4531/2
PHYSICS
Paper 2
September
2012
2 ½ hours

Index Number : .....

Name : .....

Class : .....

MAKTAB RENDAH SAINS MARA

SIJIL PELAJARAN MALAYSIA
TRIAL EXAMINATION 2012

PHYSICS
Paper 2

Two hours and thirty minutes

PHYSICS

Paper 2

Two hours and thirty minutes

DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO

1. Write down your index number, name and class in the space provided.

2. The questions are written in English and *bahasa Melayu.*

3. Candidates are required to read the information at the back of the Booklet.

For Examiner's Use			
Section	Question	Total Marks	Score Obtained
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	
		Total	

This booklet consists of 34 printed pages and 2 blank pages

[Turn page over

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

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

1 $v = \frac{s}{t}$

2 $a = \frac{v-u}{t}$

3 $v^2 = u^2 + 2as$

4 $s = ut + \frac{1}{2}at^2$

5 Momentum = mv

6 $F = ma$

7 Kinetic energy/*Tenaga kinetik* = $\frac{1}{2}mv^2$

8 Gravitational potential energy/ *Tenaga keupayaan gravity* = mgh

9 Elastic potential energy/ *Tenaga keupayaan kenyal* = $\frac{1}{2}Fx$

10 Density /*Ketumpatan*, $\rho = \frac{m}{V}$

11 Pressure/*Tekanan*, $P = \frac{F}{A}$

12 Pressure/*Tekanan*, $P = h\rho g$

13 Heat/*Haba*, $Q = mc\theta$

14 Heat/*Haba*, $Q = ml$

15 $\frac{PV}{T}$ = constant/*pemalar*

16 Atmospheric pressure at sea level/ *Tekanan atmosfera pada aras laut* = 1×10^5 Pa

17 $v = f\lambda$

18 Wavelength/*Panjang gelombang*, $\lambda = \frac{ax}{D}$

18 Power/*Kuasa*, $P = \frac{\text{energy / } tenaga}{\text{time / } masa}$

20 $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

21 Linear magnification/*Pembesaran linear*, $M = \frac{v}{u}$

22 Refractive index/*Indeks biasan*, $\eta = \frac{\sin i}{\sin r}$

23 Refractive index/*Indeks biasan*,

$$\eta = \frac{\text{real depth/}dalam\ nyata}{\text{apparent depth/}dalam\ ketara}$$

24 $Q = It$

25 $V = IR$

26 $E = VQ$

27 Power/*Kuasa*, $P = IV$

28 $\frac{N_s}{N_p} = \frac{V_s}{V_p}$

29 $E = mc^2$

30 Efficiency/*Kecekapan* = $\frac{I_s V_s}{I_p V_p} \times 100\%$

31 $g = 10\ \text{m s}^{-2}$

32 $c = 3.0 \times 10^8\ \text{m s}^{-1}$

33 $e = 1.6 \times 10^{-19}\ \text{C}$

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HALAMAN KOSONG

Section A
Bahagian A

[60 *marks*]
[60 *markah*]

Answer **all** questions in this section.

Jawab **semua** *soalan dalam bahagian ini.*

1 Diagram 1 shows the light ray MO directed to a plane mirror.

Rajah 1 menunjukkan pantulan satu sinar cahaya MO menuju ke satu cermin satah.

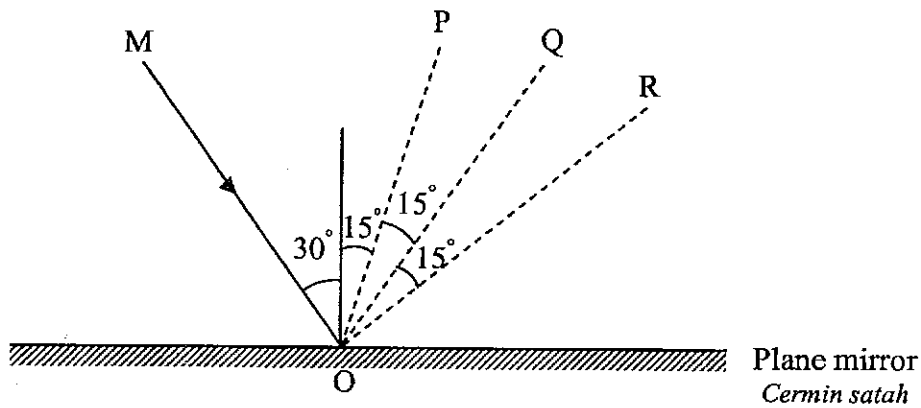


Diagram 1
Rajah 1

(*a*) Complete the sentences below by ticking (✓) the correct box.

Lengkapkan ayat di bawah dengan menanda (✓) kotak yang betul.

