

Name : .....  
 Form : .....



## JABATAN PELAJARAN TERENGGANU

### PEPERIKSAAN PERCUBAAN

**SIJIL PELAJARAN MALAYSIA 2009**

**4531/2**

**PHYSICS**

**Kertas 2**

**September**

**$2\frac{1}{2}$  jam**

**Dua jam tiga puluh minit**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

*Untuk Kegunaan Pemeriksa*

1. Write your **name** and **form** in the space provided.
2. Kertas soalan ini adalah dalam dwibahasa
3. Candidate is required to read information on page 2.

Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	4	
	2	5	
	3	6	
	4	7	
	5	8	
	6	8	
	7	10	
	8	12	
B	9	20	
	10	20	
C	11	20	
	12	20	
<b>Jumlah</b>			

Kertas soalan ini mengandungi 27 halaman bercetak

**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. *This question paper consists of three sections: Section A, Section B and Section C.*  
*Kertas soalan ini mengandungi tiga bahagian : Bahagian A, Bahagian B dan Bahagian C.*
2. *Answer all questions in Section A. Write your answers for Section A in the spaces provided in the question paper.*  
*Jawab semua soalan dalam Bahagian A. Tulis jawapan bagi Bahagian A dalam ruang yang disediakan dalam kertas soalan*
3. *Answer one question from Section B and one question from Section C. Write your answers for Section B and Section C on the lined pages at the end of this question paper. Answer questions in Section B and Section C in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.*  
*Jawab satu soalan daripada Bahagian B dan satu soalan daripada Bahagian C. Tuliskan jawapan bagi Bahagian B dan Bahagian C pada halaman bergaris di bahagian akhir kertas soalan ini. Jawab Bahagian B dan Bahagian C dengan terperinci. Anda boleh menggunakan persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. *Show your working, it may help you to get marks.*  
*Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.*
5. *If you wish to cancel any answer, neatly cross out the answer.*  
*Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu*
6. *The diagram in the question provided are not drawn to scale unless stated.*  
*Gambarajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
7. *A list of formulae is provided on page 3.*  
*Satu senarai rumus disediakan di halaman 3.*
8. *The marks allocated for each question or part question are shown in brackets.*  
*Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
9. *The time suggested to answer Section A is 90 minutes, Section B is 30 minutes and Section C is 30 minutes.*  
*Masa yang dicadangkan untuk menjawab Bahagian A ialah 90 minit, Bahagian B ialah 30 minit dan Bahagian C ialah 30 minit.*
10. *You may use a non-programmable scientific calculator.*  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh deprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan.*
11. *Hand in this question paper at the end of the examination.*  
*Serahkan kertas soalan ini di akhir peperiksaan.*

The following information may be useful. The symbols have their usual meaning.

Maklumat berikut mungkin berfaedah. Simbol-simbol mempunyai makna yang biasa.

1.  $a = \frac{v - u}{t}$
2. Momentum =  $mv$
3.  $F = ma$
4. Gravitational potential energy =  $mgh$
5. Kinetic energy =  $\frac{1}{2}mv^2$
6.  $\rho = \frac{m}{v}$
7. Pressure,  $p = \frac{F}{A}$
8. Pressure,  $p = h\rho g$
9. Heat,  $Q = mc\theta$
10.  $\frac{pV}{T} = \text{constant}$
11.  $E = mc^2$
12.  $v = f\lambda$
13.  $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
14.  $n = \frac{\sin i}{\sin r}$
15.  $V = IR$
16.  $v^2 = u^2 + 2as$
17.  $s = ut + \frac{1}{2}at^2$
18. Power,  $P = \frac{\text{energy}}{\text{time}}$
19.  $\lambda = \frac{ax}{D}$
20.  $n = \frac{H}{h}$
21.  $Q = It$
22. Power,  $P = IV$
23.  $g = 10 \text{ m s}^{-2}$

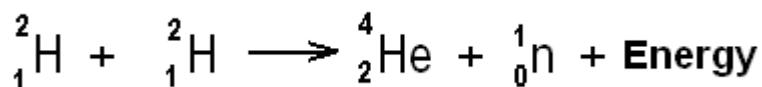
1.  $a = \frac{v - u}{t}$
2. Momentum =  $mv$
3.  $F = ma$
4. Tenaga keupayaan =  $mgh$
5. Tenaga kinetic =  $\frac{1}{2}mv^2$
6.  $\rho = \frac{m}{v}$
7. Tekanan,  $p = \frac{F}{A}$
8. Tekanan,  $p = h\rho g$
9. Haba,  $Q = mc\theta$
10.  $\frac{pV}{T} = \text{pemalar}$
11.  $E = mc^2$
12.  $v = f\lambda$
13.  $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
14.  $n = \frac{\sin i}{\sin r}$
15.  $V = IR$
16.  $v^2 = u^2 + 2as$
17.  $s = ut + \frac{1}{2}at^2$
18. Kuasa,  $P = \frac{\text{tenaga}}{\text{masa}}$
19.  $\lambda = \frac{ax}{D}$
20.  $n = \frac{H}{h}$
21.  $Q = It$
22. Kuasa,  $P = IV$
23.  $g = 10 \text{ m s}^{-2}$

**Section A**

[60 marks ]

*Answer all questions in this section**The time suggested to answer this section is 90 minutes.*

- 1 The following equation represents the reaction that occurs in the core of the sun.  
*Persamaan di bawah adalah tindak balas yang berlaku diteras matahari.*



- (a) (i) Name the reaction that occurs.  
*Namakan tindak balas yang berlaku.*

---

[1 mark]

- (ii) State **one** conditions that is required for the reaction in (a) (i) to occur.  
*Nyatakan **satu** syarat yang diperlukan untuk tindak balas dalam (a) (i) berlaku.*

---

[1 mark]

- (b) (i) State the charges of  ${}_2^4\text{He}$   
*Nyatakan cas bagi  ${}_2^4\text{He}$*

---

[1 mark]

- (ii) State the number of neutron in  ${}_2^4\text{He}$   
*Nyatakan bilangan neutron pada  ${}_2^4\text{He}$ .*

---

[1 mark]

- 2 Diagram 2 shows a bag of cement of mass 35 kg on a ramp with  $15^\circ$  slope to horizontal. Frictional force exerted between the bag and the ramp is 90.6 N.

*Rajah 2 menunjukkan sekampit simen di atas landas condong dengan kecondongan  $15^\circ$  terhadap ufuk. Daya geseran yang bertindak di antara kampit dan landas condong itu ialah 90.6 N.*

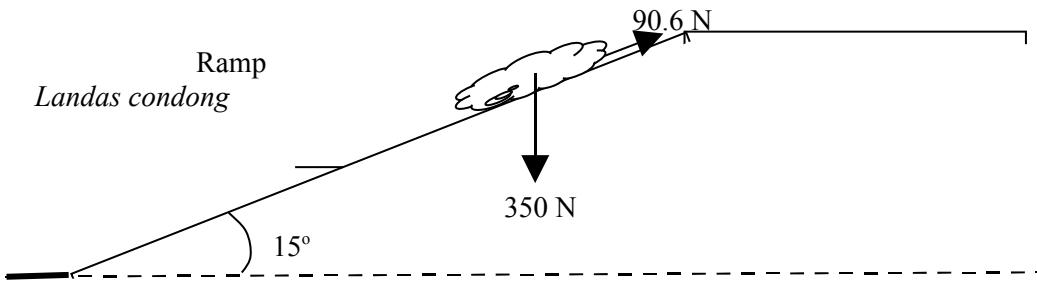


Diagram 2  
Rajah 2

- (a) What is meant by frictional force?  
*Apakah yang dimaksudkan dengan daya geseran?*

[1 mark]

- (b) Calculate the resultant force parallel to the ramp.  
*Hitungkan daya paduan selari dengan landas condong itu.*

[2 marks]

- (c) Based on your answer in (b), explain what happens to the motion of the bag of cement?  
*Berdasarkan jawapan anda dalam (b), terangkan apakah berlaku pada gerakan kampit simen itu?*

[2 marks]

- 3 Diagram 3 shows an experiment to determine the wavelength of monochromatic light waves by using a red light source.

Rajah 3 menunjukkan satu eksperimen dwicelah Young untuk menentukan panjang gelombang cahaya monokromatik menggunakan sumber cahaya berwarna merah.

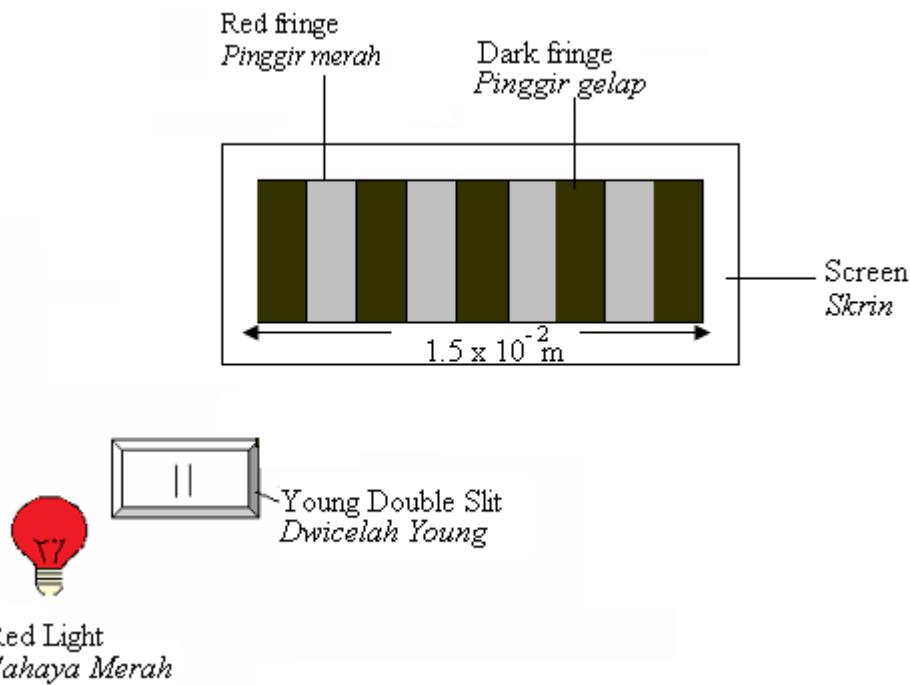


Diagram 3  
Rajah 3

- (a) What is meant by monochromatic light?  
*Apakah yang dimaksudkan dengan cahaya monokromatik?*

.....  
[1 mark]

- (b) Why are red fringes formed on the screen ?  
*Mengapa pinggir-pinggir merah terbentuk pada skrin?*

.....  
[1 mark]

- (c) The distance between the Young double slit and the screen is 3.0 m. The double slit used has the slit separation is  $5 \times 10^{-4}$  m.  
Calculate the wave length of the red light.

*Jarak antara Dwicelah Young dan skrin tersebut adalah 3.0 m. Pengasingan celah bagi Dwicelah yang digunakan ialah  $5 \times 10^{-4}$  m.  
Hitungkan panjang gelombang cahaya merah yang digunakan.*

[ 2 marks]

- (d) The red light is replaced by the green light.  
*Cahaya merah digantikan dengan cahaya hijau.*

- (i) What happen to distance between two consecutive dark fringes.  
*Apakah yang terjadi kepada jarak antara dua pinggir gelap berturutan.*

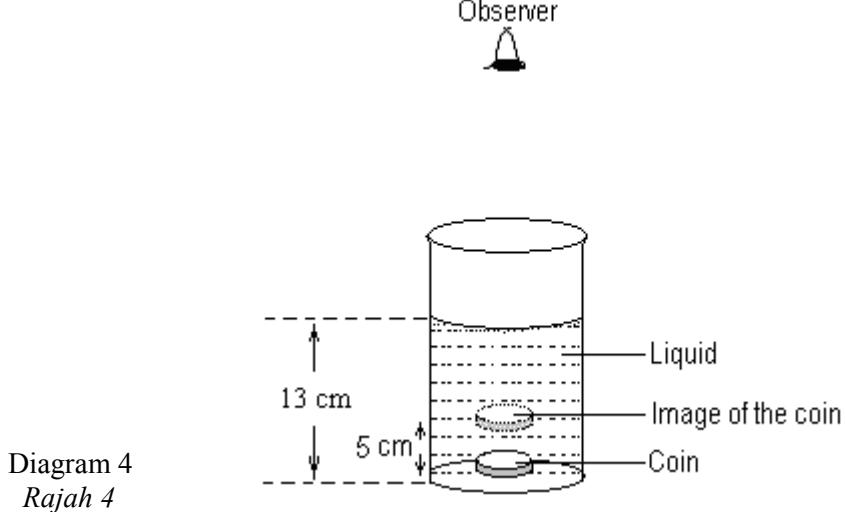
.....  
[1 mark]

- (ii) Give the reason for your answer in (d)(i).  
*Berikan sebab bagi jawapan anda di (d)(i).*

.....  
.....  
[2 marks]

4. Diagram 4 shows a coin at the base of the beaker which contains a liquid with the depth of 13 cm. The observer found the image of the coin appears to be 5 cm from the base of the beaker.

