INSTRUCTION:

This section consists of **SIX (6)** structured questions. Answer **FOUR (4)** questions only.

ARAHAN:

Bahagian ini mengandungi ENAM (6) soalan berstruktur. Jawab EMPAT (4) soalan sahaja.

QUESTION 1

SOALAN 1

CLO1 C2

a. Simplify the following terms:
Permudahkan ungkapan algebra di bawah:

i) $3(x-2y) - 2(x+y)$ [2 marks] [*2 markah*]

ii) $\frac{2m+6}{8m} \times \frac{10}{m+3}$ [3 marks] [*3 markah*]

iii) $\frac{x+y}{12} \div \frac{x^2-y^2}{3}$ [3 marks] [*3 markah*]

iv) $(x + y)(2x - y) - y^2 + xy$ [3 marks] *[3 markah]*

CLO1 C1

b. Factorize the following algebraic equation completely.
Faktorkan dengan lengkap ungkapan algebra berikut:

i) $1 - 4x^2$ [2 marks] *[2 markah]*

ii) $12x^2 - 3y^2$ [2 marks] *[2 markah]*

POLITEKNIK
Jabatan Pengajian Politeknik

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENGAJIAN POLITEKNIK
KEMENTERIAN PENDIDIKAN MALAYSIA

JABATAN MATEMATIK, SAINS DAN KOMPUTER

PEPERIKSAAN AKHIR

SESI JUN 2013

BA103: MATHEMATICS

TARIKH : 21 OKTOBER 2013
TEMPOH : 2 JAM (8.30 AM - 10.30 AM)

Kertas ini mengandungi **EMPAT BELAS (14)** halaman bercetak.
Bahagian A: 6 Soalan
Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

QUESTION 2

SOALAN 2

CLO 2 C2

a. Find the values of x for the following quadratic expression.

Dapatkan nilai-nilai x untuk ungkapan kuadratik berikut.

i) $x^2 - 3 = 2x$ [3 marks]

[3 markah]

ii) $-5x^2 - 1 = -6x$ [3 marks]

[3 markah]

iii) $-x^2 = -4x + 3$ [3 marks]

[3 markah]

CLO 2 C3

b. Solve the equation below by using quadratic formula.

Selesaikan persamaan di bawah dengan menggunakan formula kuadratik.

i) $25(x-3)^2 - 36 = 0$ [8marks]

[8markah]

ii) $(v-3)^2 = 250$ [8marks]

[8markah]

CLO2 C2

c. i) Given that $= \frac{BX}{C+X}$. Express X in terms of A, B and C. [5 marks]

Diberi $= \frac{BX}{C+X}$. *Ungkapkan X dalam sebutan A, B and C.* *[5 markah]*

ii) The volume V cm^3 of a gas is related to its temperature T °*C* by the formula V = 50 + 4T. When its temperature is 28°C, what is its volume of the gas, in cm^3? [2 marks]

Isipadu V cm^3 bagi gas berkait dengan suhu T °C menggunakan formula V = 50 + 4T. Apabila suhu adalah 28°C, apakah isipadu gas tersebut, dalam cm^3? *[2 markah]*

iii) If A cm^2 is the area of the trapezium shown below, construct a formula using *h* as the subject of the formula.

Jika A cm^2 adalah luas trapezium di bawah, bina rumus menggunakan h sebagai tajuk rumus.

[3 marks]
[3 markah]

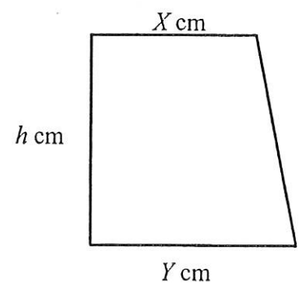


Figure 1 (a)

Rajah 1(a)

QUESTION 3

SOALAN 3

a. Convert the following numbers into the standard form.
Tukar yang berikut kepada bentuk piawai.

CLO1
C2

i) 567.562×10^{-4} [2marks]

[*2markah*]

ii) $7.8 \times 10^{6} + 6.5 \times 10^{6}$ [3marks]

[*3markah*]

b. Find the value of the following.
Cari nilai yang berikut.

