KEMENTERIAN PENDIDIKAN TINGGI
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI

BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENDIDIKAN TINGGI

JABATAN MATEMATIK SAINS DAN KOMPUTER

PEPERIKSAAN AKHIR

SESI I : 2024/2025

BBS10103: PHYSICS

TARIKH   : 02 JANUARI 2025
MASA   : 9.00 PAGI – 12.00 TENGAH HARI
**   (3 JAM)**

Kertas ini mengandungi **SEBELAS (11)** halaman bercetak.

Struktur (4 soalan)

Dokumen sokongan yang disertakan : Formula

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

STRUCTURED: 100 MARKS

STRUKTUR : 100 MARKAH

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:

*Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab **semua** soalan.*

CLO1

QUESTION 1 (a)

SOALAN 1(a)

    i.   Convert $82\ gcms^{-2}$ to $kgcmh^{-2}$.

            Tukarkan $82\ gcms^{-2}$ kepada $kgcmh^{-2}$.

[2 marks]

[*2 markah*]

    ii.   Differentiate between scalar and vector quantities with **ONE (1)** example for each quantity.

            *Bezakan di antara kuantiti skalar dan kuantiti vektor dengan **SATU (1)** contoh bagi setiap kuantiti.*

[4 marks]

[*4 markah*]

CLO1   **QUESTION 1 (b)**
        SOALAN 1(b)

  i.   Calculate the total volume of five warehouses Ahmad has if each warehouse
        with dimension of 20.0 yards long, 10.0 yards wide and 15.0 feet high to it's
        S.I Unit. (Given that 1 yard = 91.44 cm ,1 feet =304.8 mm).
        Kira jumlah isipadu lima gudang kepunyaan Ahmad jika setiap gudang dengan
        dimensi panjangnya 20.0 ela, kelebaran 10.0 ela dan ketinggian 15.0 kaki
        dalam S.I Unit. (Diberi bahawa 1 ela = 91.44 cm , 1 kaki = 304.8 mm).

[7 marks]

[7 markah]

  ii.   Calculate surface area of cylinder with its zero error as shown in Diagram 1b(iii)
        in its S.I Unit.
        Kirakan luas permukaan silinder dalam Rajah 1b(iii) dengan ralat sifar seperti
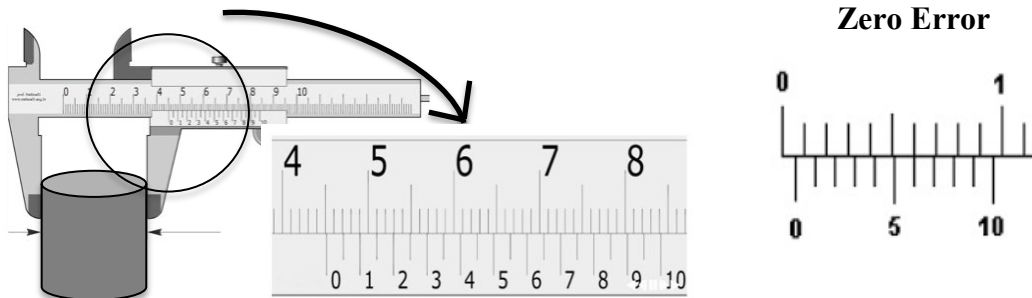   *dalam Rajah 1b(iii).*

Diagram 1b(iii) / *Rajah 1b(iii)*

[7 marks]

[*7 markah*]

QUESTION 2 (a)
SOALAN 2 (a)

CLO1

Compare **TWO (2)** characteristics between 2D (2 dimensions) and 3D (3 dimensions) of vectors.

*Bandingkan **DUA (2)** karakteristik di antara vektor 2D (2 dimensi) dan 3D (3 dimensi).*

[4 marks]

[4 markah]

QUESTION 2 (b)
SOALAN 2 (b)

CLO1

A tugboat is horizontally pulled by two forces F_1 and F_2, of 1450 N respectively with each making an angle of 20° with the long axis of the tugboat as shown in the Diagram 2(b) in which the view is from above. Determine the resultant force and direction for the given situations with assumption there is no friction.

Sebuah bot tunda ditarik secara mendatar oleh dua daya F_1 dan F_2 bernilai 1450N dengan setiap satu membentuk sudut 20° dengan paksi panjang bot tunda seperti yang ditunjukkan dalam Rajah 2(b) dimana pandangan adalah dari atas. Tentukan daya paduan dan arah untuk situasi yang diberikan dengan andaian tiada geseran.
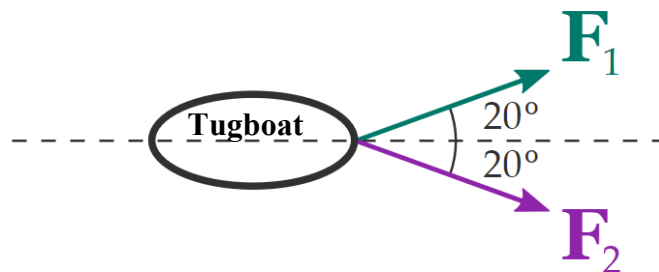

Diagram 2(b) / *Rajah 2 (b)*

[6 marks]

[6 markah]

QUESTION 2 (c)

SOALAN 2 (c)

CLO1

A van is driven to the South for a distance of 35km, then to the East for 50km and finally in the direction of 60° Northeast for 14km.