*Rajah 4 menunjukkan sekeping duit syiling yang berada pada dasar sebuah bikar yang mengandungi air dengan kedalaman 13 cm. Pemerhati mendapati imej duit syiling kelihatan berada 5 cm dari dasar bikar.*



- (a) Name the light phenomenon involved.  
*Namakan fenomena cahaya yang terlibat.*

.....  
[1 mark]

- (b) Explain how this phenomenon occurs.  
*Terangkan bagaimana fenomena ini berlaku.*

---

[2 marks]

- (c) Calculate the refractive index of the liquid.  
*Hitungkan indeks biasan bagi cecair tersebut.*

---

[2 marks]

- (d) The liquid is replaced with less dense liquid.  
*Cecair itu digantikan dengan cecair lain yang kurang tumpat.*
- (i) What happens to the image of the coin?  
*Apakah yang berlaku kepada imej duit syiling itu?*

---

[1 mark]

- (ii) Give the reason for your answer in (d)(i) based on the concept of apparent depth.  
*Berikan sebab bagi jawapan anda dalam (d) (i) berdasarkan konsep dalam ketara.*

---

[1 mark]

- 5 Diagram 5.1 and Diagram 5.2 show two identical polystyrene glasses are filled by hot water at the same temperature.  
Diagram 5.3 and Diagram 5.4 shows the changes in temperature of the water after 5 minutes the water are cooled.

Rajah 5.1 dan Rajah 5.2 menunjukkan dua biji gelas polisterina diisikan dengan air panas pada suhu yang sama.

Rajah 5.3 dan 5.4 menunjukkan perubahan suhu air itu selepas 5 minit disejukkan.

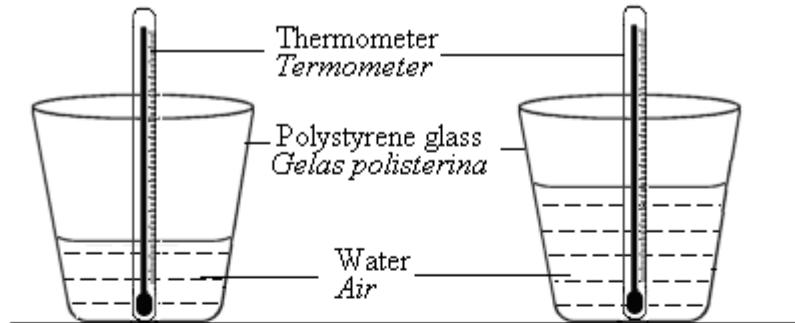


Diagram 5.1  
Rajah 5.1

Diagram 5.2  
Rajah 5.2

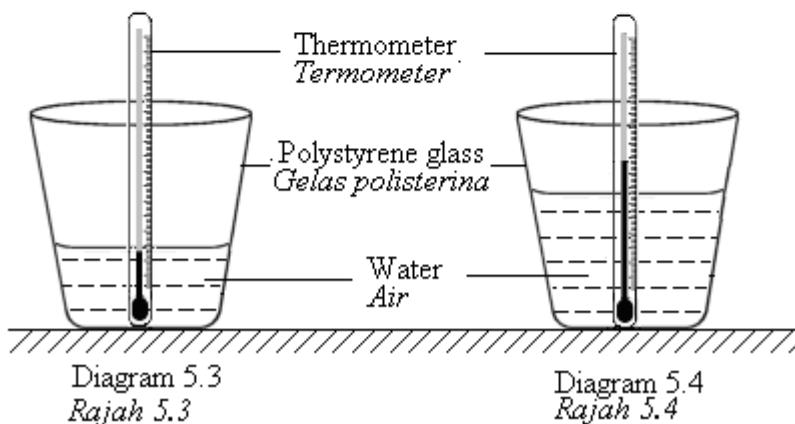


Diagram 5.3  
Rajah 5.3

Diagram 5.4  
Rajah 5.4

- (a) State the working principle used in the thermometer.

*Nyatakan prinsip kerja yang digunakan dalam termometer itu*

[1 mark]

- (b) Using Diagram 5.1 and Diagram 5.2 , compare the mass of water in the both glasses.

*Menggunakan Rajah 5.1 dan Rajah 5.2 ,bandingkan jisim air dalam kedua-dua gelas.*

[1 mark]

- (c) Using Diagram 5.3 and 5.4, compare

*Menggunakan Rajah 5.3 dan Rajah 5.4 , bandingkan*

- (i) the reading of the thermometer.  
*bacaan termometer*

.....  
.....

[1 mark]

- (ii) the rate of loss of heat from the water in the glasses after 5 minutes.  
*kadar kehilangan haba daripada air dalam kedua-dua gelas selepas 5 minit.*

.....  
.....

[1 mark]

- (d) Based on your answer in c(ii) compare the quantity of heat in the water in the glasses in Diagram 5.3 and Diagram 5.4.

*Berdasarkan jawapan anda di c(ii) bandingkan kuantiti haba dalam air dalam kedua-dua gelas pada Rajah 5.3 dan Rajah 5.4.*

.....

[1 mark]

- (e) Based on your answer in (a) and (d), state the relationship between mass and quantity of heat in the water.

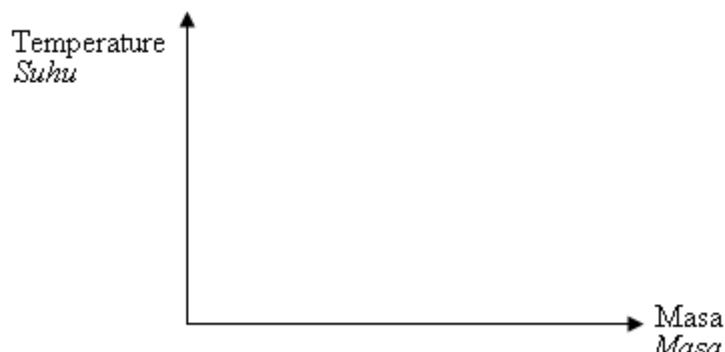
*Berdasarkan jawapan anda di(a) dan (d) , nyatakan hubungan antara jisim dan kuantiti haba dalam air.*

.....

[1 mark]

- (f) Sketch the graph temperature against time when the water in the glass in Diagram 5.1 is cooled for a long time.

*Lakarkan graf suhu melawan masa apabila air di dalam gelas pada Rajah 5.1 dibiarkan sejuk untuk suatu jangka masa yang panjang.*



[2 marks]

- 6 Diagram 6.1 shows a bar magnet is moved into a solenoid.

Rajah 6.1 menunjukkan satu magnet batang digerakkan ke dalam gegelung

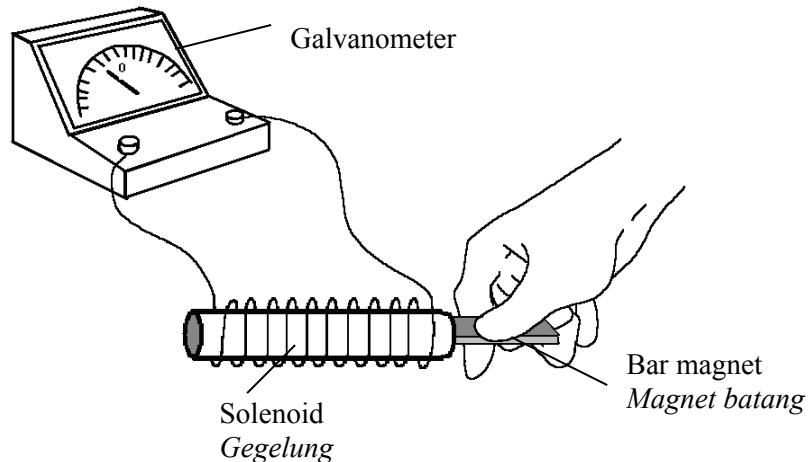


Diagram 6.1  
Rajah 6.1

Diagram 6.2 shows two bar magnets are moved into a solenoid. Galvanometer shows the reading of the induced current.

Rajah 6.2 menunjukkan dua magnet batang digerakkan ke dalam gegelung. Galvanometer menunjukkan bacaan arus aruhan.

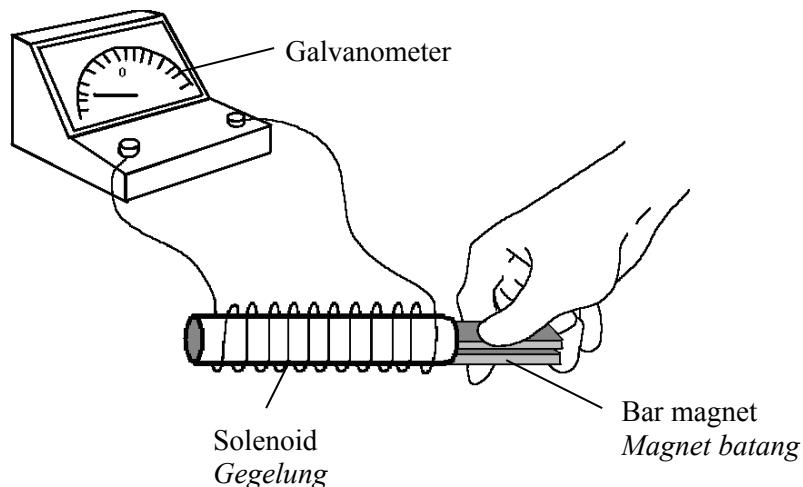


Diagram 6.2  
Rajah 6.2

- (a) What is meant by induced current?  
*Apakah yang dimaksudkan dengan arus aruhan?*

- (b) Using Diagram 6.1 and Diagram 6.2, compare

[1 mark]

*Menggunakan Rajah 6.1 dan Rajah 6.2, bandingkan*

- (i) the number of turns of the wire of the solenoid  
*bilangan lilitan wayar pada solenoid*

.....  
.....  
.....

[1 mark]

- (ii) the strength of the magnetic field  
*kekuatan medan magnet*

.....  
.....  
.....

[1 mark]

- (iii) the magnitude of the induced current  
*nilai arus aruhan*

.....  
.....  
.....

[1 mark]

- (c) (i) Based on the answer in 6(b), state the relationship between the strength of magnetic field and induced current.

*Berdasarkan jawapan di 6(b), nyatakan hubungan antara kekuatan medan magnet dengan arus aruhan.*

.....  
.....  
.....

[1 mark]

- (ii) Name the physics law involved in 6(c)(i)  
*Namakan hukum fizik yang terlibat di 6(c)(i)*

.....  
.....  
.....

[1 mark]

- (d) Diagram 6.3 shows a bar magnet is moved towards a solenoid.

Rajah 6.3 menunjukkan satu magnet batang digerakkan ke arah satu gegelung.

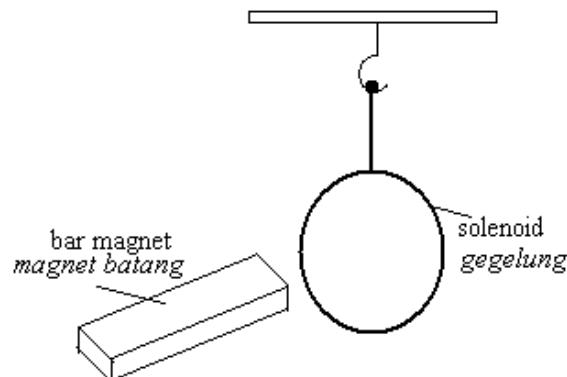


Diagram 6.3  
Rajah 6.3

Explain why the solenoid moves away from the bar magnet?  
Terangkan mengapa gegelung bergerak menjauhi magnet batang ?

.....  
.....

[2 marks]

7. Diagram 7 shows a nuclide Thorium-234,  $^{234}_{90}Th$  is placed in a container. Thorium-234 nuclide decays to a nuclide Radium-226,  $^{226}_{88}Ra$  by emitting  $\alpha$  particle and  $\beta$  particle.

*Rajah menunjukkan nuklid Thorium-234,  $^{234}_{90}Th$  diletakkan di dalam satu bekas. Nuklid Thorium-234 mereput kepada nuklid Radium-226,  $^{226}_{88}Ra$  dengan memancarkan zarah  $\alpha$  dan zarah  $\beta$ .*

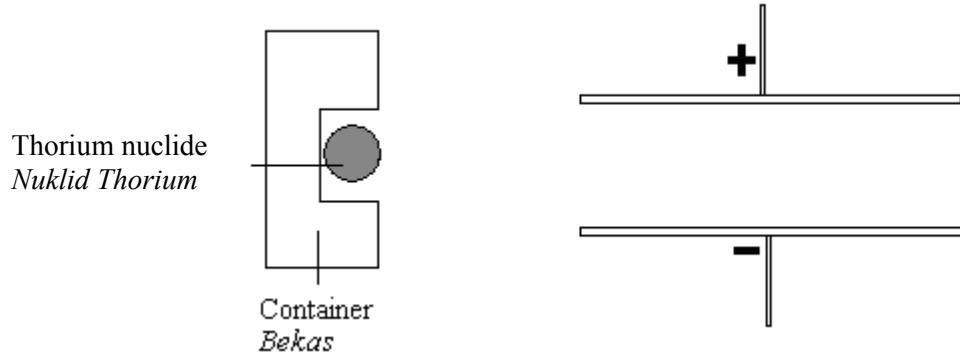


Diagram 7  
Diagram 7

- (a) What is meant by radioactive decay?  
*Apakah yang dimaksudkan dengan reputan radioaktif?*

[1 mark]

- (b) (i) In Diagram 7, draw the path of  $\alpha$  particle and  $\beta$  particle.  
*Pada Rajah 7, lukiskan lintasan bagi zarah  $\alpha$  dan zarah  $\beta$ .*

[2 marks]

- (ii) Explain your answer in (b) (i).  
*Terangkan jawapan anda dalam (b) (i).*

[3 marks]

- (c) Calculate the number of  $\alpha$  particle and  $\beta$  particle that emitted in the Thorium-234 decays.  
*Hitungkan bilangan zarah  $\alpha$  dan zarah  $\beta$  yang dipancarkan semasa reputan Thorium-234.*

[2 marks]

- (d) Thorium-234 has half-life of 20 days and initial mass of 48 g.