CLO1
C1

[4marks]

$16^{\frac{3}{4}} \times 2^{-5} \times 8^{\frac{2}{3}}$

[*4markah*]

c. Find the value for each of the following.
Cari nilai bagi setiap yang berikut.

CLO1
C3

i) $\log_3 9 + \log_3 3$ [3marks]

[*3markah*]

ii) $\log_2 14 + \log_2 12 - \log_2 21$ [4marks]

[*4markah*]

iii) $3\log_a x + 2\log_a y$ [2marks]

[*2markah*]

d. Find the value of x.
Cari nilai bagi x.

CLO1
C1

i) $\log_6 x = 3$ [2marks]

[*2markah*]

ii) $\log_x 9 = 2$ [2marks]

[*2markah*]

e. Solve the following equation.
Selesaikan persamaan berikut.

CLO1
C3

[3marks]

$\log 5 + \log(2y - 1) = \log 2 + \log(y + 2)$

[*3markah*]

CLO1
C1

QUESTION 4

SOALAN 4

a. Without using a calculator, state the value for the following :

Tanpa menggunakan kalkulator, nyatakan nilai bagi setiap yang berikut :

i) $\cos 30^o$ [1marks]

[1*markah*]

ii) $\tan 60^o$ [1marks]

[1*markah*]

iii) $\sin 45^o$ [1marks]

[1*markah*]

CLO1
C1

b. Find the reference angle for each of the following and state in which quadrant it may exist.

Dapatkan sudut rujukan bagi setiap yang berikut dan nyatakan dalam sukuan mana ia berada.

i) $\theta = 75^o$ [2marks]

[2*markah*]

ii) $\theta = 235^o$ [2marks]

[2*markah*]

iii) $\theta = 330^o$ [2marks]

[2*markah*]

iv) $\theta = -210^o$ [3marks]

[3*markah*]

CLO2
C2

c. Without using a calculator, calculate the value for each of the following trigonometric expression.

Tanpa menggunakan kalkulator, kirakan nilai bagi setiap ungkapan trigonometri yang berikut..

i) $\cos 30^o + \sin 60^o$ [3marks]

[3*markah*]

ii) $\cos 120^o + \tan 225^o$ [5marks]

[5*markah*]

CLO3
C3

d. Given that $\sin\theta = -\frac{1}{2}$. Without using a calculator, calculate the value of $\cos\theta$.

Diberikan $\sin\theta = -\frac{1}{2}$. *Tanpa menggunakan kalkulator, kirakan nilai bagi* $\cos\theta$.

[5marks]

[5*markah*]

CLO 2
C1

c. Figure 5(c) below shows a circle with the centre O. Given that PRW is a tangent with $\angle TOR = 53°$ and $\angle PRQ = 42°$. Find:

Rajah 5(c) menunjukkan sebuah bulatan berpusat di O. Diberi PRW adalah suatu garis lurus dengan $\angle TOR = 53°$ dan $\angle PRQ = 42°$. Cari;

i) x

[4 marks]
[4 *markah*]

ii) z

[2 marks]
[2 *markah*]

iii) v

[2 marks]
[2 *markah*]

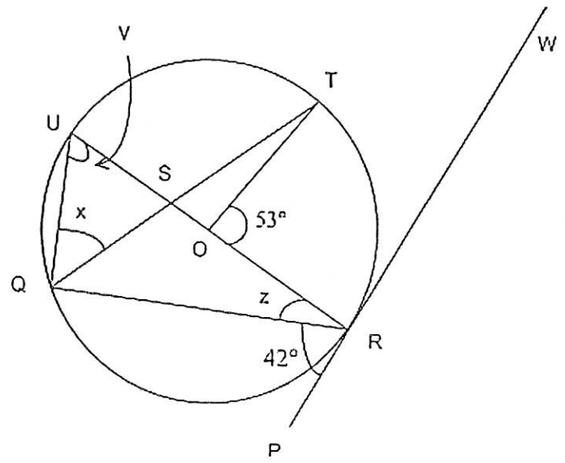


Figure 5(c)

Rajah 5(c)

QUESTION 5

SOALAN 5

CLO 1
C1

a. Find the value of x, y and z for Figure 5(a) below.