Wave classification for light wave is

Klasifikasi gelombang bagi cahaya ialah

☐ Longitudinal wave
Gelombang membujur

☐ Transverse wave
Gelombang melintang

[1 *mark*]
[1 *markah*]

1(*a*) 1

For Examiner's Use

(*b*) Based on Diagram 1, choose the **correct** reflected ray.

*Berdasarkan Rajah 1, pilih sinar pantulan yang **betul**.*

.....

[1 *mark*]
[1 *markah*]

1(*b*)

(*c*) Complete the sentences below by ticking (✓) the correct box.

Lengkapkan ayat di bawah dengan menanda (✓) kotak yang betul.

Upon reflection, the speed of light :.

Bila dipantulkan, kelajuan cahaya :

☐ remains unchanged
tidak berubah

☐ increases
bertambah

☐ decreases
berkurang

[1 *mark*]
[1 *markah*]

1(*c*) 1

(*d*) What is transferred by the wave ?

Apakah yang dipindahkan oleh gelombang tersebut?

.....

[1*mark*]
[1 *markah*]

1(*d*) 1

Total A1 4

2 Diagram 2 shows a helicopter moving with constant velocity at a height of 120 m.

Rajah 2 menunjukkan sebuah helikopter bergerak dengan halaju seragam pada ketinggian 120 m.

Diagram 2
Rajah 2

(*a*) What is the meaning of velocity ?

Apakah yang dimaksudkan dengan halaju?

2(*a*) 1

.....

[1 *mark*]
[1 *markah*]

(*b*) In Diagram 2, mark and label the vertical forces acting on the helicopter.

Pada Rajah 2, tanda dan label daya menegak yang bertindak pada helikopter tersebut.

2(*b*) 2

[2 *marks*]
[2 *markah*]

(*c*) The engine of the helicopter suddenly fails and the helicopter experiences free fall.

Calculate the final velocity of the helicopter before it touches the ground.

Enjin helikopter tiba-tiba tidak berfungsi dan helikopter mengalami jatuh bebas.

Kirakan halaju akhir helikopter sebelum ia mencecah bumi.

2(*c*) 2

Total A2 5

[2 *marks*]
[2 *markah*]

For Examiner's Use

3 Diagram 3 shows a mercury thermometer which has not been calibrated.

Rajah 3 menunjukkan termometer merkuri yang belum ditentukur.

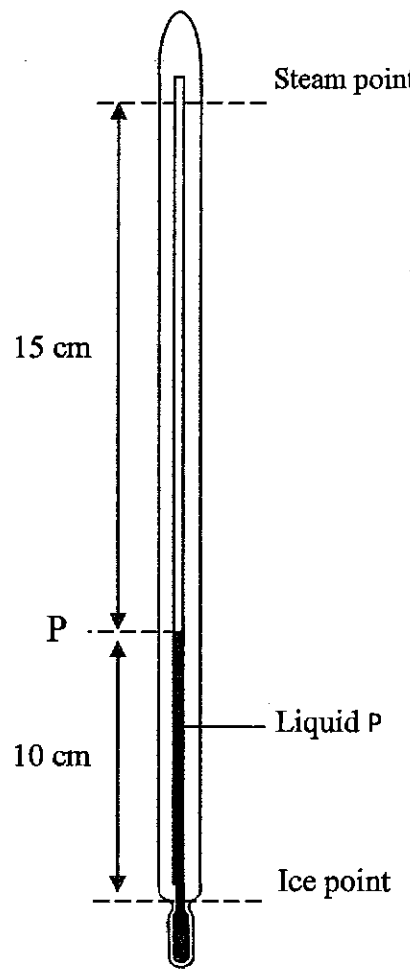


Diagram 3
Rajah 3

(*a*) (i) Name the physical quantity that changes as temperature increases.

Namakan kuantiti fizik yang berubah apabila suhu meningkat.

.....

[1 *mark*]
[1 *markah*]

3(*a*)(i) 1

(ii) Why is mercury used in the liquid-in-glass thermometer?

Mengapa merkuri digunakan di dalam termometer cecair dalam kaca?

.....

[1 *mark*]
[1 *markah*]

3(*a*)(ii) 1

(*b*) The length between the ice point and the steam point is marked into 100 equal divisions.

Calculate the temperature at P in °C.

Panjang di antara takat ais dan takat stim ditanda kepada 100 bahagian yang seragam.

Kirakan suhu pada P dalam °C.

[2 *marks*]
[2 *markah*]

3(*b*) 2

(*c*) Suggest one method to improve the sensitivity of the thermometer.

*Cadangkan **satu** kaedah untuk meningkatkan kepekaan termometer.*

.....

[1 *mark*]
[1 *markah*]

3(*c*) 1

(*d*) Name **one** liquid which is suitable for a liquid-in-glass thermometer to be used in the Artics.