Calculate the mass of undecayed Thorium-234 after 60 days.

*Thorium-234 mempunyai separuh hayat 20 hari dan jisim asal 48 g. Hitungkan jisim Thorium-234 yang tidak mereput selepas 60 hari.*

[2 marks]

- 8 Diagram 8.1 shows an automatic parking barrier for any vehicle enter parking lots. The parking barrier automatically rises up when a sufficient amount of coin is slotted in a machine or an applicable electronic card is touched to the detector.

*Rajah 8.1 menunjukkan satu sistem palang automatik di tempat masuk kawasan meletak kereta. Palang automatik akan terangkat ke atas apabila jumlah wang mencukupi dimasukkan atau pengesan kad elektronik yang sah disentuh pada pengesan.*

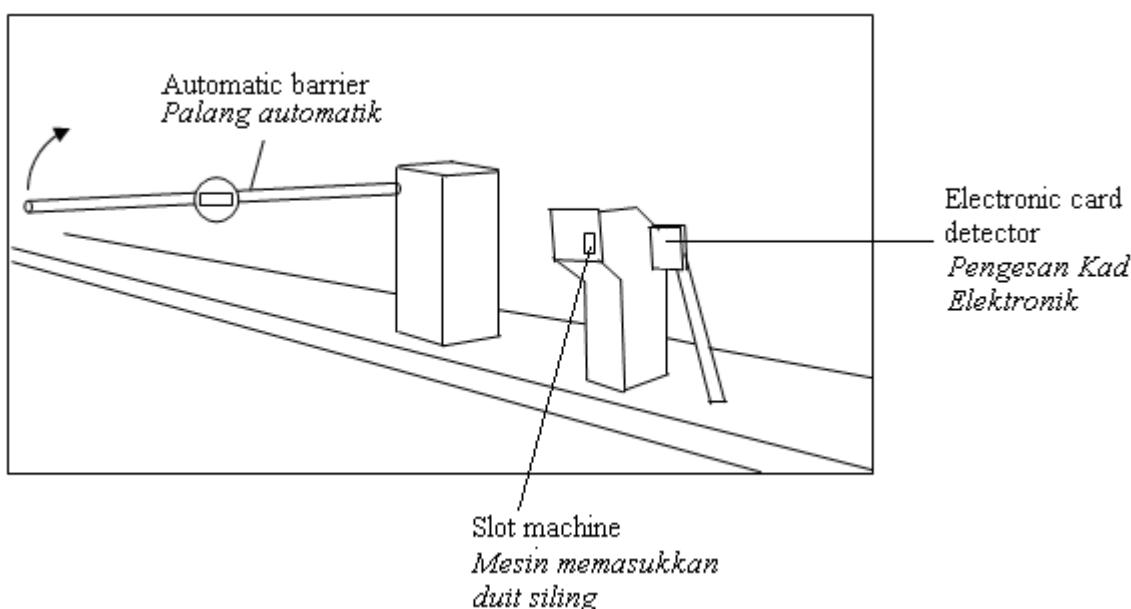


Diagram 8.1  
Rajah 8.1

Diagram 8.2 shows the circuit used in the automatic parking barrier.

Rajah 8.2 menunjukkan litar yang digunakan dalam sistem palang automatik itu.

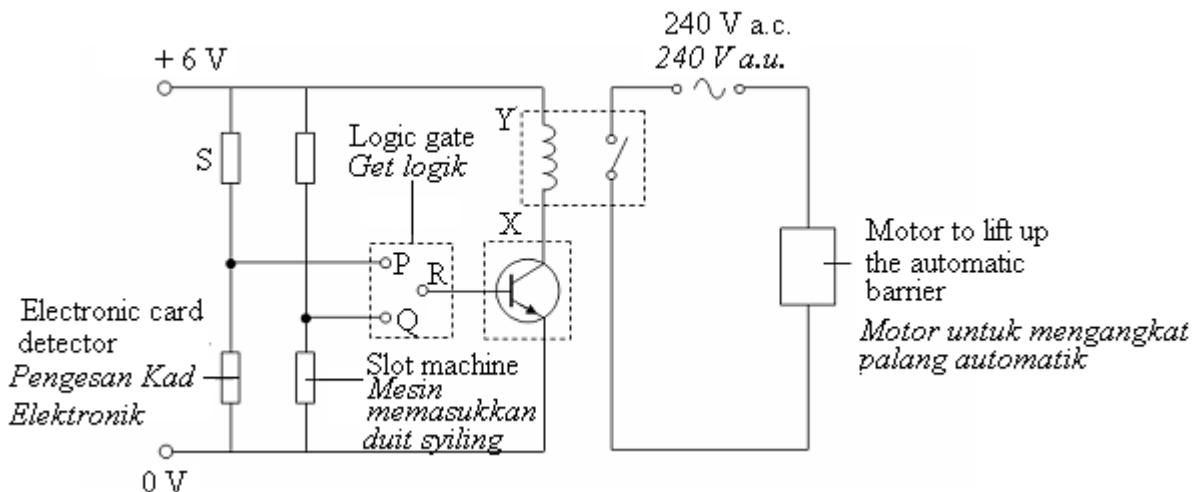


Diagram 8.2  
Rajah 8.2

- (a) Name the electronic component X.  
*Namakan komponen elektronik X.*

[1 mark]

- (b) What is the potential different across the electronic card detector when the potential different across resistor S is 4 V?  
*Berapakah beza keupayaan merentasi pengesek kad elektronik itu apabila beza keupayaan merentasi perintang S ialah 4V?*

[1 mark]

- (c) The electronic component Y is connected to an electric motor to lift up the automatic barrier. 240 V a.c. is supplied to the motor.  
*Komponen elektronik Y disambungkan kepada sebuah motor elektrik untuk mengangkat palang automatik itu. 240 V a.u. dibekalkan kepada motor itu.*

- (i) Name the electronic component Y.  
*Namakan komponen elektronik Y.*

[1 mark]

- (ii) Explain why the electronic component Y is used?  
*Mengapakah komponen elektronik Y itu digunakan?*

[1 mark]

- (d) The following truth table shows the operation of a logic gate in the circuit in Diagram 8.2  
*Jadual kebenaran berikut menunjukkan operasi bagi get logik litar dalam Rajah 12.2.*

Input P		Input Q		Output R
Electronic card detector <i>Pengesan Kad Elektronik</i>	Input voltage at P <i>Beza keupayaan input di P</i>	Coin detector <i>Pengesan Duit Syiling</i>	Input voltage at Q <i>Beza keupayaan input di Q</i>	
No <i>Tidak</i>		No <i>Tidak</i>		
No <i>Tidak</i>		Yes <i>Ya</i>		
Yes <i>Ya</i>		No		
Yes <i>Ya</i>		Yes <i>Ya</i>		

Key:  
*Kunci*

An applicable electronic card is touched  
*Satu kad elektronik yang sah disentuh*  
An inapplicable electronic card is touched  
*Satu kad elektronik yang tidak sah disentuh*  
A sufficient amount of coin is slotted in  
*Duit syiling yang mencukupi dimasukkan*  
An insufficient amount of coin is slotted in  
*Duit syiling yang tidak*

High input voltage  
*Beza keupayaan yang tinggi di P*

Logic'1'  
*Logik '1'*

Low input voltage P  
*Beza keupayaan yang rendah di P*

Logic'0'  
*Logik '0'*

High input voltage at Q  
*Beza keupayaan yang tinggi di Q*

Logic'1'  
*Logik '1'*

Low input voltage at Q  
*Beza keupayaan yang rendah di Q*

Logic'0'  
*Logik '0'*

*mencukupi dimasukkan*

- (i) Using the given key, complete the truth table above.

*Menggunakan Kunci yang diberikan , lengkapkan jadual kebenaran di atas.*

[4 marks]

- (ii) Name the logic gate in the circuit in Diagram 12.2

*Namakan get logik pada pada litar dalam Rajah 12.2.*

.....  
[1 mark]

- (iii) Draw the symbol of the logic gate in (d) (ii)

*Lukiskan simbol get logik pada d(ii).*

[1 mark]

- (e) Using two switches , two dry cells and a bulb draw a circuit that equivalent to logic gate in d(ii).

*Menggunakan dua buah suis , dua buah sel kering dan sebiji mentol , lukiskan satu litar yang setara dengan get logik pada d(ii).*

[ 2 marks]

**Section B**

[ 20 marks]

*Answer any one question from this section.**The time suggested to answer this section is 30 minutes.*

- 9** Diagram 9 shows a ball placed onto smooth incline plane at point P. The ball is rolling down over the incline plane caused by gravitational potential energy. Point Q and point R are at the middle of the incline plane and at the ground respectively.

*Rajah 9 menunjukkan sebiji bola diletakkan di atas satah condong yang licin di titik P. Bola itu bergolek turun di atas satah condong itu disebabkan oleh tenaga keupayaan kenyal. Titik Q dan titik R adalah masing-masing di tengah satah condong itu dan di tanah.*

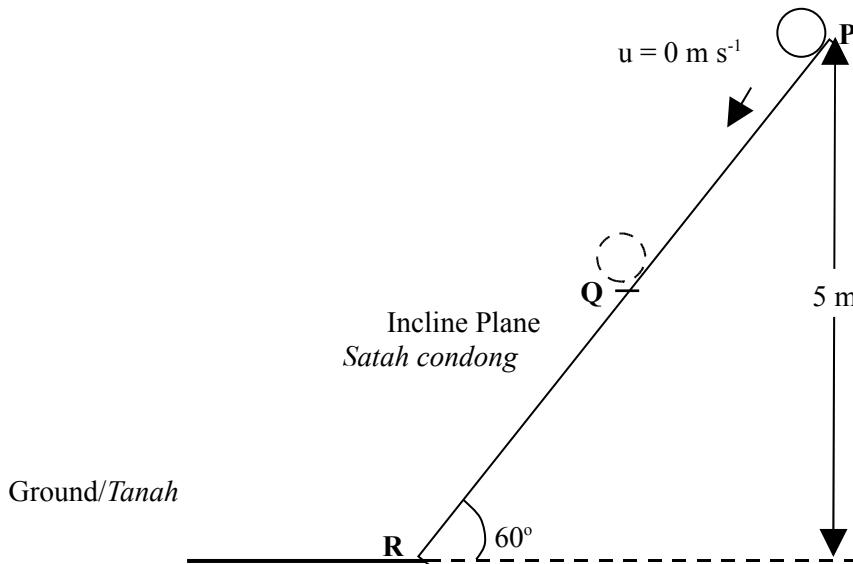


Diagram 9

Rajah 9

- (a) What is meant by gravitational potential energy? [1 mark]  
*Apakah yang dimaksudkan dengan tenaga keupayaan kenyal?*

- (b) (i) Using Diagram 9, compare the height of the ball, the gravitational potential energy of the ball, the velocity of the ball and the kinetic energy of the ball at point P and point Q.

Deduce the relationship between the kinetic energy and the gravitational potential energy of the rolling ball.

[5 marks]

*Menggunakan Rajah 9, bandingkan ketinggian bola itu, tenaga keupayaan kenyal bola itu, halaju bola itu dan tenaga kinetik bola itu pada titik P dan titik Q.*

*Rumuskan hubungan di antara tenaga kinetik dengan tenaga keupayaan kenyal bola yang bergolek itu.*

- (ii) Name the physical principle involved in (b)(i). [1 marks]  
*Namakan prinsip fizik yang terlibat dalam (b)(i).*

- (c) Explain what happens to the velocity of the ball when it reaches point R on the ground. [3 marks]  
*Terangkan apa yang terjadi kepada halaju bola itu apabila ia sampai pada titik R di atas tanah.*

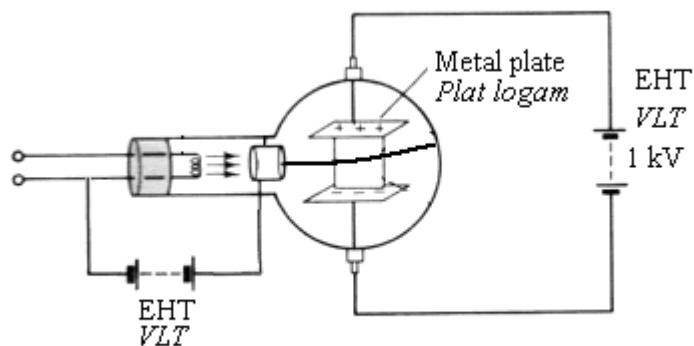
- (d) Based on the physical principle above, you are required to design a roller skate track. Using appropriate physics concept, explain the design of the roller skate track so that it can be used to oscillate skate board continuously.  
 Your answer should include the following aspects:

*Berdasarkan prinsip fizik di atas, anda diminta untuk merekabentuk trek papan peluncur. Menggunakan konsep fizik yang sesuai, terangkan rekabentuk trek papan peluncur yang dapat digunakan supaya papan peluncur boleh berayun berterusan.  
 Jawapan anda hendaklah merangkumi aspek-aspek berikut:*

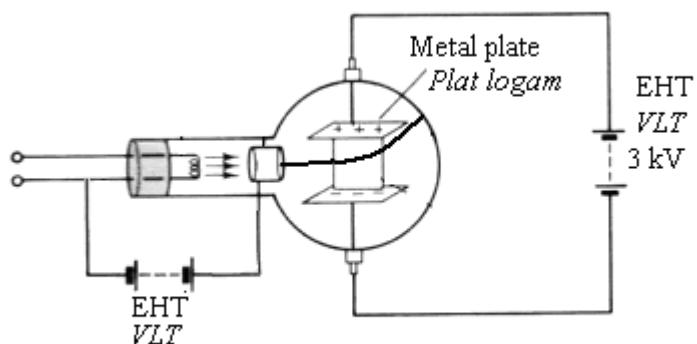
- (i) Shape of the track  
*Bentuk trek*
- (ii) Slope of the track  
*Kecondongan trek*
- (iii) Surface of the track  
*Permukaan trek*
- (iv) Safety.  
*Keselamatan.*

[10 marks]

- 10** Diagram 10.1 and 10.2 show the deflection of a cathode ray in a deflection tube.