Kirakan nilai bagi x, y and z bagi Rajah 5(a) di bawah.

[6 marks]
[6 *markah*]

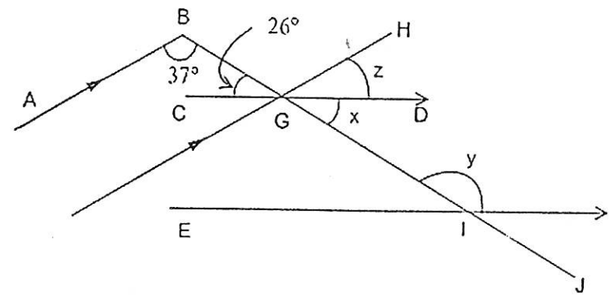


Figure 5(a)

Rajah 5(a)

CLO 2
C1

b. Figure 5(b) below shows a cyclic quadrilateral TUVW. Calculate the value of $\angle$ VWT.

Rajah 5(b) di bawah menunjukkan sebuah sisiempat kitaran TUVW. Kirakan nilai bagi $\angle$ VWT.

[4 marks]
[4*markah*]

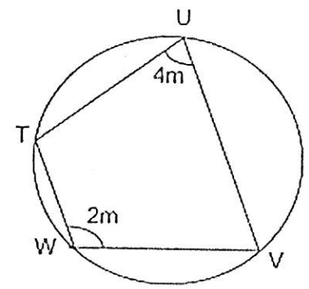


Figure 5(b)

Rajah *5(b)*

QUESTION 6

SOALAN 6

CLO 1
C1

a. Convert the following angles into degrees.
Tukarkan sudut berikut kepada darjah.

i) 1.92 rad

[2 marks]
[2 *markah*]

ii) $\frac{8\pi}{5}$ rad

[2 marks]
[2 markah]

CLO 1
C1

b. Figure 6(b) below shows a circle with the centre O. Given that the radius of the circle OK is 7 cm and the length of the minor arc JK is 14.21 cm. Find the value of θ in radian.
Rajah 6(b) di bawah menunjukkan suatu bulatan yang berpusat di O. Diberi jejari bulatan OK adalah 7 cm dan panjang lengkok kecil JK adalah 14.21 cm. Cari nilai bagi θ dalam radian.

[3 marks]
[3*markah*]

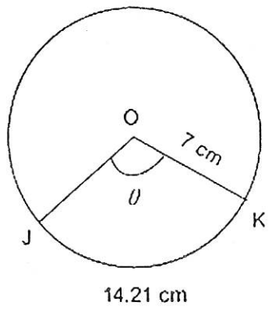


Figure 6(b)
Rajah *6(b)*

CLO 3
C3

d. Figure 5(d) shows a combination of a right-angled triangle and a shape CDEJKFGH. Given that CI = 90 m, IH = 30 m and DE = FG = 35 m. Find:
Rajah 5(d) menunjukkan gabungan sebuah segitiga dan bentuk CDEJKFGH. Diberi CI = 90 m, IH = 30 m dan DE = FG = 35 m. Kirakan;

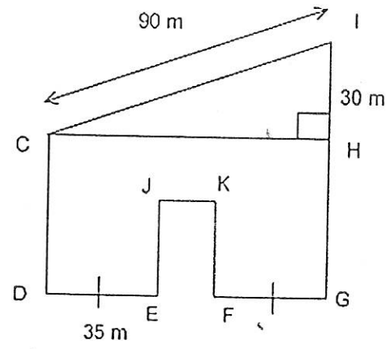


Figure 5(d)
Rajah 5(d)

i) Length of a straight line CH
Panjang bagi garis lurus CH

[3 marks]
[3 *markah*]

ii) Length of a straight line JK
Panjang bagi garis lurus JK

[4 marks]
[4 *markah*]

CLO 3
C3

d. Figure 6(d) below shows a composite solid of a cone and a hemisphere. Given that the length of AB = 8 cm, AC = 17 cm and the radius of the hemisphere is twice of the radius of the cone. Find:

Rajah 6(d) di bawah menunjukkan pepejal gubahan daripada kon dan hemisfera. Diberi panjang AB = 8 cm, AC = 17 cm dan jejari bagi hemisfera adalah dua kali ganda jejari bagi kon. Cari;