*Namakan **satu** cecair yang sesuai bagi suatu termometer cecair-dalam-kaca yang akan digunakan di kawasan Artik.*

.....

[1 *mark*]
[1 *markah*]

3(*d*) 1

Total A3 6

For Examiner's Use

4 Diagram 4 shows the structure of an electron deflection tube. Through thermionic emission process electrons are produced.

Rajah 4 menunjukkan struktur sebuah tiub pemesongan elektron. Elektron dihasilkan melalui proses pancaran termion.

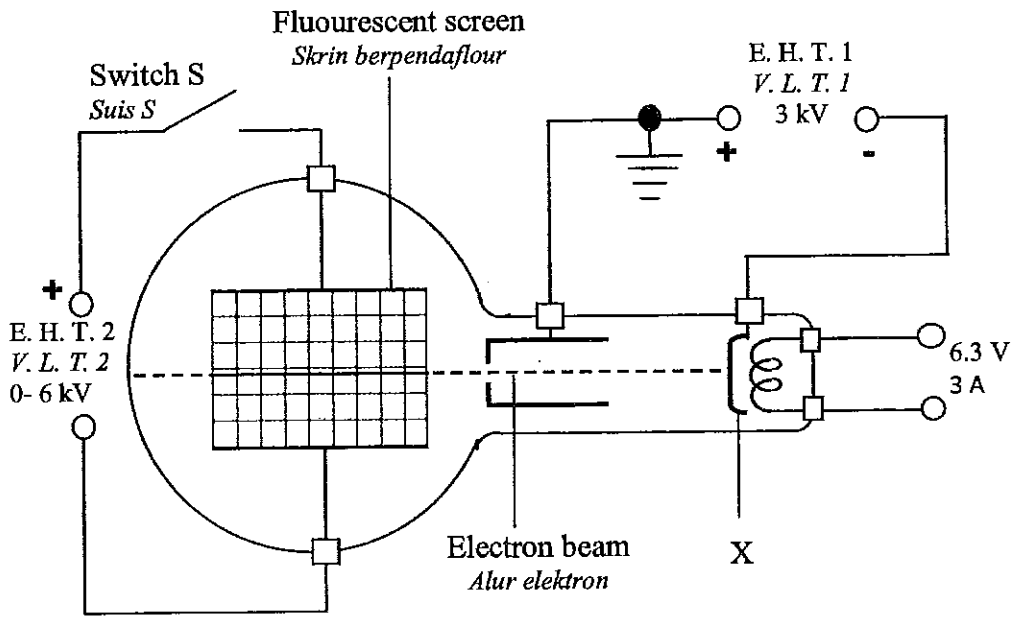


Diagram 4
Rajah 4

(*a*) What is the meaning of thermionic emission?

Apakah yang dimaksudkan dengan pancaran termion?

.....

[1 *mark*]
[1 *markah*]

4(*a*) 1

(*b*) (i) Name the structure labelled X.

Namakan bahagian berlabel X.

.....

[1 *mark*]
[1 *markah*]

4(*b*)(i) 1

(ii) On Diagram 4, draw the deflection of the electron beam when switch S is closed.

Pada Rajah 4, lukis pemesongan alur elektron apabila suis S ditutup.

[1 *mark*]
[1 *markah*]

4(*b*)(ii) 1

[Turn page over

(iii) What happens to the deflection of electron beam, if the voltage of the electric field is increased from 2 kV to 6 kV?

Apakah berlaku kepada pemesongan alur elektron jika voltan medan elektrik ditambah dari 2 kV kepada 6 kV?

4(*b*)(iii) 1

.....

[1 *mark*]
[1 *markah*]

(*c*) (i) Calculate the kinetic energy of an electron when it reaches the anode. (e = 1.6 x 10^{-19} C)

Kirakan tenaga kinetik elektron apabila tiba di anod.
(e = 1.6 x 10^{-19}C)

4(*c*)(i) 2

[2 *marks*]
[2 *markah*]

(ii) What happens to the kinetic energy in (*c*)(i) when the voltage of the E.H.T 1 is reduced?

Give the reason.

Apakah terjadi kepada tenaga kinetik di (c)(i) jika voltan V.L.T 1 dikurangkan?

Nyatakan sebabnya.

4(*c*)(ii) 1

.....

[1 *mark*]
[*1 markah*]

Total A4 7

For Examiner's Use

5 Diagram 5.1 shows the path of a light ray travelling in air and medium X.
Diagram 5.2 shows the path of a light ray travelling in air and medium Y.

Rajah 5.1 menunjukkan lintasan sinar cahaya dalam udara dan medium X.
Rajah 5.2 menunjukkan lintasan sinar cahaya dalam udara dan medium Y.

