KYPJ
KOLEJ YAYASAN
PELAJARAN JOHOR

KOLEJ YAYASAN PELAJARAN JOHOR
FINAL EXAMINATION

COURSE NAME	:	**PHYSICS**
COURSE CODE	:	**DEG 1013**
EXAMINATION	:	**DECEMBER 2022**
DURATION	:	**2 HOURS 30 MINUTES**

INSTRUCTION TO CANDIDATES /
ARAHAN KEPADA CALON

1.   This examination paper consists of **ONE (1)** part : /   PART A (100 Marks) /
     *Kertas soalan ini mengandungi **SATU (1)** bahagian:*   *BAHAGIAN A (100 Markah)*

2.   Candidates are not allowed to bring any material to examination room except with the
     permission from the invigilator. The formula was attached at the back question paper. /
     *Calon tidak dibenarkan untuk membawa sebarang bahan/nota ke bilik peperiksaan tanpa
     arahan/kebenaran daripada pengawas. Rumus dilampirkan di belakang kertas soalan
     peperiksaan.*

3.   Please check to make sure that this examination pack consists of: /
     Pastikan kertas soalan peperiksaan ini mengandungi:
     i.   Question Paper /
          Kertas Soalan.
     ii. Answering Booklet /
          Buku Jawapan.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO /
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU
This examination paper consists of **8** printed pages including front page
*Kertas soalan ini mengandungi **8** muka surat termasuk kulit hadapan*

This part contains of **FIVE (5)** questions. Answer **ALL** questions in the **Answering Booklet.**

Bahagian ini mempunyai LIMA (5) soalan. Jawab SEMUA soalan di dalam Buku Jawapan.

QUESTION 1 / *SOALAN 1*

a) Calculate the magnitude and direction of a vector A that has A_x = - 5 cm and A_y = - 7 cm.

Kirakan magnitud dan arah bagi vektor A yang mempunyai A_x = - 5 cm and A_y = - 7 cm.

(4 marks / *markah*)

b) Vector A points in the negative x direction. Vector B points at an angle of 30^0 above the positive x axis. Vector C has a magnitude of 15 m and points in a direction 40^0 below the positive x axis. Given that A + B + C = 0, determine the magnitudes of A and B.

Titik vektor A berada pada arah x negatif. Titik vektor B berada pada sudut 30^0 di atas paksi x positif. Vektor C mempunyai magnitud 15 m dan titik arah 40^0 di bawah paksi x positif. Diberi A + B + C = 0, tentukan magnitud A dan B.

(16 marks / *markah*)

QUESTION 2 / *SOALAN 2*

a) Adam is walking to the library which is located 500 m from his house in 10 minutes. If he takes the same time to reach his house. Determine:
   i)   the total displacement.
   ii)   the total distance walked.
   iii)   the speed.
   iv)   the velocity.

Adam berjalan ke perpustakaan yang terletak 500 m dari rumahnya selama

10 minit. Jika dia mengambil masa yang sama dalam perjalanan pulang.

Tentukan:

i)   *jumlah sesarannya.*

ii)   *jumlah jarak yang dilaluinya.*

iii)   *laju.*

iv)   *hala laju*

(8 marks / markah)

b) A man jumped from a building at height 72 m with initial velocity 10 m/s. Calculate:

i)   the time taken to hit the ground.

ii)   the velocity when it hits the ground.

Seorang lelaki terjun dari bangunan setinggi 72 m dengan hala laju awalnya

10 m/s. Kirakan:

i)   *masa yang diambil untuk sampai ke bumi.*

ii)   *lajunya semasa mencecah bumi.*

(12 marks / markah)

QUESTION 3 / SOALAN 3

a) A truck of mass 1200 kg moving at 30 m/s collides with a car of mass 1000 kg which is traveling in the opposite direction at 20 m/s. After the collision, the two vehicles move together as shown in **Figure 3 (a)**. Determine the velocity of both vehicles immediately after the collision?