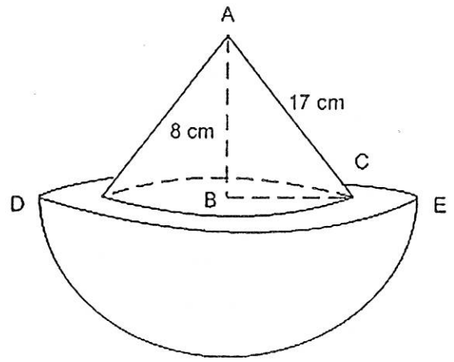


Figure 6(d)

Rajah *6(d)*

i) the length of radius of the cone, BC.
panjang jejari bagi kon, BC.

[3 marks]
[3*markah*]

ii) the volume of the hemisphere.
isipadu bagi hemisfera.

[5 marks]
[5 *markah*]

SOALAN TAMAT

CLO 2
C3

c. Figure 6(c) below shows a composite solid of a cuboid and a half cylinder. Given that EF = 12 cm, FG = 6 cm, GH = 5 cm and IJ = 4 cm. Find the surface area of the composite solid. (Given, $\pi = 3.142$)

Rajah 6(c) di bawah menunujukkan sebuah pepejal gubahan daripada kuboid dan separuh silinder. Diberi EF = 12 cm, FG = 6 cm, GH = 5 cm and IJ = 4 cm, Cari luas permukaan pepejal gubahan tersebut. (Diberi, $\pi = 3.142$)

[10 marks]
[10 *markah*]

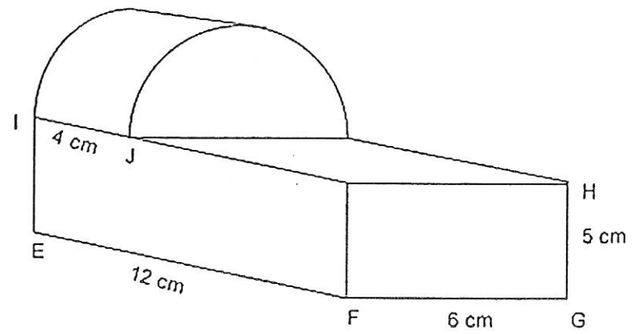


Figure 6(c)

Rajah *6(c)*

FORMULA SHEET FOR MATHEMATICS (BA103)

INDICES AND LOGARITHM

Basic of Index and Logarithm

1. $y = a^x \leftrightarrow x = \log_a y$

Rules of Indices

1. $a^m \times a^n = a^{m+n}$
2. $\frac{a^m}{a^n} = a^{m-n}$
3. $(a^m)^n = a^{mn}$
4. $(ab)^n = a^n b^n$
5. $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$, $b \neq 0$
6. $a^{-n} = \frac{1}{a^n}$, $a \neq 0$
7. $a^{\frac{m}{n}} = \sqrt[n]{a^m}$

Rules of Logarithm

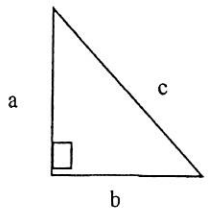
1. $\log_a MN = \log_a M + \log_a N$
2. $\log_a \frac{M}{N} = \log_a M - \log_a N$
3. $\log_a N^P = P \log_a N$

SOLVING QUADRATIC EQUATION

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

TRIGONOMETRY

Pythagoras' Theorem



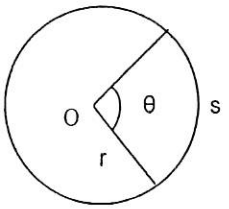
$$c^2 = a^2 + b^2$$

$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

MEASUREMENT

Arc Length of a Circle

$$s = r\theta$$



Area of a Sector

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

Area of a Segment

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

FORMULA OF TRIANGLE

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

SURFACE AREA AND VOLUME

Cylinder : $A = 2\pi rh + 2\pi r^2$

$V = \pi r^2 h$

Cone : $A = \pi rs + \pi r^2$

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

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

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

Pyramid : A = area of four triangles + area of base

V = (1/3) x (area of base) x (height)