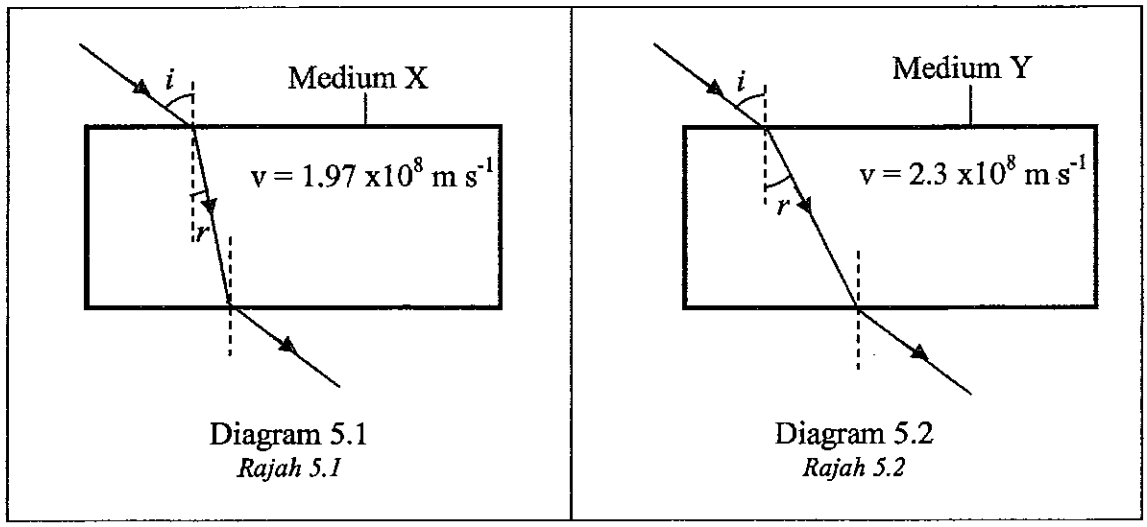


Diagram 5.1
Rajah 5.1

Diagram 5.2
Rajah 5.2

(a) Name the phenomenon shown in Diagram 5.1 and Diagram 5.2.
Namakan fenomena yang ditunjukkan di Rajah 5.1 dan 5.2.

.....

[1 *mark*]
[1 *markah*]

5(*a*) 1

(*b*) Based on Diagram 5.1 and Diagram 5.2 , compare
Berdasarkan Rajah 5.1 dan Rajah 5.2 bandingkan

(i) the angle *r*.
sudut r.

.....

[1 *mark*]
[*1 markah*]

5(*b*)(i) 1

(ii) the speed of light in medium X and medium Y.
kelajuan cahaya dalam medium X dan medium Y.

.....

[1 *mark*]
[*1 markah*]

5(*b*)(ii) 1

[Turn page over

(*c*) Based on the answers in 5(*b*),

Berdasarkan jawapan di 5(b),

(i) state the relationship between angle *r* and the speed of light.

nyatakan hubungan antara sudut r dan laju cahaya

5(*c*)(i) 1

.....

[1 *mark*]
[1 *markah*]

(ii) state the relationship between the speed of light and the density of the medium.

nyatakan hubungan antara laju cahaya dan ketumpatan medium.

5(*c*)(ii) 1

.....

[1 *mark*]
[1 *markah*]

(*d*) Based on the answers in 5(*c*), make a deduction on the relationship between the angle *r* and the density of the medium.

Berdasarkan jawapan di 5(c), buat satu deduksi tentang hubungkait antara sudut r dengan ketumpatan medium.

5(*d*) 1

.....

[1 *mark*]
[1 *markah*]

(*e*) What happens to the speed of light as it emerges from medium X?
Explain why.

Apakah yang berlaku kepada kelajuan cahaya apabila ia keluar dari medium X?
Jelaskan mengapa.

5(*e*) 2

.....

.....

.....

[2 *marks*]
[2 *markah*]

Total A5

8

For Examiner's Use

6 Diagrams 6.1 and 6.2 show the apparatus arrangement to study the effect of the number of turns of a solenoid on electromagnetic induction. The magnet bar is displaced downwards through the solenoid which is connected to a zero-centre galvanometer.

Rajah 6.1 dan 6.2 menunjukkan susunan radas untuk mengkaji kesan bilangan lilitan solenoid terhadap aruhan elektromagnet. Bar magnet di sesarkan ke bawah melalui solenoid yang di sambung ke galvanometer sifar tengah.