Sebuah van dipandu ke arah Selatan sejauh 35km kemudiannya ke Timur sejauh 50km dan akhirnya bergerak 60° ke arah Timur Laut sejauh 14km.

  i.   Sketch a motion diagram of the van.

         Lakarkan gambarajah pergerakkan van tersebut.

[2 marks]

[*2 markah*]

  ii.   Compute the magnitude of displacement from its starting point in meter (m).

         Kirakan magnitud sesaran dari titik permulaan dalam meter (m)

[8 marks]

[*8 markah*]

QUESTION 3 (a)
SOALAN 3 (a)

CLO1   Two forces of magnitude 3N and 4N are acting on an object. Based on the following net force, explain the directions for both applied forces if:

Dua daya dengan magnitud 3N dan 4N bertindak ke atas suatu objek. Berdasarkan daya bersih berikut, terangkan arah bagi kedua-dua daya yang dikenakan jika :

      i.   The net force has a magnitude of 7N

           Daya bersih mempunyai magnitud 7N

[2 marks]
[*2 markah*]

      ii.   The net force has a magnitude of 5N

           Daya bersih mempunyai magnitud 5N

[4 marks]
[*4 markah*]

QUESTION 3 (b)

SOALAN 3 (b)

CLO1 | Diagram 3b shows two blocks connected by a smooth pulley on an inclined plane. Assuming no frictional forces are involved,

Rajah 3b menunjukkan dua bongkah disambungkan melalui takal licin di atas satah condong. Andaian tiada daya geseran terlibat,
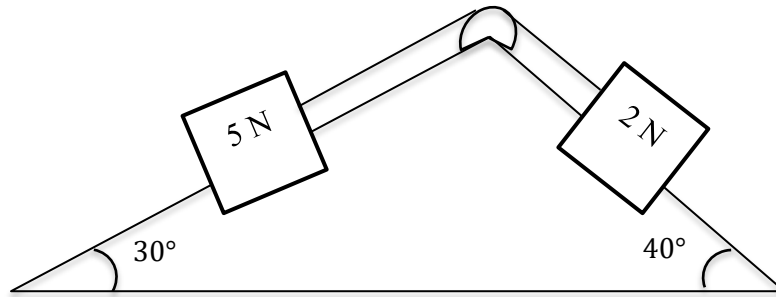

Diagram 3b / *Rajah 3b*

i.   Calculate mass of each block.

Kira jisim bagi setiap bongkah.

[4 marks]

[*4 markah*]

ii.   Determine the acceleration of the two blocks.

Tentukan pecutan kedua-dua bongkah tersebut.

[6 marks]

[*6 markah*]

QUESTION 3 (c)

SOALAN 3 (c)

CLO1

Diagram 3c shows a block of wood of mass 200g connected by a light string to a piece of stone of mass 300g over a smooth pulley. Mass of string can be neglected. Calculate

Rajah 3c menunjukkan sebuah bongkah kayu berjisim 200g disambungkan dengan tali ringan kepada seketul batu berjisim 300kg di atas takal licin. Jisim tali boleh diabaikan. Hitungkan
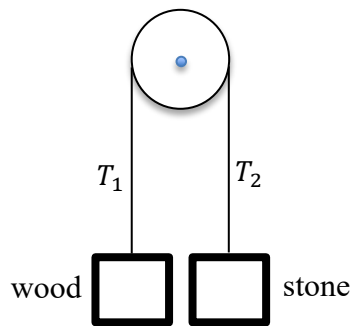

T_1 T_2

wood   stone

Diagram 3c / R*ajah 3c*

i.   the acceleration of the system

pecutan sistem

[7 marks]

[*7 markah*]

ii.   the tensional force in the string at T_1

daya tegangan pada tali di T_1

[5 marks]

[*5 markah*]

iii.   the tensional force in the string at T_2

daya tegangan pada tali di T_2

[2 marks]

[*2 markah*]

QUESTION 4 (a)
SOALAN 4 (a)

CLO1   i.   The impulse-momentum theorem is an important concept in physics because it provides a relationship between force, time, and motion. One of the most important applications is in the car safety features. Explain the relation between impulse and momentum.

Teorem impuls-momentum adalah konsep penting dalam fizik kerana ia menghubungan antara daya, masa, dan gerakan. Salah satu aplikasi yang paling penting ialah dalam ciri keselamatan kereta. Terangkan hubungan di antara impuls dan momentum.