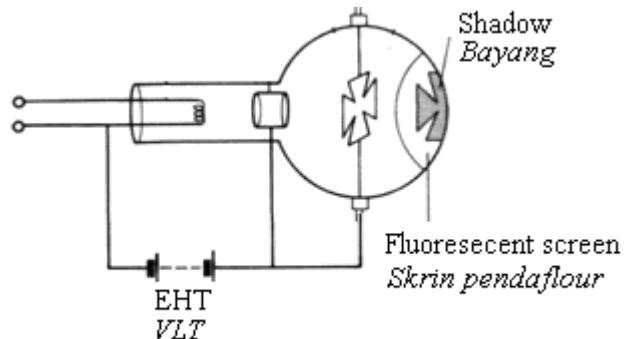
*Diagram 10.1  
Rajah 10.1*



*Diagram 10.2  
Rajah 10.2*

- (a) What is the meaning of cathode ray  
*Apakah maksud sinar katod*  
[1 mark]
- (b) Using Diagram 10.1 and Diagram 10.2,  
*Menggunakan Rajah 10.1 dan 10.2,*
- (i) state the charge of the cathode ray,  
*nyatakan cas bagi sinar katod*  
[1 mark]

- (ii) compare the voltage of EHT connected to the metal plate and the deflection of the cathode ray  
*bandingkan voltan VLT yang disambungkan pada plat logam dan pesongan pada sinar katod*  
[2 marks]
- (c) State the relationship between  
*Nyatakan hubungan antara*
- (i) the voltage of EHT and the strength of the electric field between the metal plates,  
*voltan VLT dengan kekuatan medan elektrik di antara plat logam,*  
[1 mark]
- (ii) the strength of the electric field between the metal plates and the deflection of the cathode ray  
*kekuatan medan elektrik di antara plat logam dengan pesongan sinar katod*  
[1 mark]
- (d) Diagram 10.3 shows a shadow is formed on fluorescent screen of the Maltase cross tube.  
*Rajah 10.3 menunjukkan satu bayang terbentuk pada tiub Palang Maltase.*



**Diagram 10.3**  
**Rajah 10.3**

Explain how the shadow is formed on the fluorescent screen ?  
*Terangkan bagaimana bayang terbentuk pada skrin pendaflour?*

[4 marks]

- (e) Maltase cross tube in Diagram 10.3 is not suitable for measuring the frequency of the sound waves.  
*Tiub palang Maltase pada Rajah 10.3 adalah tidak sesuai untuk mengukur frekuensi gelombang bunyi.*

Suggest modifications that can be made to the Maltase cross tube in Diagram 10.3 to transform it into Cathode Ray Oscilloscope that can measure the frequency of the sound waves.

*Cadangkan pengubahsuaian yang boleh dilakukan pada tiub palang Maltase pada Rajah 10.3 untuk ditukarkan kepada Osiloskop Sinar Katod yang dapat mengukur frekuensi gelombang bunyi.*

In your suggestions, state the components that are used and their functions based on the following aspects:

*Dalam cadangan anda, nyatakan komponen-komponen yang digunakan dan fungsi setiap komponen*

*Berdasarkan aspek-aspek berikut:*

- the electron gun
- senapang elektorn

- the deflection system
- sistem pemesongan

[10 marks]

### Section C

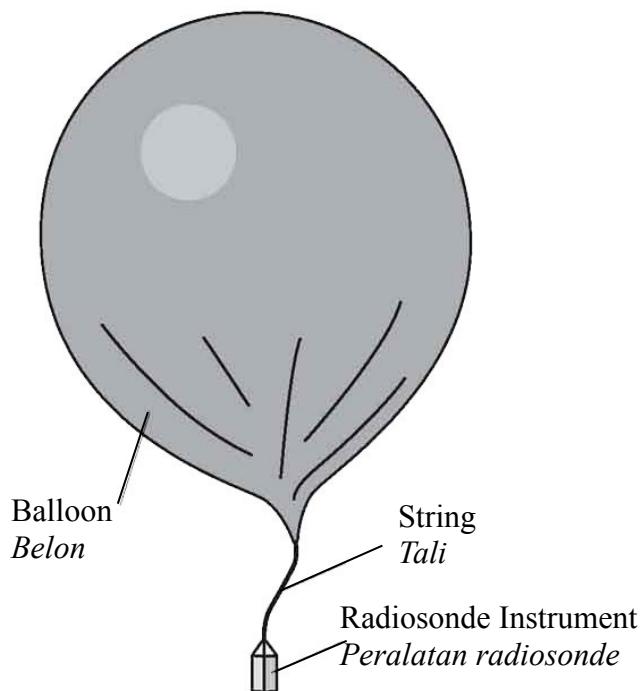
[ 20 marks ]

*Answer any one question from this section.*

*The time suggested to answer this section is 30 minutes.*

- 11 Diagram 11.1 shows the air balloon which is used as a weather balloon to carry a radiosonde instrument for collecting data about the atmosphere. The weather balloon rises up in the air due to Archimedes principal

*Rajah 11.1 menunjukkan belon udara yang digunakan sebagai belon kajicuaca untuk membawa peralatan radiosonde bagi mengumpul data mengenai atmosfera. Belon cuaca naik ke udara disebabkan oleh prinsip Archimedes.*



- (a) (i) State Archimedes' principle.  
*Nyatakan prinsip Archimedes.*

[1 mark]

- (ii) Explain why a weather balloon that is rising up in the air will stop at certain altitude.

*Jelaskan mengapa sebuah belon yang sedang naik ke udara akan berhenti pada altitud tertentu.*

[4 marks]

- (b) Table 11.2 shows the characteristics of four weather balloons, P, Q, R and S .

*Jadual 11.2 menunjukkan ciri-ciri empat belon cuaca, P, Q, R dan S .*

Balloons <i>Belon</i>	Characteristics of the balloons <i>Ciri-ciri belon</i>			
	Size of balloon <i>Saiz belon</i>	Density of filled gas in the balloon <i>Ketumpatan gas yang diisi dalam belon</i> /kgcm <sup>-3</sup>	Type of balloon fabric <i>Jenis fabrik belon</i>	Mass of radiosonde <i>Jisim radiosonde</i> /kg
P	Big <i>besar</i>	0.090	Canvas <i>Kanvas</i>	4.5
Q	Small <i>kecil</i>	0.178	Synthetic nylon <i>Nilon sintetik</i>	3.0
R	Big <i>besar</i>	0.178	Synthetic nylon <i>Nilon sintetik</i>	0.5
S	Medium <i>sederhana</i>	1.429	Canvas <i>Kanvas</i>	0.4

You are required to determine the most suitable weather balloons which is able to carry the instrument to a higher altitude in a shorter time.

Study the characteristics of all the four weather balloons from the following aspects:

*Anda dikehendaki menentukan belon cuaca yang paling sesuai untuk membawa peralatan ke altitud yang lebih tinggi dalam masa yang lebih pendek.*

*Kaji ciri-ciri bagi kesemua empat belon kajicuaca itu dari aspek berikut:*

- The size of the balloon
- *Saiz belon*

- The density of filled gas in the balloon
- *ketumpatan gas yang di isi ke dalam belon*
  
- Type of the fabric of the balloon
- *Jenis fabrik bagi belon*
  
- Mass of radiosonde instrument
- *jisim peralatan radiosonde*

Explain the suitability of the aspects.

Justify your choice.

*Jelaskan kesesuaian aspek-aspek itu.*

*Beri sebab bagi pilihan anda.*

[10 marks]

- (c) Diagram 11.3 shows a balloon which contains helium. The volume of the balloon is  $1.2 \text{ m}^3$ . Density of helium gas is  $0.18 \text{ kg m}^{-3}$ .

*Rajah 11.3 menunjukkan sebuah belon yang mengandungi gas helium. Isipadunya ialah  $1.2 \text{ m}^3$ . Ketumpatan gas helium ialah  $0.18 \text{ kg m}^{-3}$*



DIAGRAM 11.3

- (i) By neglecting the mass of the balloon, calculate the mass of helium gas in the balloon.

*Dengan mengabaikan jisim belon, kirakan jisim gas helium di dalam belon.*

[2 marks]

- (ii) Calculate the bouyant force which acts on the balloon.

(Density of air is  $1.3 \text{ kg m}^{-3}$ )

*Kirakan daya tujah ke atas yang bertindak pada belon .  
(Ketumpatan udara ialah  $1.3 \text{ kg m}^{-3}$  )*

[3 marks]

- 12** Diagram 12.1 shows a ping pong ball coated with thin metal foil placed between a pair of parallel metal disc. When the E.H.T is switched on, an electric field is formed in between the metal disc.

*Rajah 12.1 menunjukkan sebiji bola ping pong disalut dengan kerajang logam nipis diletakkan diantara sepasang plat logam. Apabila suis V.L.T dipasang, satu medan elektrik terhasil di antara dua cakera logam tersebut.*

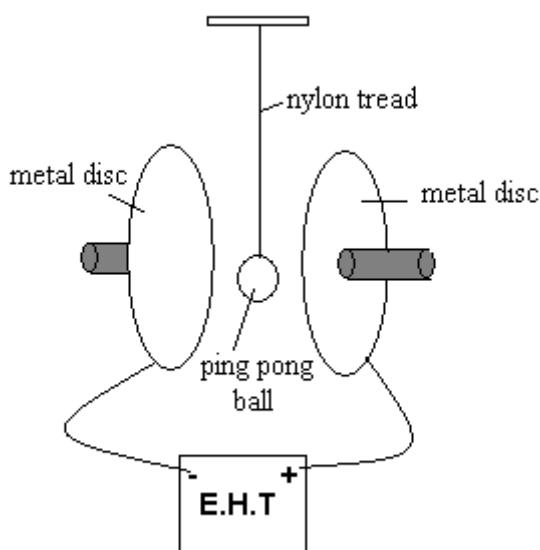


Diagram 12.1  
Rajah 12.1

- (a) What is meant by electric field?

*Apakah yang dimaksudkan dengan medan elektrik?*

[1 mark]

- (b) Explain what will happen to the ping pong ball when it is brought to touch the metal disc connected to positive terminal of EHT?

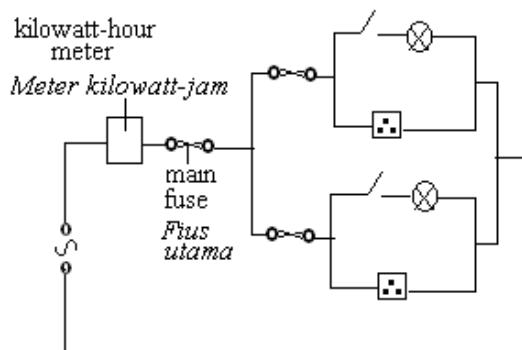
*Terangkan apakah yang akan berlaku kepada bola ping pong itu bila ia dibawa bersentuh dengan cakera logam yang disambungkan dengan terminal positif VLT?*

[4 marks]

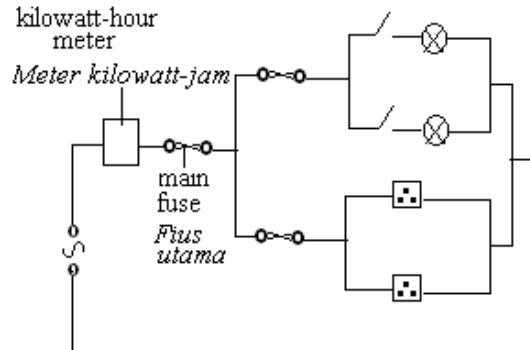
- (c) Diagram 12.2 shows four electric circuits, K, L, M and N, with different arrangement of bulbs and power sockets. The circuit is to be used in wiring a guard booth.