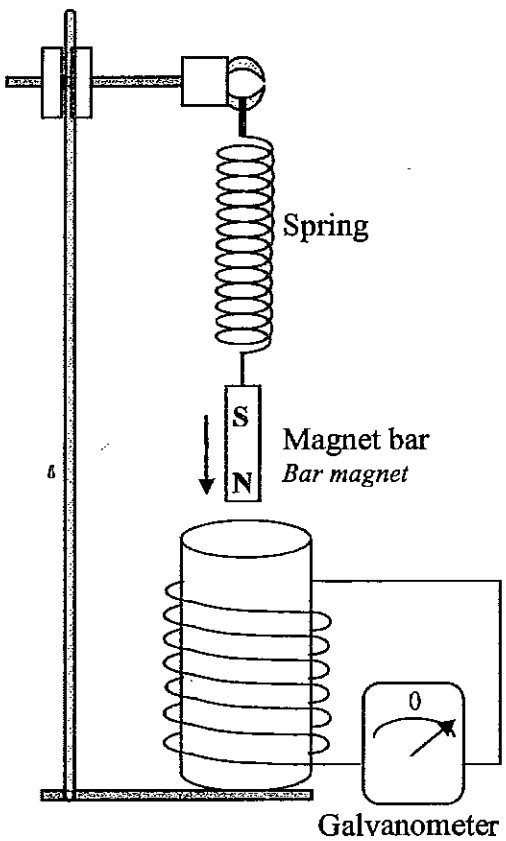


Diagram 6.1
Rajah 6.1

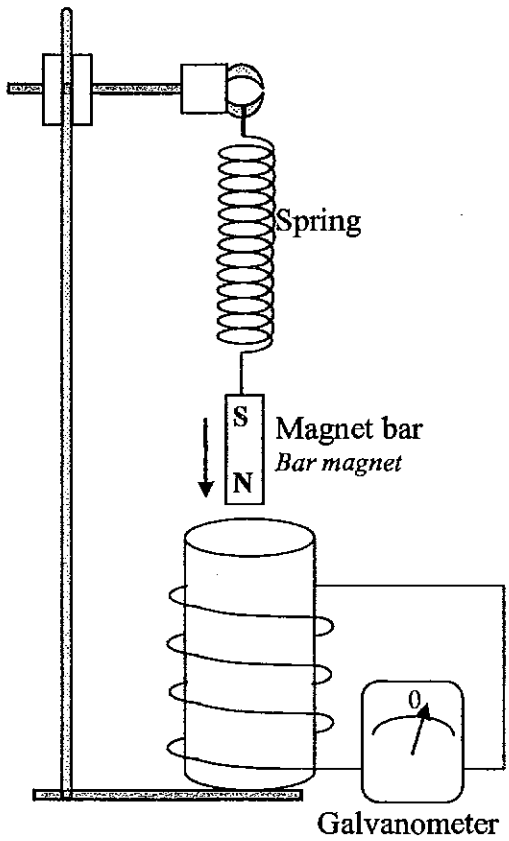


Diagram 6.2
Rajah 6.2

(*a*) What is meant by electromagnetic induction?

Apakah yang dimaksudkan dengan aruhan elektromagnet?

.....

[1 *mark*]
[1 *markah*]

6(*a*)

1

[Turn page over

(*b*) Observe Diagrams 6.1 and 6.2

Perhatikan Rajah 6.1 dan 6.2.

6(*b*)(i) 1

(i) compare the number of turns of the coil.

bandingkan bilangan lilitan gegelung.

.....

[1 *mark*]
[1 *markah*]

6(*b*)(ii) 1

(ii) compare the deflection of the galvanometer pointer.

bandingkan pesongan penunjuk galvanometer.

.....

[1 *mark*]
[1 *markah*]

6(*b*)(iii) 1

(iii) relate the number of turns of the coil and the deflection of the galvanometer pointer.

hubungkaitkan bilangan lilitan gegelung dengan pesongan penunjuk galvanometer.

.....

[1 *mark*]
[1 *markah*]

6(*b*)(iv) 1

(iv) relate the induced current and the rate of cutting of magnetic flux.

hubungkaitkan arus aruhan dengan kadar pemotongan fluks magnet.

.....

[1 mark]
[1 *markah*]

(*c*) Name the physics law that explains the comparison you made in (*b*).

Namakan hukum Fizik yang menerangkan perbandingan yang anda nyatakan di (b).

6(*c*) 1

.....

[1 *mark*]
[1 *markah*]

For Examiner's Use

6 *(d)* Diagram 6.3 shows the position of the bar magnet when it is being displaced downwards.

Rajah 6.3 menunjukkan kedudukan magnet bar apabila ia di sesarkan ke bawah.