*Sebuah lori yang berjisim 1200 kg bergerak pada 30 m/s berlanggar dengan sebuah kereta yang berjisim 1000 kg yang memandu pada arah berlawanan dengan kelajuan 20 m/s. Selepas pelanggaran, kedua-dua kenderaan bertembung seperti yang ditunjukkan dalam **Rajah 3 (a)**. Tentukan hala laju kedua-dua kenderaan tersebut sebaik sahaja pelangggaran berlaku.*
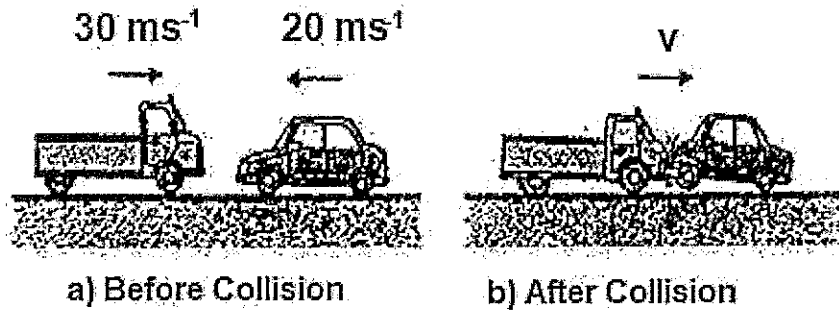
(4 marks / *markah*)

30 ms⁻¹   20 ms⁻¹   v

a) Before Collision   b) After Collision

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

b) An object is thrown upward from the top of a building with speed 15 m/s. An object reaches the ground after 4 s. Calculate

i)   The height of the building.

ii)   The speed when an object hits the ground. (Neglect air friction and use $g = 9.81 \text{ ms}^{-2}$)

iii)   Maximum height of the object from the ground.

Satu jasad diluncurkan mencancang ke atas dari atap sebuah bangunan dengan laju 15 m/s. Jasad itu sampai ke bumi selepas 4 s. Kirakan:

i)   *tinggi bangunan.*

ii)   *laju jasad ketika ia sampai ke tanah. (Abaikan geseran udara dan ambil g = 9.81 ms⁻²)*

iii)   *ketinggian maksimum jasad diukur dari aras bumi.*

(16 marks / *markah*)

QUESTION 4 / *SOALAN 4*

a) A force 30 N exerted on the block which is placed upon an inclined plane as shown in **Figure 4 (a)**. The mass of the block is 20 N. If the block slides up with a plane that has coefficient of friction $\mu_k = 0.02$.

i)   Draw the free body diagram.

ii)   Calculate the acceleration of the block.

*Daya 30 N dikenakan ke atas blok yang terletak di atas satah condong seperti dalam **Rajah 4 (a)**. Berat jasad blok adalah 20 N. Jika jasad mengelongsor ke atas dengan satah yang mempunyai pekali geseran kinetik $\mu_k = 0.02$.*

i)   *Lakarkan rajah jasad bebas.*
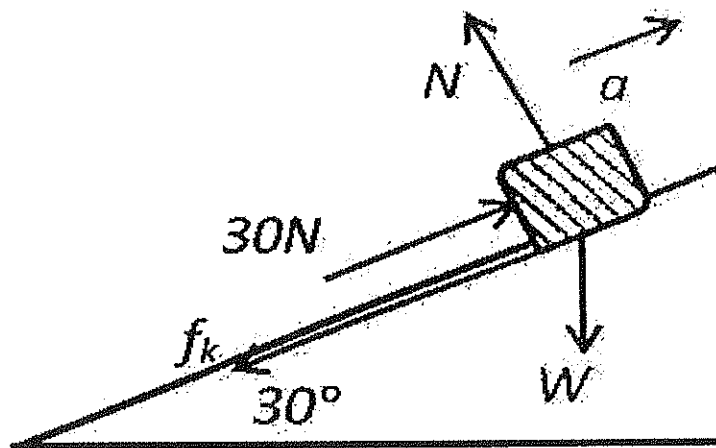
ii)   *Kirakan pecutan jasad.*

(8 marks / *markah*)

Figure 4 (a)/ *Rajah 4 (a)*

b) Two objects tied at two ends of the string as shown in **Figure 4 (b)**. The string passes over a pulley. Calculate:

i)   the acceleration of the system.

ii)   the tension of the string.