You are required to determine the most suitable circuit to light up and supply the electrical power to the booth. Study all the four circuits based on the following aspects:  
*Rajah 12.1 menunjukkan empat litar elektrik, K, L, M dan N, dengan susunan mentol-mentol dan soket-soket yang berbeza. Litar tersebut digunakan untuk pendawaian sebuah pondok jaga. Anda dikehendakki menentukan litar yang paling sesuai untuk menyalakan mentol-mentol lampu dan membekalkan kuasa elektrik pada pondok itu.*  
*Kaji ciri-ciri bagi empat litar itu dari aspek berikut:*

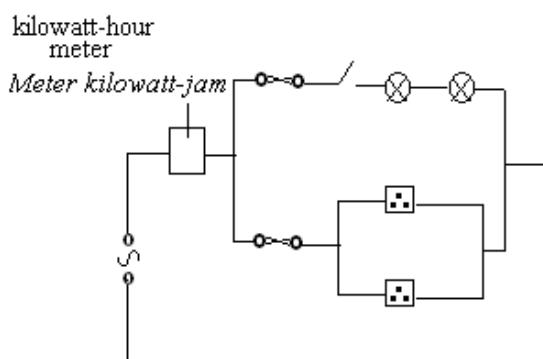
- safety feature  
*ciri keselamatan*
- arrangement of bulbs and power sockets  
*susunan mentol-mentol dan soket-soket*
- position of the kilowatt-hour meter and main fuse  
*kedudukan meter kilowatt-jam dan fius utama*



K



L



M

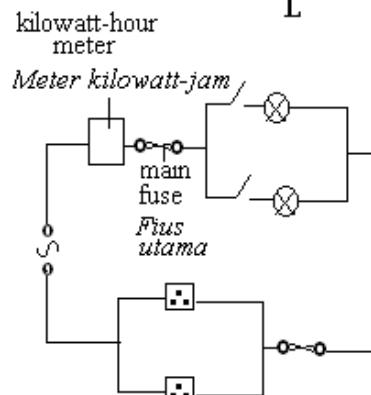


Diagram 12.2

Rajah 12.2

- (d) An electric toaster has a heating element of resistance  $26.7 \Omega$ . The current flowing through it while in use is  $9A$

*Sebuah pemanggang elektrik mempunyai satu elemen pemanas berintangan  $26.7 \Omega$ . Arus yang mengalir melaluinya semasa digunakan ialah  $9A$ .*

- State the suitable fuse for the toaster.  
*Nyatakan nilai fius yang sesuai untuk pemanggang itu.*
- Calculate  
*Hitungkan*

- the supplied voltage
- *voltan yang dibekalkan*
  
- the power dissipated by the toaster
- *kuasa yang dikeluarkan oleh pemanggang*

[5 marks]

END OF QUESTION PAPER  
KERTAS SOALAN TAMA

## MARKING SCHEME P2

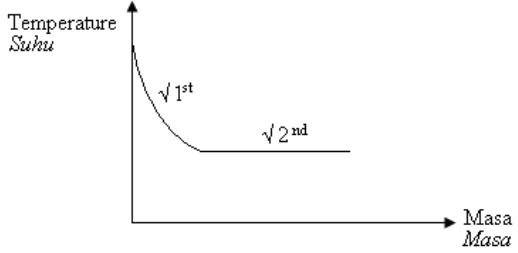
**SECTION A**

<b>QUESTION 1</b>	<b>Mark</b>	<b>Answer</b>	<b>Note</b>
(a)( i )	1	Nuclear Fusion	
(a)( ii )	1	High temperature	
(b)(i)	1	Positive ( +ve )	
(b)( ii )	1	2	
<b>TOTAL</b>	<b>4</b>		

<b>QUESTION 2</b>	<b>Mark</b>	<b>Answer</b>	<b>Note</b>
(a)	1	Force that oppose acted force forward.	
(b)	1	F = Acted force - Frictional force = W Cosθ - Fr = 350 Cos 75° - 90.6 // 350 Sin 15° - 90.6 = 0 N	Gantian betul Jwpn dgn unit betul
(c)	1	Stationary.	
	1	Balanced forces // Forces in equilibrium // Acted force equal to frictional force.	
<b>TOTAL</b>	<b>5</b>		

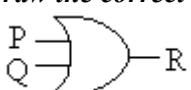
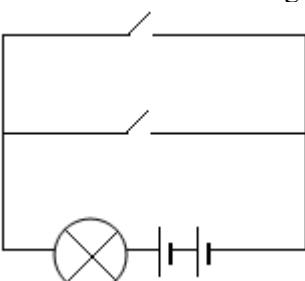
<b>QUESTION 3</b>	<b>Mark</b>	<b>Answer</b>	<b>Note</b>
(a)	1	<b>Give the meaning of the monochromatic light correctly</b> One colour // One wave length	
(b)	1	<b>Give the correct reason why are red fringes formed on the screen</b> Constructive interference // crest meet crest // trough meet trough // diagram	
(c)	1	<b>Give the correct substitution</b> $\left( (5 \times 10^{-4}) \left( \frac{1.5 \times 10^{-2}}{4} \right) \right) // \left( (5 \times 10^{-4}) (1.5 \times 10^{-3}) \right)$ 3	
	1	<b>Answer with the correct unit</b> $6.25 \times 10^{-7} \text{ m}$	
(d)(i)	1	<b>State what happen to the distance between two consecutive dark fringes</b> Decreases	
(d)(ii)	1	<b>Give the correct reason</b> Wavelength of red > green // $\lambda_{\text{red}} > \lambda_{\text{green}}$ // vice versa	
<b>TOTAL</b>	<b>6</b>		

QUESTION 4	Mark	Answer	Note
4 (a)	1	refraction	
(b)	1 1	Light ray travel from denser to less dense medium Refract away from normal	
(c)	1 1	13/8 1.625	
(d) (i)	1	Distance from the base of the beaker decrease	
(d) (ii)	1	Apparent depth increase	
<b>TOTAL</b>	<b>7</b>		

QUESTION 5	Mark	Answer	Note
(a)	1	<b>Name the working principle correctly,</b> Thermal equilibrium	
(b)	1	<b>Give the correct comparison about the mass of the water.</b> Mass of the water in Diagram 5.2 > 5.1	
(c)(i)	1	<b>Give the correct comparison about the thermometer reading</b> The reading in of thermometer in 5.3 < 5.4	
(c)(ii)	1	<b>Give the correct comparison about the rate of heat loss</b> The rate of heat loss from water in Diagram 5.3 > 5.4	
(d)	1	<b>Give the correct comparison about the quantity of heat in the water in the glasses</b> Quantity of Heat in Diagram 5.4 > 5.3	
(e)	1	<b>State the relationship correctly</b> When the mass increases quantity of heat increases	
(f)	2	<b>Sketch the correct graph</b> 	
<b>TOTAL</b>	<b>8</b>		

QUESTION 6	Mark	Answer	Note
(a)	1	<b>State the meaning of induced current correctly,</b> Current produced when a conductor cuts a magnetic flux	
(b)(i)	1	<b>Give the correct comparison about the number of turns of the wire correctly</b> Equal// same	
(ii)	1	<b>Give the correct comparison about the strength of the magnetic correctly</b> Diagram 6.2>6.1	
(iii)	1	<b>Give the correct comparison about the induced current correctly</b> Diagram 6.2 > 6.1	
(c)(i)	1	<b>State the relationship between the strength of magnetic field and induce current correctly</b> The strength of magnetic field increases, the induced current increases// directly proportional	
(ii)	1	<b>Name the physics law involved correctly</b> Faraday	
(d)	1	<b>State the explanation correctly</b> The induced current flows in a direction to produce north pole at the solenoid Same pole repel	
<b>TOTAL</b>	<b>8</b>		

QUESTION 7	Mark	Answer	Notes
(a)	1	The process in which unstable nucleus changes into a more stable nucleus by emitting radioactive radiation	
(b) (i)	1	$\alpha$ deflects to negative plate and $\beta$ deflects to positive plate	
	1	$\beta$ deflects more than $\alpha$	
(ii)	1	$\alpha$ positive charge	
	1	$\beta$ negative charge	
	1	mass $\alpha$ bigger than $\beta$	
(c)	1	Number of alpha particle = 2 // $226 + 4x = 234$ $x = 2$	
	1	number of beta = 2// $88 + 2x - y = 90$ $y = 2$	
(d)	1	$48 \text{ g} \rightarrow 24 \text{ g} \rightarrow 12 \text{ g} \rightarrow 6 \text{ g}$	
<b>TOTAL</b>	<b>10</b>		

QUESTION 8	Mark	Answer				Note																															
(a)	1	<b>Name the electronic component X correctly,</b> Transistor																																			
(b)	1	<b>Give the correct value of the potential difference across the electronic card detector.</b> <i>2V</i>																																			
(c)(i)	1	<b>Name the electronic component Y correctly,</b> Relay																																			
(c)(ii)	1	<b>Give the correct reason why the Y is used</b> As a switch of the secondary circuit / motor circuit																																			
(d)(i)	4	<table border="1"> <thead> <tr> <th></th> <th>Input P</th> <th></th> <th>Input Q</th> <th>Output R</th> </tr> </thead> <tbody> <tr> <td>Electronic card detector <i>Pengesan Kad Elektronik</i></td> <td>Input voltage at P <i>Beza keupayaan input di P</i></td> <td>Coin detector <i>Pengesan Duit Syiling</i></td> <td>Input voltage at Q <i>Beza keupayaan input di Q</i></td> <td></td> </tr> <tr> <td>No <i>Tidak</i></td> <td>0</td> <td>No <i>Tidak</i></td> <td>0</td> <td>0</td> </tr> <tr> <td>No <i>Tidak</i></td> <td>0</td> <td>Yes <i>Ya</i></td> <td>1</td> <td>1</td> </tr> <tr> <td>Yes <i>Ya</i></td> <td>1</td> <td>No</td> <td>0</td> <td>1</td> </tr> <tr> <td>Yes <i>Ya</i></td> <td>1</td> <td>Yes <i>Ya</i></td> <td>1</td> <td>1</td> </tr> </tbody> </table> <p><b>Complete the truth table correctly</b></p>						Input P		Input Q	Output R	Electronic card detector <i>Pengesan Kad Elektronik</i>	Input voltage at P <i>Beza keupayaan input di P</i>	Coin detector <i>Pengesan Duit Syiling</i>	Input voltage at Q <i>Beza keupayaan input di Q</i>		No <i>Tidak</i>	0	No <i>Tidak</i>	0	0	No <i>Tidak</i>	0	Yes <i>Ya</i>	1	1	Yes <i>Ya</i>	1	No	0	1	Yes <i>Ya</i>	1	Yes <i>Ya</i>	1	1	One mark for each row.
	Input P		Input Q	Output R																																	
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Yes <i>Ya</i>	1	No	0	1																																	
Yes <i>Ya</i>	1	Yes <i>Ya</i>	1	1																																	
(d)(ii)	1	<b>Give the correct name of the logic gate</b> OR -gate																																			
(d)(iii)	1	<b>Draw the correct symbol of the logic gate</b> 																																			
(e)	2	<b>Draw the correct circuit</b> <ul style="list-style-type: none"> <li>- Two switches in parallel</li> <li>- The circuit functioning</li> </ul> 																																			
<b>TOTAL</b>	<b>12</b>																																				

**SECTION B**

<b>QUESTION 9</b>	<b>Mark</b>	<b>Answer</b>	<b>Note</b>
(a)	1	Energy caused by position from ground..	
(b)(i)	1 1 1 1 1	The height of the ball at P > at Q Gravitational potential energy of the ball at P > at Q The velocity of the ball at Q > at P The Kinetic energy at Q > at P. The Kinetic energy increases as the gravitational potential energy decreases.	
(ii)	1	Principle of conservation of energy.	
(c)	1 1 1	Velocity increases Kinetic energy maximum / increases Based on the principle of conservation of energy, gravitational potential energy is zero because changed to maximum kinetic energy.	
(d)	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Semi circular curve shaped Exchange between kinetic energy and gravitational potential energy easily. Increasing / decreasing slope slightly Easily oscillates caused by changing of energy. Smooth surface Easily to moves // Reduce frictional force. Soft layer at the surface Reduce impulsive force when landing / accident. Strong material // concrete of foundation of the track. Withstand to the high force caused by jumping and landing.	
<b>TOTAL 10</b>	<b>20</b>		

<b>QUESTION 10</b>	<b>Mark</b>	<b>Answer</b>	<b>Note</b>
(a)	1	<b><i>State the meaning of cathode ray correctly</i></b> Cathode ray is a narrow beam of a fast electrons moving in a vacuum.	
(b)(i)	1	<b><i>State the charge of the cathode ray correctly.</i></b> Negative/ (-)	
(ii)	1 1	<b><i>Give the correct comparison about the voltage EHT and the deflection of the cathode ray correctly</i></b> Voltage of EHT in diagram 10.2> 10.1 The deflection in diagram 10.2>10.1	
(c)(i)	1	<b><i>State the relationship correctly</i></b> Voltage of EHT increases, the strength of electric field increases // directly proportional	
(c)(ii)	1	The strength of electric field increases , the deflection	

		of the cathode ray increases// directly proportional																	
(d)	1 1 1 1 1	<b><i>Give the explanation for forming the shadow correctly</i></b>  The cathode is heated emits electrons The electron/cathode ray accelerated Cathode rays travel in a straight line. Cathode rays is blocked by maltase cross Cathode rays carry kinetic energy and converts to light energy when they hit the screen.	<b>MAX 4</b>																
(e)	1,2 3,4 5,6  7,8 9,10 11,12 13,14	<table border="1"> <thead> <tr> <th><b><i>Component</i></b></th><th><b><i>Function</i></b></th></tr> </thead> <tbody> <tr> <td>Filament</td><td>To heat up the cathode</td></tr> <tr> <td>Cathode</td><td>Emits electrons</td></tr> <tr> <td>Control Grid</td><td>Controls the number of electrons// control the brightness of the image on the screen</td></tr> <tr> <td>Focusing anode</td><td>Focuses the electrons into a beam</td></tr> <tr> <td>Accelerating anode</td><td>To accelerate electrons to towards the screen</td></tr> <tr> <td>Y-plates</td><td>To deflect the electron beam vertically</td></tr> <tr> <td>X-plates</td><td>To deflect the electron beam horizontally</td></tr> </tbody> </table>	<b><i>Component</i></b>	<b><i>Function</i></b>	Filament	To heat up the cathode	Cathode	Emits electrons	Control Grid	Controls the number of electrons// control the brightness of the image on the screen	Focusing anode	Focuses the electrons into a beam	Accelerating anode	To accelerate electrons to towards the screen	Y-plates	To deflect the electron beam vertically	X-plates	To deflect the electron beam horizontally	<b>MAX 10</b>
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<b>TOTAL</b>	<b>20</b>																		