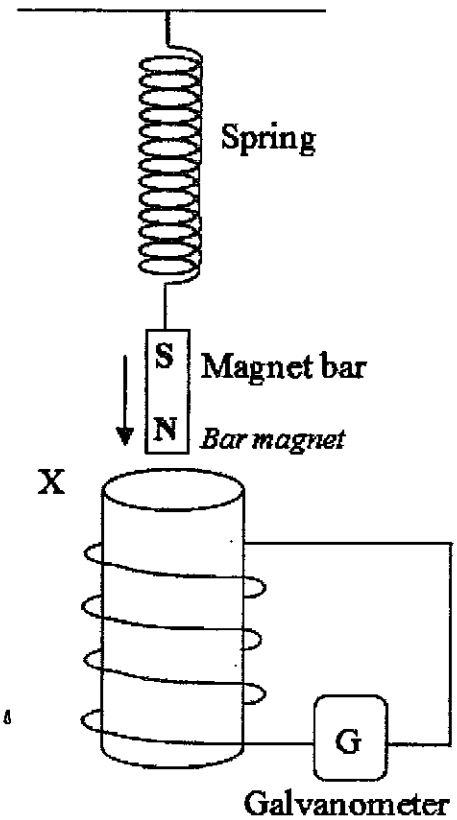


Diagram 6.3
Rajah 6.3

(*d*) Based on Diagram 6.3

Berdasarkan Rajah 6.3

(i) state the magnetic pole formed at end X of the solenoid.

nyatakan kekutuban magnet yang terbentuk di hujung X solenoid.

.....

[1 *mark*]
[1 *markah*]

6(*d*)(i) 1

(ii) mark the direction of the induced current in the solenoid in Diagram 6.3.

tandakan arah arus aruhan pada solenoid pada Rajah 6.3.

[1 *mark*]
[1 *markah*]

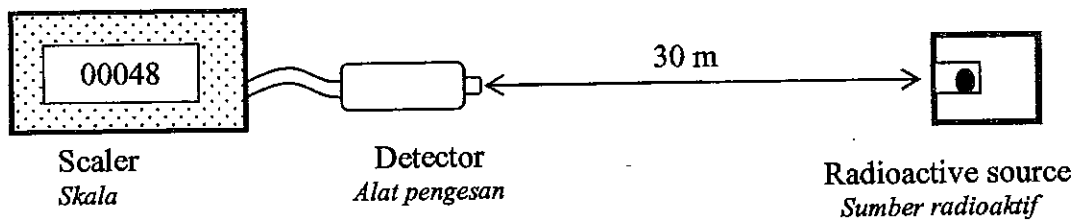
6(*d*)(ii) 1

Total A6 8

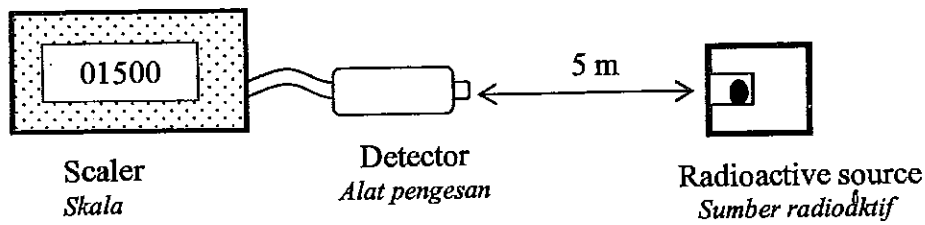
7 Diagrams 7.1 show a detector being used to measure the radioactivity count of a substance with a long half-life. Readings are taken for four different situations.

Rajah 7.1 menunjukkan satu alat pengesan digunakan untuk mengukur keradioaktifan bahan yang separuh hayatnya panjang. Bacaan diambil untuk empat situasi berbeza.

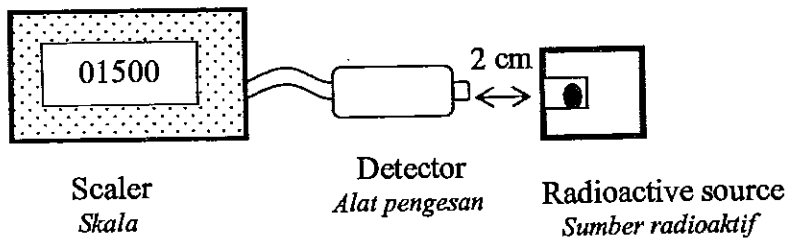
Situation 1



Situation 2



Situation 3



Situation 4

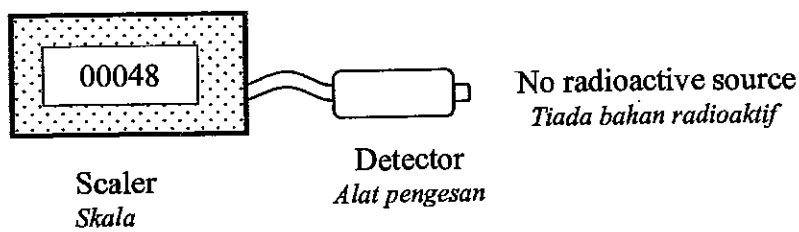


Diagram 7.1
Rajah 7.1

For Examiner's Use

(*a*) Name the detector used in this experiment.