[2 marks]

[2 markah]

ii.   A ball is released from rest and falls to the Earth. As it falls, the velocity and momentum of the ball increase. Explain how the increase in the momentum of the ball is consistent with the principle of conservation of linear momentum.

Sebiji bola dilepaskan dari keadaan rehat dan jatuh kebumi. Apabila bola ini jatuh, halaju dan momentum bola bertambah. Jelaskan bagaimana peningkatan momentum bola ini setara dengan prinsip keabadian momentum linear.

[4 marks]

[4 *markah*]

QUESTION 4 (b)
SOALAN 4 (b)

CLO1

A table with a rough surface is attached to a smooth pulley at each end. Three loads are connected by a rope as shown in Diagram 4b. Mass of the string is neglected. Calculate
Sebuah meja dengan permukaan yang kasar dipasangkan dengan takal licin pada setiap hujungnya. Tiga beban disambungkan dengan tali seperti yang ditunjukkan dalam Rajah 4b. Jisim tali diabaikan. Kirakan
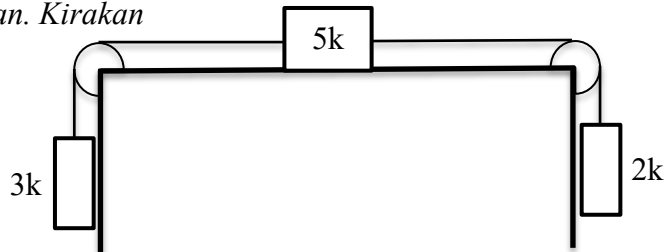

Diagram 4b / *Rajah 4b*

i.   the coefficient, μ_s when the 3kg load goes down while the 2kg load goes up.

koefisien, μ_s bila beban 3kg turun ke bawah manakala beban 2 kg naik ke atas.

[4 marks]
[*4 markah*]

ii.   the coefficient, μ_k if the direction of movement is the same as in (i). Given that the acceleration of the system is $0.5ms^{-1}$.

koefisien, μ_k jika arah pergerakan sistem adalah sama seperti di (i). Diberi bahawa pecutan sistem ialah $0.5ms^{-1}$.

[4 marks]
[*4 markah*]

iii.   the acceleration of system if $\mu_k = 0.4$ and $\mu_s = 0.6$

pecutan sistem jika $\mu_k = 0.4$ dan $\mu_s = 0.6$

[6 marks]
[*6 markah*]

QUESTION 4 (c)
SOALAN 4 (c)

CLO1

A student of mass 50 kg on roller skates moves to the right with velocity $4ms^{-1}$ and collides with a trolley of mass 80 kg which moves to the left with velocity of $2ms^{-1}$. After collision, the trolley moves to the right with velocity of $2.5ms^{-1}$ while the student moves with velocity of $v\ ms^{-1}$. Determine

Seorang pelajar berjisim 50 kg menaiki kasut roda bergerak ke kanan dengan halaju $4ms^{-1}$ dan berlanggar dengan troli berjisim 80 kg yang bergerak ke kiri dengan halaju $2ms^{-1}$. Selepas perlanggaran, troli bergerak ke kanan dengan halaju $2.5ms^{-1}$ manakala pelajar bergerak dengan halaju $v\ ms^{-1}$. Tentukan

      i.   the velocity of the student, v after the collision.
             halaju pelajar, v selepas perlanggaran .

[8 marks]
[*8 markah*]

      ii.   the direction of the student after collision.
             arah pergerakan pelajar selepas perlanggaran.

[2 marks]
[*2 markah*]

SOALAN TAMAT

FORMULA BBS10103 PHYSICS

$S = ut + \dfrac{1}{2}at^2$	$P = mv$
$v = u + at$	$\Delta p = F \times \Delta t$
$v^2 = u^2 + 2as$	$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$
$S = \dfrac{1}{2}(u+v)t$	$m_1 u_1 + m_2 u_2 = (m_1 + m_2)v$
$a_{cp} = \dfrac{v^2}{R}$	$u_1 - u_2 = -(v_1 - v_2)$
$v = \dfrac{\Delta x}{\Delta t}$	$\Delta U = Q - W$
$E_k = \dfrac{1}{2}mv^2$	$W = \rho \Delta V$
$f_s = \mu_s N$	$W = nRT \ln \left(\dfrac{v_2}{v_1}\right)$
$F = ma$	$\dfrac{P_1 v_1}{T_1} = \dfrac{P_2 v_2}{T_2}$
$R = \sqrt{R_x^2 + R_y^2}$	$\Delta V = \beta (V_1)(\Delta T)$
$\theta = \tan^{-1} \dfrac{R_x}{R_y}$	$\Delta L = \alpha_L (L_1)(\Delta T)$