**SECTION C**

<b>QUESTION 11</b>	<b>Mark</b>	<b>Answer</b>	<b>Note</b>
(a)(i)	1	<b>State Archimedes principal as</b> Buoyant force equal to weight of fluid displaced	
(ii)	1 1 1 1	Volume of air displaced equal to volume of a balloon Density of air decreased as a altitude increase Weight of displaced air become smaller At certain height weight of displaced air equal to weight of the balloon	
(iii)	1 1 1 1 1 1 1 1 1 1 1 1 1 1	Large balloon To produce bigger buoyant / up thrust // Increase the volume of the air displaced Low density of gas filled in the balloon Lighter Synthetic nylon Light-weight, strong and air-proof material Low mass of radiosonde instrument To produce a bigger upward resultan force R is choosen Large balloon/low density of gas /synthetic nylon / low mass of radiosonde instrument	
( b )( i )	1 1	<b>Giving a correct equation / Substitute the equation correctly</b> mass = density x volume <b>Correct answer with unit</b> $m=0.216\text{kg}$	
(b)(i)	1 1 1	<b>show the volume of displaced air</b> $V= 1.2\text{m}^3$ <b>Calculate mass of displaced air correctly</b> $m= 1.56\text{kg}$ <b>Calculate weight of displaced air correctly and state that bouyant force equal to weight of displaced air</b> $= 15.6\text{N}$	
<b>TOTAL</b>	<b>20</b>		

<b>QUESTION 12</b>	<b>Mark</b>	<b>Answer</b>	<b>Notes</b>
(a)	1	Electric field is a region around a charged object which	

		any other charged body experience a force	
(b)	1 1 1 1	Charges on the disc neutralize the negative charges on the ping pong ball Likes charges on the disc and the ball repelled each other The ball attracted by the positively charged disc The ball oscillates between the two plates	
(c)	1,2 3,4 5,6 7,8 9,10	aspects Fuse for each circuit Bulbs and power sockets arrange in parallel Circuit for lighting is in parallel with power circuit Kilowatt-hour meter installed near main fuse Circuit L	explanation Cut off current if overloaded Other bulb or power socket still working when one of it blows out Supply different value of current Record total power usage and prevent overloading of current (state all correct aspects)
(d)(i)	1 1 1 1 1	10 – 13 A $V = IR$ $= 9 \times 26.7$ $= 240.3 \text{ V}$ $P = IV$ $= 9 \times 240.3$ $= 2162.7 \text{ W}$	Gantian Jawapan dan unit Gantian Jawapan dan unit
<b>Total</b>	<b>20</b>		

4531/3

**Fizik****Kertas 3****Ogos****2009** $1\frac{1}{2}$  jam

No Kad Pengenalan :

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Nama : \_\_\_\_\_

Tingkatan : 5 \_\_\_\_\_



**PEPERIKSAAN PERCUBAAN 2009  
SIJIL PELAJARAN MALAYSIA**

**JABATAN PELAJARAN TERENGGANU**

**PHYSIC  
FIZIK**

Paper 3  
Kertas 3

One hour and thirty minutes  
Satu jam tiga puluh minit

**DO NOT OPEN THIS QUESTION PAPER  
UNTIL TOLD**

***JANGAN BUKA KERTAS SOALANINI  
SEHINGGA DIBERITAHU***

Section	Question	Full marks	Marks obtain
A	1	16	
	2	12	
B	3	12	
	4	12	
Total			

1. Write your **name, identity card numbers** and form in the space provided  
*Tuliskan nama, nombor kad pengenalan dan tingkatan anda pada ruang yang disediakan..*
2. Candidate is required to read information on page 2.  
*Calon dikehendaki membaca maklumat di halaman 2 dan halaman 3.*

This question paper contain 17 printed pages  
Kertas soalan ini mengandungi 17 halaman bercetak.

**INFORMATION FOR CANDIDATES  
MAKLUMAT UNTUK CALON**

- 1 **This question paper consists of two sections:** Section A and Section B.  
*Kertas soalan ini mengandungi dua bahagian : Bahagian A dan Bahagian B.*
- 2 **Answer all question. Write your answers in the spaces provided in the question paper.**  
*Jawab semua soalan dalam Bahagian A. Jawapan kepada Bahagian A hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*
- 3 **Answer all question from Section A and one question from Section B. Answer questions in Section A and Section B in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.**  
*Jawab satu soalan daripada Bahagian B. Jawapan kepada Bahagian B hendaklah ditulis pada halaman bergaris yang disediakan di Bahagian Akhir kertas soalan ini. Anda diminta menjawab dengan lebih terperinci. Jawapan mestilah jelas dan logik. Persamaan, gambar rajah jadual graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
- 4 **If you wish to cancel any answer, neatly cross out the answer.**  
*Sekiranya anda hendak membatalkan sesuatu jawapan, buatkan garisan di atas jawapan itu.*
- 5 **The diagram in the question provided are not drawn to scale unless stated.**  
*Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*
- 6 **The marks allocated for each question or part question are shown in brackets.**  
*Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.*
- 7 You may use a non-programmable scientific calculator  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh digunakan diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan.*
- 8 **The time suggested to answer Section A is 90 minutes, Section B is 30 minutes and Section C is 30 minutes.**  
*Masa yang dicadangkan untuk menjawab Bahagian A ialah 90 minit, Bahagian B ialah 30 minit dan Bahagian C ialah 30 minit.*

Section A  
*Bahagian A*  
[28 marks]

[28 markah]

Answer **all** questions in this section  
*Jawab semua soalan dalam bahagian ini.*

Time suggestion in this section is 60 minutes  
*Masa yang dicadangkan untuk menjawab bahagian ini ialah 60 minit.*

1. A student carries out an experiment to investigate the relationship between pressure,  $P$  and volume,  $V$ , for about three-quarters full of air in a syringe as shown as in Figure 1.1

The smallest scale of the syringe is **2.5 cm<sup>3</sup>**

*Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara tekanan,  $P$ , dengan isipadu,  $V$ , bagi kira-kira tiga -suku udara yang terperangkap dalam sebuah picagari seperti yang ditunjukkan pada Rajah 1.1*

*Skala terkecil picagari adalah 2.5 cm<sup>3</sup>.*

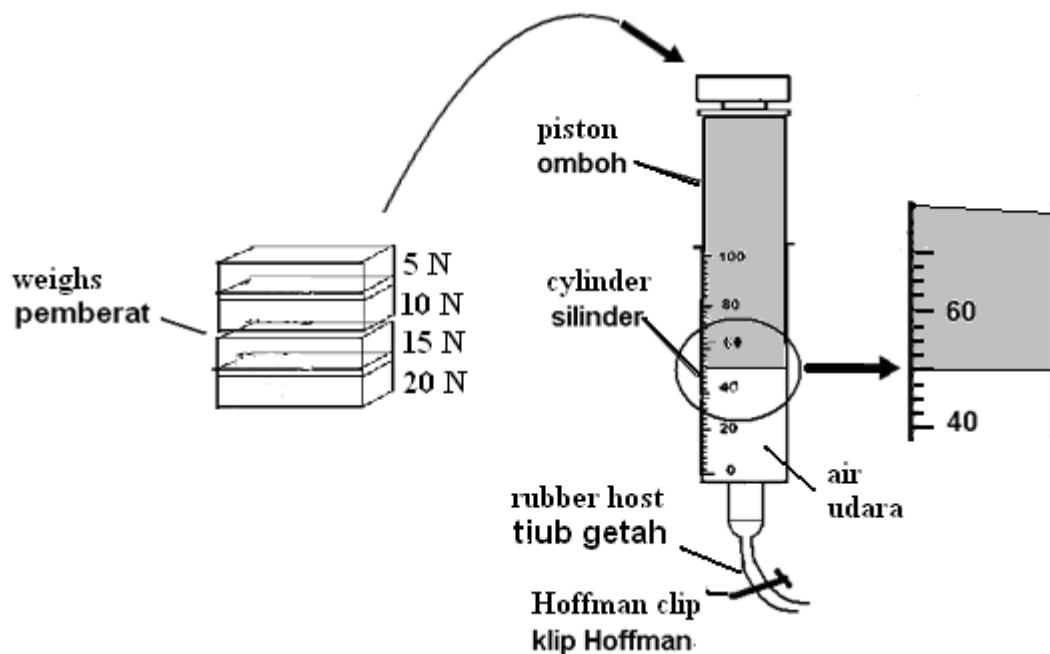


FIGURE 1.1  
RAJAH 1.1

The student starts the experiment with puts the 5N weighs on the top of syringe as shown in Figure 1.2. Then the volume,  $V$  of trapped air in the syringe is recorded.

The experiment is repeated with weighs of 10 N, 15 N, 20 N, 25 N and 30 N as shown in Diagram 1.3, 1.4, 1.5, 1.6 and 1.7.

*Pelajar tersebut memulakan eksperimen dengan meletakkan pemberat 5N di atas picagari seperti dalam Rajah 1.2. Kemudian isipad uudara terperangkap , V didalam picagari dicatatkan.*

*Eksperimen diulang dengan pemberat 10 N, 15 N, 20 N, 25 N dan 30N seperti yang ditunjukkan pada Rajah 1.3, 1.4, 1.5, 1.6 and 1.7.*

