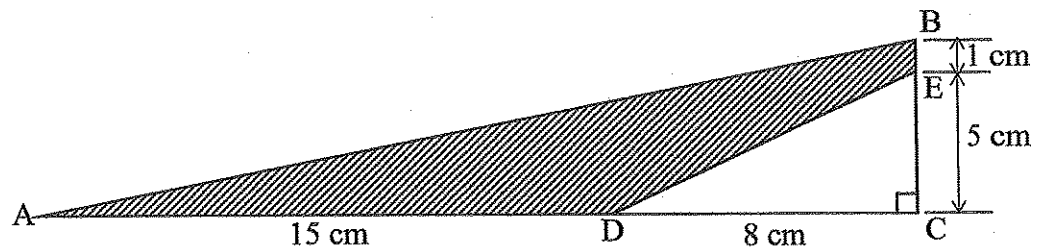

Figure 6(b) i / *Rajah 6(b)i*

[8 marks]

[*8 markah*]

ii) Figure 6(b)ii are two sectors OAB and OCD with common center O, and radius OB and OC respectively. OCA and ODB are straight lines. Given $\theta = 28°$, OB=12cm and CA=2cm. Calculate the area of the shaded region

Rajah 6(c) adalah dua sektor OAB dan OCD dengan pusat sepunya O, dan jejari OB dan OC masing-masing. OCA dan ODB adalah garis lurus. Diberi $\theta = 28°$, OB=12cm dan CA=2cm. Hitungkan luas rantau berlorek.
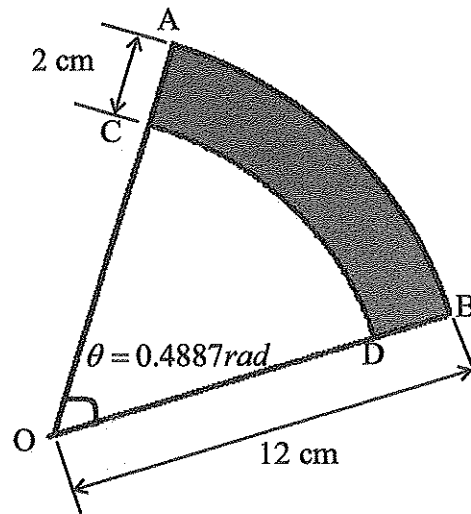

Figure 6(b)ii / *Rajah 6(b)ii*

[7 marks]

[7 *markah*]

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

$$A = Area\ of\ 3\ rectagular\ faces +$$
$$\quad area\ of\ 2\ trigular\ faces$$
$$V = Area\ triangle \times length$$

Area Triangle

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

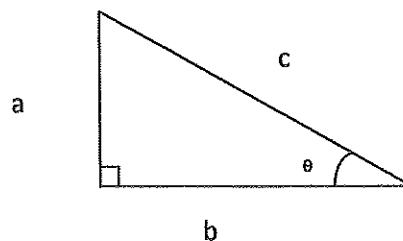## TRIGONOMETRY
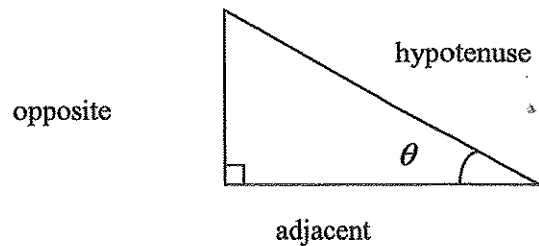
$$\tan\theta = \frac{opposite}{adjacent}$$

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

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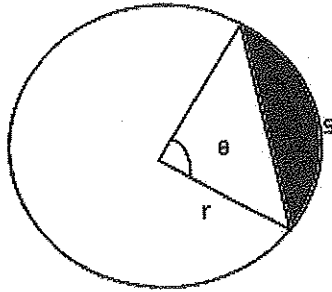
$$\cos ec\,\theta = \frac{1}{\sin\ \theta}$$

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

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

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

MEASUREMENT

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

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

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

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

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