Namakan alat pengesan yang digunakan dalam eksperimen ini.

.....

[1 *mark*]
[*1 markah*]

7(*a*) 1

(*b*) (i) State the radiation detected by the detector at the distance 5 m.

Namakan sinaran yang dikesan oleh alat pengesan pada jarak 5 m.

.....

[1 *mark*]
[1 *markah*]

7(*b*)(i) 1

(ii) What is the nature of the radiation in (*b*)(i)?

Apakah sifat semulajadi sinaran di (b)(i)?

.....

[1 *mark*]
[1 *markah*]

7(*b*)(ii) 1

The same radioactive source is then placed between two strong magnet bars as shown in Diagram 7.2.

Sumber radioaktif yang sama telah diletakkan di antara dua bar magnet yang kuat seperti ditunjukkan pada Rajah 7.2.

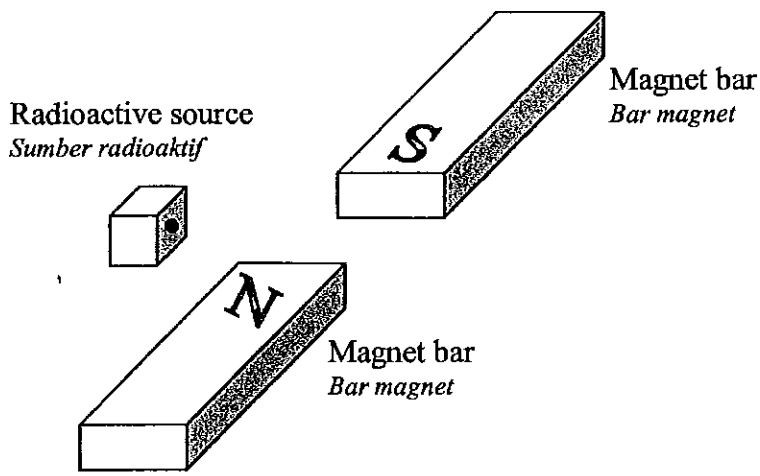


Diagram 7.2
Rajah 7.2

(*c*) On Diagram 7.2, draw the path of the radiation released by the source.

Pada Rajah 7.2, lukis laluan sinar yang dibebaskan oleh sumber tersebut.

[1 mark]
[*1 markah*]

7(*c*) 1

[Turn page over

(*d*) A fruit exporter wants to switch from the conventional method of making fruits stay fresh longer to the method of irradiation using radioisotopes. Some characteristics of radioisotopes need to be considered in order to choose a suitable radioisotope to be used for fruit irradiation.

Seorang pengeksport buah-buahan mahu menukar dari kaedah konvensional untuk mengekalkan kesegaran buah-buahannya kepada kaedah penyinaran menggunakan radioisotop. Beberapa ciri radioisotop perlu diambilkira dalam pemilihan radioisotop yang akan digunakan untuk penyinaran buah-buahan.

State the suitable property for the following characteristics and give one reason for the choice.

Nyatakan sifat-sifat yang sesuai bagi kaedah itu dan berikan satu sebab.

(i) Type of radiation for fruit irradiation

Jenis radiasi untuk penyinaran buah-buahan

.....

7(*d*)(i) 2

Reason:

Sebab

.....

[2 *marks*]
[*2 markah*]

(ii) Half-life of the radioisotope (radiation source)

Separuh hayat radioisotop (sumber sinaran)

.....

7(*d*)(ii) 2

Reason:

Sebab:

.....

[2 *marks*]
[*2 markah*]

(iii) Physical state of the radioisotope

Keadaan fizikal radioisotop

.....

7(*d*)(iii) 2

Reason:

Sebab:

.....

Total A7

[2 *marks*]
[*2 markah*]

10

For Examiner's Use

8 The set-up in Diagram 8.1 shows the basic working principle of a hydrometer. The depth to which the test tube sinks depends on the buoyant force acting on it.

Rajah 8.1 menunjukkan asas prinsip kerja sebuah hidrometer. Kedalaman tabung uji tenggelam bergantung kepada daya apungan yang bertindak ke atasnya.

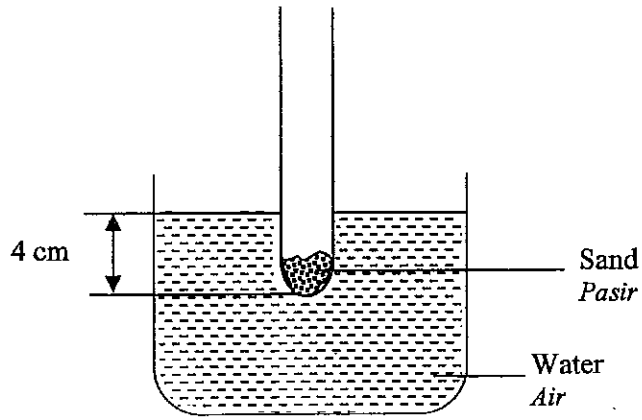


Diagram 8.1
Rajah 8.1

(*a*) Name the physics principle associated with the working of a hydrometer.