*Dua jasad diikat di dua hujung seutas tali seperti dalam **Rajah 4 (b)**. Tali tersebut melalui sebuah takal. Kirakan:*

i)   *pecutan sistem.*
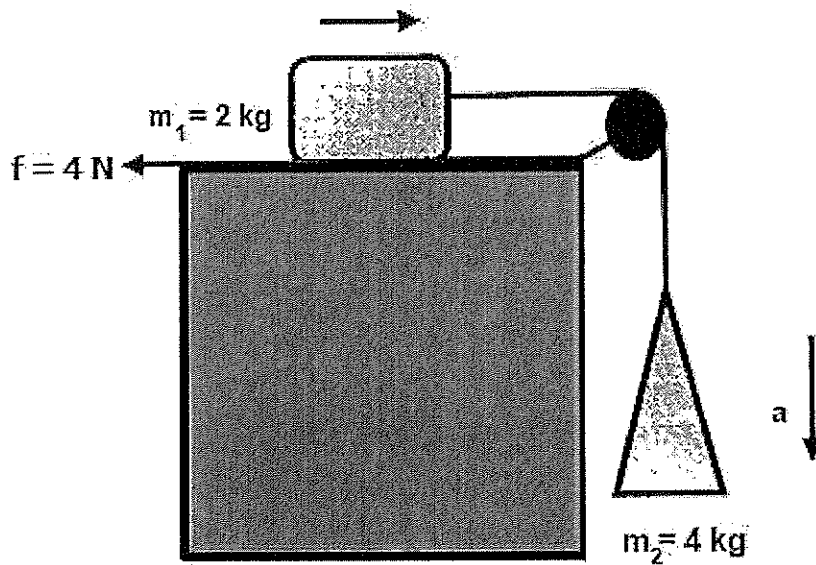
ii)   *ketegangan tali.*

(12 marks / *markah*)

Figure 4 (b)/ *Rajah 4 (b)*

QUESTION 5 / *SOALAN 5*

a) **Figure 5 (a)** shows the three point charges, 5 µC, - 3 µC and 8 µC arranged in a straight line. If the – 3 µC charge in equilibrium, calculate the distance x between the – 3 µC charge and 5 µC charge.

Rajah 5 (a) menunjukkan tiga titik cas, 5 µC, - 3 µC dan 8 µC yang berada pada garis lurus. Jika cas – 3 µC berada dalam keseimbangan, kira jarak x di antara cas – 3 µC dan cas 5 µC.
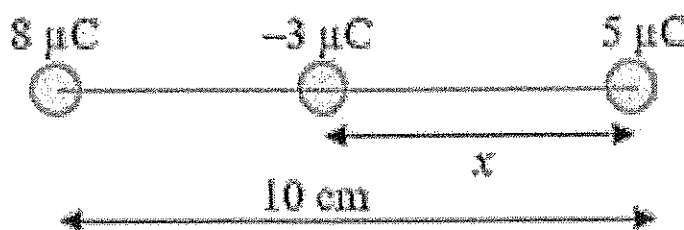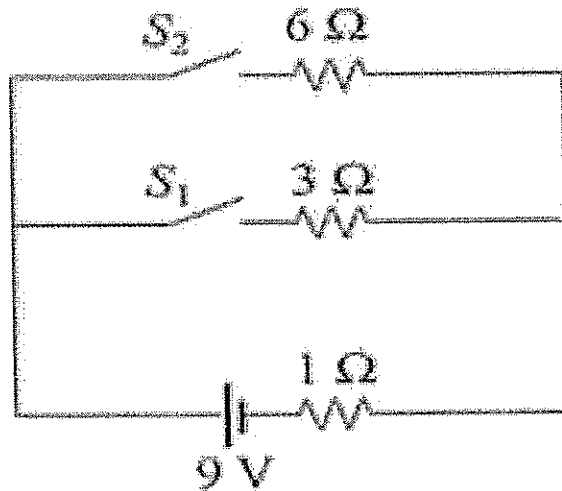
(6 marks / *markah*)

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

b) **Figure 5 (b)** shows an electric current circuit consisting of a battery of e.m.f. 9.0 V and internal resistance 1.0 Ω, two resistors and two switches. Calculate the terminal potential difference of the battery.

   i)   If S1 is open and S2 is open.

   ii)   If S1 is closed and S2 is open.

   iii)   If S1 is closed and S2 is closed.