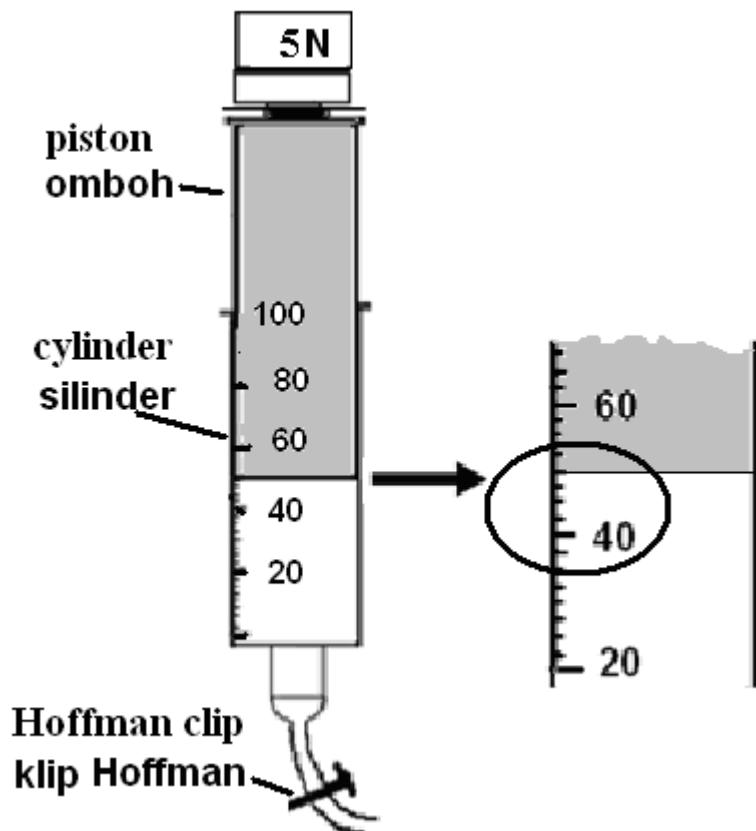


DIAGRAM 1.2  
RAJAH 1.2

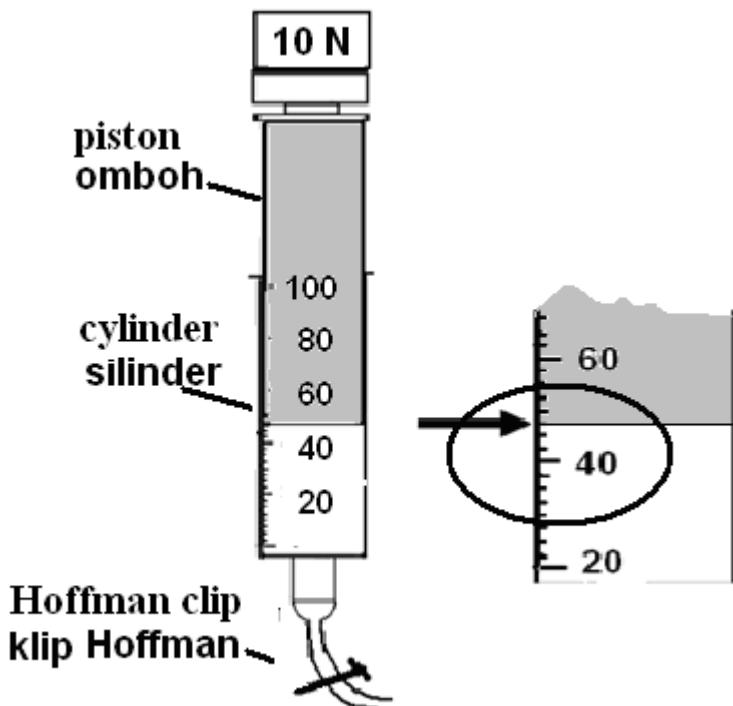


DIAGRAM 1.3  
RAJAH 1.3

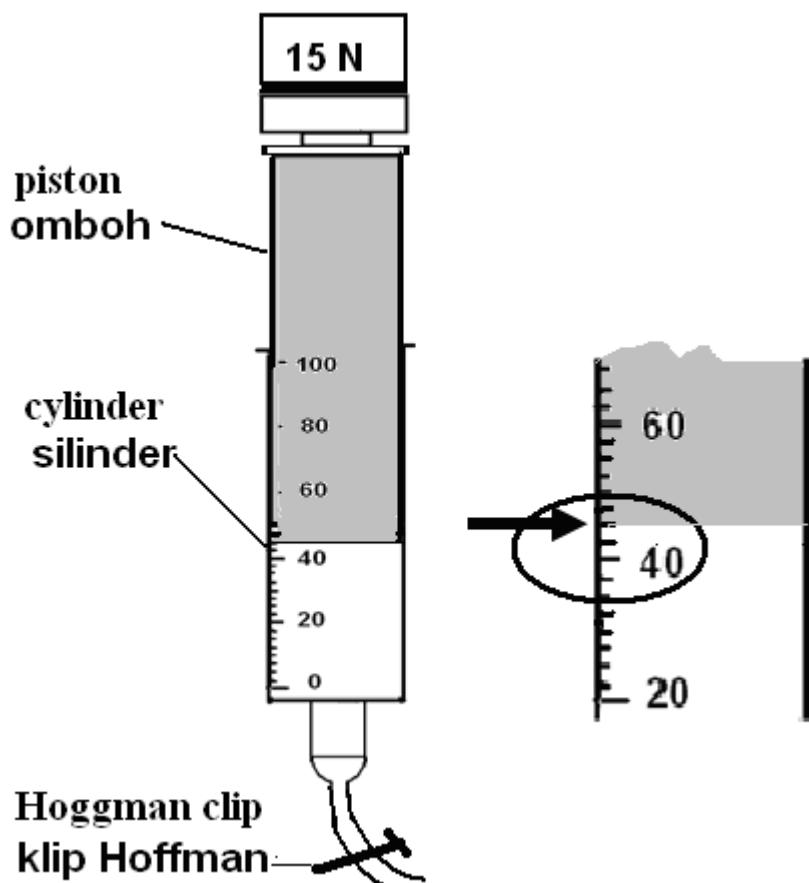


DIAGRAM 1.4  
RAJAH 1.4

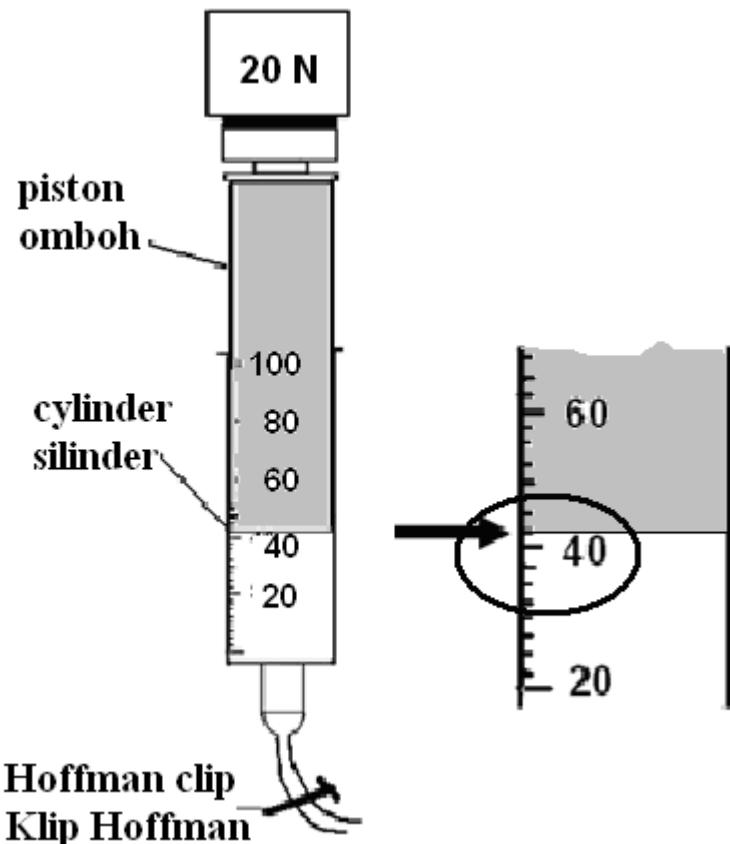


DIAGRAM 1.5  
RAJAH 1.5

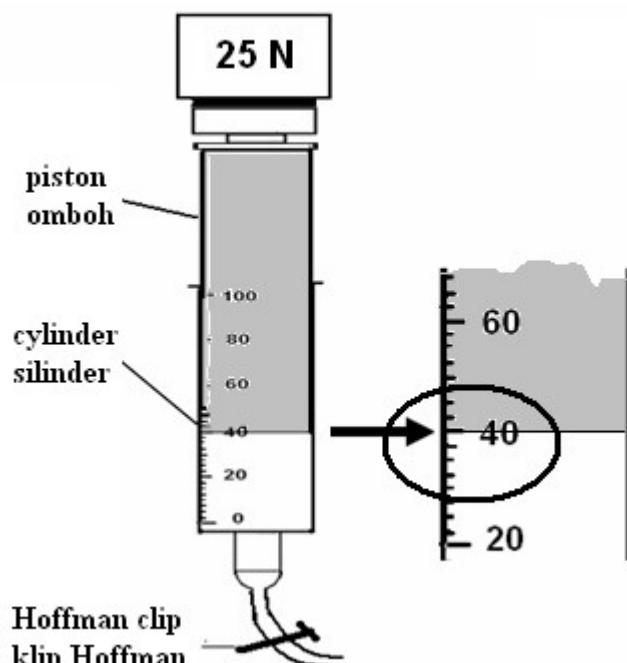


DIAGRAM 1.6  
RAJAH 1.6

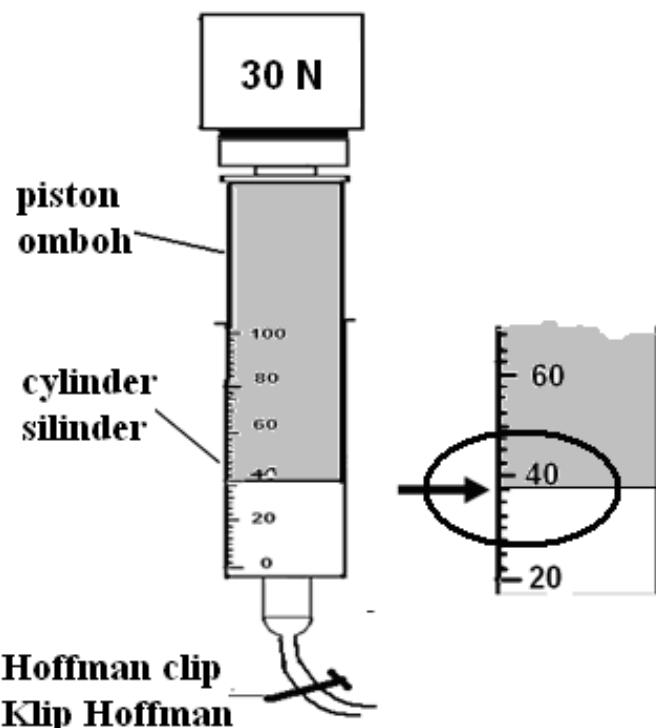


DIAGRAM 1.7  
RAJAH 1.7

- (a) For experiment described on page 3 and 4, identify :  
*Untuk eksperimen yang diterangkan pada muka surat 3 dan 4, kenalpasti;*

- (i) The manipulated variable  
*pembolehubah dimanipulasikan.*

[1 mark]  
[1 markah]

- (ii) The responding variable  
*pembolehubah bergerakbalas.*

[1 mark]  
[1 markah]

- (iii) The constant variable  
*pembolehubah yang dimalarkan.*

[1 mark]  
[1 markah]

- (b) Based on Diagram 1.2 , 1.3, 1.4 , 1.5 , 1.6 and 1.7 on page 4, 5, 6 and 7:  
*Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5, 1.6 dan 1.7 di halaman 4, 5, 6 dan 7:*

- (i) Record the pressure,  $P$ , volume,  $V$  and the reciprocal of volume,  $\frac{1}{V}$ , of difference weight of 5 N, 10 N, 15 N, 20 N, 25 N and 30 N.

The pressure,  $P$  can be calculate with formula  $P = \frac{W}{A} + 10$  and the cross sectional area of syringe,  $A$  is  $10.0 \text{ cm}^2$ .

*Catatkan tekanan,  $P$ , isipadu,  $V$  dan salingan isipadu,  $\frac{1}{V}$  bagi pemberat yang berlainan 5N, 10 N, 15 N, 20 N, 25 N dan 30 N.*

*Tekanan  $P$  boleh dihitung dengan menggunakan formula  $P = \frac{W}{A} + 10$  dan luas keratin rentas picagari ,  $A$  ialah  $10.0 \text{ cm}^2$ .*

- (ii) Tabulated your result for all values of  $W$ ,  $P$ ,  $V$  and  $\frac{1}{V}$  in the space below.

*Jadualkan keputusan anda bagi  $W$ ,  $P$ ,  $V$  dan  $\frac{1}{V}$ , pada ruang di bawah.*

[ 5 marks ]  
[5 markah ]

- (c) On the graph paper, plot a graph of  $P$  against  $\frac{1}{V}$

*Di atas kertas graf, lukiskan graf  $P$  melawan  $\frac{1}{V}$*

[ 7 marks]  
[7 markah ]

- (d) Based on your graph in 1(c), state the relationship between  $P$  and  $\frac{1}{V}$

*Berdasarkan graf anda, nyatakan hubungan antara  $P$  dengan  $\frac{1}{V}$*

.....  
[1 mark ]  
[1 markah]

Graf  $P$  melawan

Graph  $P$  against

- 2** A student carries out an experiment to investigate the relationship between the potential difference across a battery,  $V$  and the current flows it,  $I$ . He used ammeter, rheostat, and voltmeter which connected as shown in the Diagram 2.1.

*Seorang pelajar menjalankan eksperimen untuk menyiasat hubungan antara beza keupayaan yang merentasi bateri  $V$  dengan arus yang mengalir,  $I$ . Pelajar itu menggunakan ammeter, reostat dan voltmeter yang disambungkan seperti dalam Rajah 2.1*

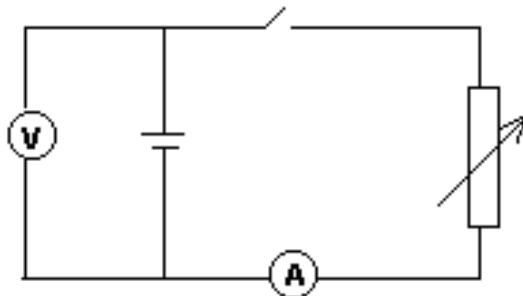


DIAGRAM 2.1  
RAJAH 2.1

The results of the experiment is shown in graph of  $V$  against  $I$  as shown in Diagram 2.2

*Keputusan eksperimen ditunjukkan dalam graf  $V$  lawan  $I$  seperti ditunjukkan dalam Rajah 2.2*

- (a) Based on the graph in Diagram 2.2, determine the value of  $V$  when  $I = 0.40 \text{ A}$   
Show on the graph, how you determine the value of  $V$ .  
*Berdasarkan graf dalam Rajah 2.2, tentukan nilai  $V$  bila  $I = 0.40 \text{ A}$   
Tunjukkan di atas graf bagaimana anda menentukan nilai  $V$*