Rajah 5 (b) menunjukkan litar arus elektrik yang mengandungi bateri e.m.f 9.0 V dan rintangan dalaman 1.0 Ω, dua rintangan dan dua suis. Kirakan beza upaya terminal bagi bateri.

   i)   *Jika S1 terbuka dan S2 terbuuka.*

   ii)   *Jika S1 tertutup dan S2 terbuka.*

   iii)   *Jika S1tertutup dan S2 tertutup.*

(

(14 marks / *markah*)

(

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

[100 MARKS / *MARKAH*]

END OF QUESTION PAPER/ *KERTAS SOALAN TAMAT*

FINAL EXAMINATION/ *PEPERIKSAAN AKHIR*

LIST OF CONSTANT AND FORMULA

Acceleration due to the gravity, $g = 9.8 \text{ ms}^{-2}$
Speed of light, $c = 3 \times 10^8 \text{ ms}^{-1}$
Elementary charge, $e = 1.6 \times 10^{-19} \text{ C}$
Electron mass, $m_e = 9.1 \times 10^{-31} \text{ kg}$
Permittivity constant, $\varepsilon_o = 8.85 \times 10^{-12} \text{ C}^2\text{N}^{-1}\text{m}^{-2}$
Coulomb constant, $k = 9.0 \times 10^9 \text{ Nm}^2\text{C}^{-2}$
Permeability constant, $\mu_o = 1.26 \times 10^{-34} \text{ Js}$

$$W = mg$$

$$\omega = \frac{d\theta}{dt}$$

$$\alpha = \frac{d\omega}{dt}$$

$$a_c = \frac{v^2}{r} = \omega^2 r$$

$$P = m \cdot v$$

$$a = r\sqrt{\omega^4 + \alpha^2}$$

$$v = r\omega$$

$$\omega = \omega_0 + \alpha t$$

$$s = ut + \frac{1}{2}at^2$$

$$f = \frac{1}{T} = \frac{\omega}{2\pi}$$

$$v^2 = u^2 + 2as$$

$$v = u + at$$

$$s = \frac{1}{2}(u + v)t$$

$$U = mgh$$

$$\theta = \tan^{-1}\left(\frac{R_y}{R_x}\right)$$

$$R = \sqrt{R_x^2 + R_y^2}$$

$$V = IR$$

$$R_{eq} = R_1 + R_2 + ..$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + ..$$

$$V_{ab} = \varepsilon - Ir = IR$$

$$P = V_{ab}I = I^2 R$$

$$V_{ab} = V_b - V_a$$

$$\sum I = 0$$

$$\sum \Delta V = 0$$

$$\sum \varepsilon = \sum IR$$

$$F = qvB\sin\theta$$

$$F = ilb\sin\theta$$

$$F_{21} = \frac{\mu_o I_1 I_2 l_2}{2\pi d}$$

$$B = \frac{\mu_o I}{2\pi r}$$

$$B = \mu_o nI$$

$$\phi = BA\cos\theta$$

$$\varepsilon = -\frac{\Delta\phi}{\Delta t}$$

$$\varepsilon = -Blv$$

$$E = hf = h\frac{c}{\lambda}$$

$$E = \Phi + K_{max}$$

$$p = \frac{h}{\lambda} \; ; \; p = \sqrt{2mK}$$

$$K_{max} = eV_o$$

$$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$$

$$m_1 u_1 + m_2 u_2 = (m_1 + m_2)v$$

$$F_{12} = \frac{kq_1 q_2}{r^2}$$

$$E = \frac{F}{q_o} \; ; E = \frac{kq}{r^2}$$

$$V = \sum \frac{kq}{r}$$

$$C = \frac{Q}{V}$$

$$C = \frac{K\varepsilon_o A}{d}$$

$$K = \frac{C}{C_o} = \frac{V_o}{V}$$

$$U = \frac{1}{2}CV^2 = \frac{1}{2}QV$$

$$f_k = \mu_k N \qquad f_s = \mu_s N$$