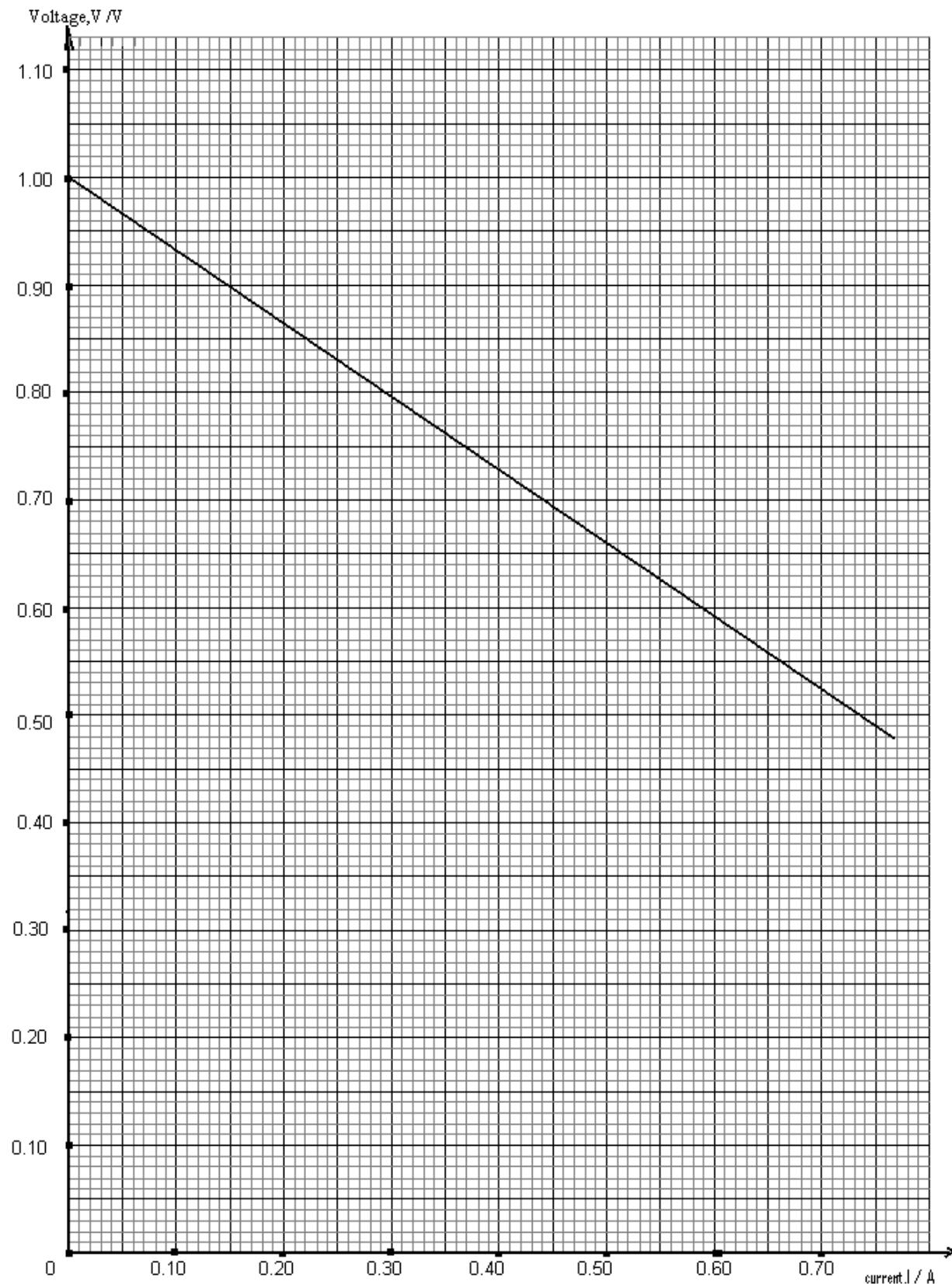
[ 3 marks]  
[3 markah]

- (b) What will happen to the value of  $V$ , if the current flows increase?  
*Apakah yang akan berlaku terhadap nilai  $V$ , jika arus yang mengalir bertambah.*

[ 1 mark]  
[1 markah]

- (c) The gradient of the graph represent to the internal resistance of the battery,  $r$ . State how the resistance varies with current  
*Kecerunan graf itu mewakili rintangan dalam sel itu,  $r$ . nyatakan bagaimana rintangan berubah dengan arus*

[ 1 mark]  
[1 markah]



**DIAGRAM 2.2**  
**RAJAH 2.2**

- (d) (i) Calculate the gradient,  $r$  of the graph.  
Show on the graph how you determine value of  $r$ .

*Kirakan kecerunan,  $r$  graf tersebut.  
Tunjukkan di atas graf bagaimana nilai  $r$  ditentukan*

$r = \dots\dots\dots\dots\dots$  [ 3 marks]  
[3 markah]

- (ii) Calculate the electromotive force,  $E$ , of the battery using formula  $E = V + Ir$ , Where  $r$  is gradient of the graph,  $V$  and  $I$  is voltage and current which are correspondence

*Kirakan pemalar Daya gerak elektrik bateri itu,  $E$ , dengan menggunakan formula  $E = V + Ir$ , di mana  $r$  ialah kecerunan graf itu,  $V$  dan  $I$  ialah Voltan dan arus yang sepadan.*

[3 marks]  
[3 markah]

- (d) State one precaution that should be taken to improved the results of the experiment.  
*Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk memperbaiki keputusan eksperimen*

..... [1 mark]  
[1 markah]

**Section B**  
**Bahagian B**  
[12 marks]  
[12 markah]

Answer any **one** from this section  
*Jawab mana-mana **satu** soalan dari bahagian ini*

- 3 Diagram 3.1 shows the part a floating cargo ship that is above water when it is fully loaded with cargo. Diagram 3.2 shows the part of the ship when most of the cargo has been removed.

*Rajah 3.1 menunjukkan bahagian yang terapong sebuah kapal kargo di atas air bila kapal itu penuh dengan muatan kargo. Rajah 3.2 menunjukkan bahagian kapal itu bila sebahagian besar muatannya telah di punggah.*

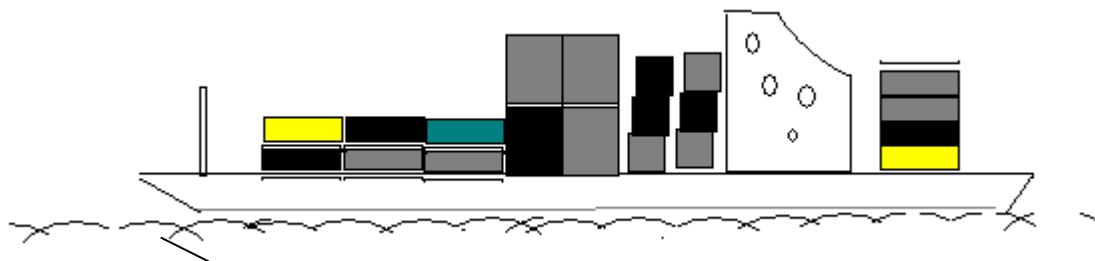


DIAGRAM 3.1  
RAJAH 3.1

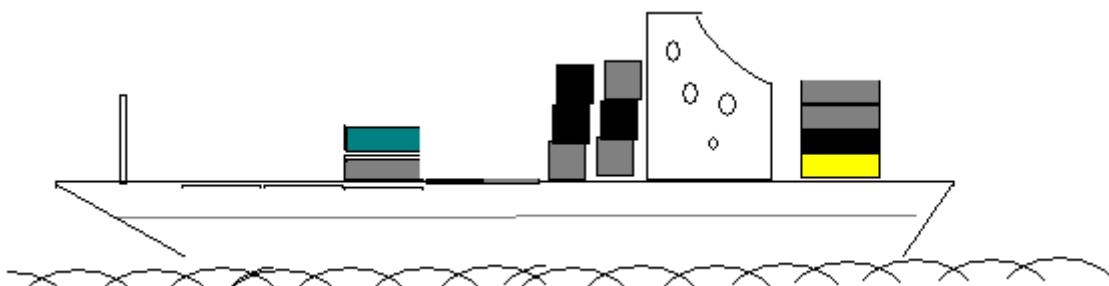


DIAGRAM 3.2  
RAJAH 3.2

Based on the information and observation above ;  
*Berdasarkan maklumat dan pemerhatian di atas;*

- (a) State **one** suitable inference.  
*Nyatakan **satu** inferensi yang sesuai.* [1 mark] [1 markah]
- (b) State **one** suitable hypothesis.  
*Nyatakan **satu** hipotesis yang sesuai.* [1 mark] [1 markah]
- (c) With the use of apparatus such as test tube , measuring cylinder,lead shot and others, describe an experiment framework to investigate the hypothesis stated in 4(b)

*Dengan menggunakan radas seperti tabung uji, selinder penyukat, butir plumbum dan lain-lain , terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan dalam 4(b)*

In your description, state clearly the following  
*Dalam penerangan anda jelaskan perkara berikut :*

- i) Aim of the experiment.  
*Tujuan eksperimen.*
- ii) Variables in the experiment.  
*Pembolehubah dalam eksperimen.*
- iii) List of apparatus and materials.  
*Senarai radas dan bahan*
- iv) Arrangement of the apparatus.  
*Susunan radas.*
- v) The procedure of the experiment which include **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.  
*Prosedur eksperimen termasuk **satu** kaedah mengawal pembolehubah dimanipulasikan dan **satu** kaedah mengukur pembolehubah bergerak balas.*
- vi) The way you would tabulate the data.  
*Penjadualan data.*
- vii) The way you would analyse the data.  
*Cara menganalisis data.*

[10 marks ]  
[10 markah]

- 4 Diagram 4.1 shows the interference pattern of monochromatic light after passing through a double slit. Same experiment is repeated by using longer wavelength of monochromatic light. The result is shown in Diagram 4.2

*Rajah 4.1 menunjukkan corak interferensi cahaya monokromat selepas melalui satu dwicelah. Eksperimen yang sama diulang dengan menggunakan cahaya monokromat yang mempunyai panjang gelombang yang lebih panjang. Keputusannya ditunjukkan dalam Rajah 4.2*

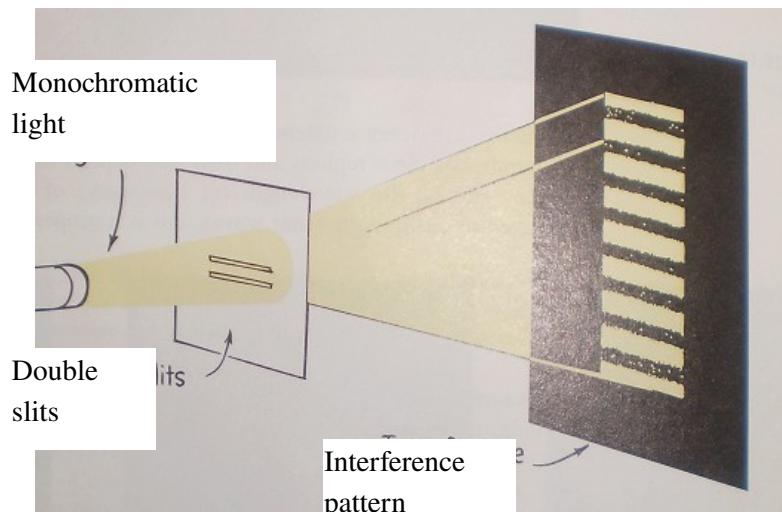


DIAGRAM 4.1  
RAJAH 4.1

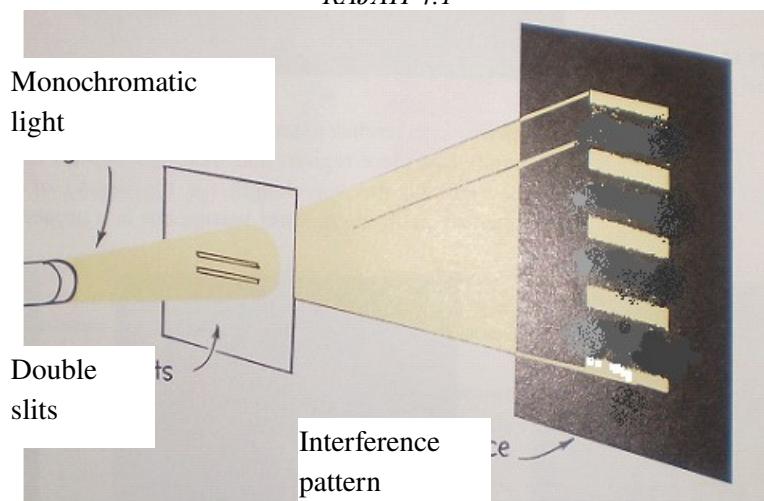


DIAGRAM 4.2  
RAJAH 4.2

Based on the observation above and your knowledge on waves phenomena;  
*Berdasarkan pemerhatian di atas dan pengetahuan anda mengenai fenomena gelombang;*

- (a) State **one** suitable inference.  
*Nyatakan **satu** inferensi yang sesuai.*

[1 mark]

[1 markah]

- (b) State **one** suitable hypothesis.  
*Nyatakan satu hipotesis yang sesuai.*

[1 mark]  
[1 markah]

- (c) With the use of apparatus such as ripple tank, motor, wooden rod and others, describe an experiment framework to investigate the hypothesis stated in 4(b)

*Dengan menggunakan radas seperti tangki riak, motor, kayu penggetar dan lain-lain, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan dalam 4(b)*

In your description, state clearly the following  
*Dalam penerangan anda jelaskan perkara berikut :*

- i) Aim of the experiment.  
*Tujuan eksperimen.*
- ii) Variables in the experiment.  
*Pembolehubah dalam eksperimen.*
- iii) List of apparatus and materials.  
*Senarai radas dan bahan*
- iv) Arrangement of the apparatus.  
*Susunan radas.*
- v) The procedure of the experiment which include **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.  
*Prosedur eksperimen termasuk satu kaedah mengawal pembolehubah dimanipulasikan dan satu kaedah mengukur pembolehubah bergerak balas.*
- vi) The way you would tabulate the data.  
*Penjadualan data.*
- vii) The way you would analyse the data.  
*Cara menganalisis data.*

[10 marks ]  
[10 markah]

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