Namakan prinsip Fizik yang berkaitan dengan prinsip kerja sebuah hidrometer.

.....

[1 *mark*]
[*1 markah*]

8(*a*) 1

(*b*) State the relationship between buoyant force and the weight of the test tube.

Nyatakan hubungkait antara daya apungan dan berat tabung uji.

.....

[1 mark]
[*1 markah*]

8(*b*) 1

(c) (i) Calculate the buoyant force acting on the test tube when the total mass of the test tube and sand is 0.05 kg.

Kirakan daya apungan ke atas tabung uji apabila jumlah jisim tabung uji dan pasir adalah 0.05 kg.

8(c)(i)

2

[2 *marks*]
[2 *markah*]

(ii) The same test tube is then immersed in a beaker of petrol. Predict the length of the test tube that is submerged.

Explain your answer.

Tabung uji yang sama kemudiannya direndam dalam sebuah bikar berisi petrol. Ramalkan panjang tabung uji itu yang tenggelam.

Terangkan jawapan anda.

8(c)(ii)

2

.....

.....

.....

[2 *marks*]
[2 *markah*]

For Examiner's Use

(*d*) Table 8 shows some information on two *sampan* used to ferry passengers along the Perak River.

Jadual 8 menunjukkan maklumat mengenai dua buah sampan yang digunakan untuk membawa penumpang di sepanjang Sungai Perak.

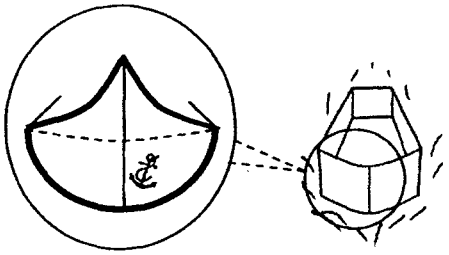
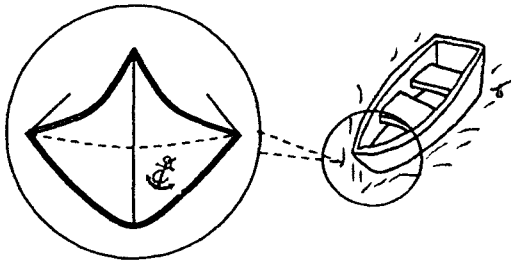
Sampan	Maximum mass of passengers/kg *Jisim maksimum penumpang/kg*	Shape of front end of sampan *Bentuk bucu hadapan sampan*
P	700	
Q	600	

Table 8
Jadual 8

Based on Table 8, state the suitable characteristics of the *sampan* to enable it to ferry the maximum mass of passengers.

Berdasarkan Jadual 8, nyatakan ciri-ciri sampan yang sesuai supaya dapat mengangkut penumpang yang maksimum.

(i) Shape of front end of the sampan
Bentuk bucu hadapan sampan

.....

Reason
Sebab

.....

[2 mar
[*2 mar*]

8(*d*)(i)

2

Diagram 8.2 shows a model of *sampan* P or Q used to ferry passengers.

Rajah 8.2 menunjukkan sebuah model sampan P atau Q yang digunakan untuk mengangkut penumpang.

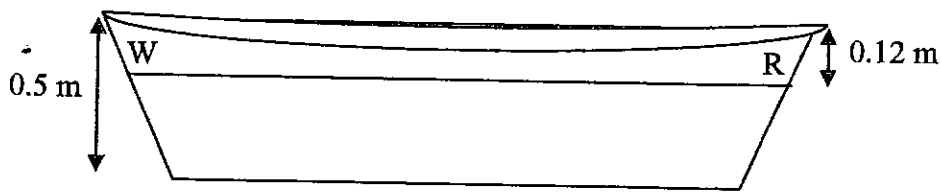


Diagram 8.2
Rajah 8.2

The *sampan* will sink if the water level exceeds line WR.
Sampan akan karam bila aras air melebihi garisan WR

The mass and average surface area of *sampan* P and Q are 100 kg and 2 m^2 respectively.

Jisim dan luas permukaan purata sampan P dan Q adalah 100 kg dan 2 m^2.

(ii) Calculate the maximum mass of passengers that can be ferried without exceeding the line WR.
(Density of river water : 1000 kg m^{-3})

Kirakan jisim maksimum penumpang yang boleh diangkut tanpa melebihi garisan WR.
(Ketumpatan air sungai : 1000 kg m^{-3})

8(*d*)(ii) 3

[3 *marks*]
[*3 markah*]

(iii) Which sampan is able to carry the maximum passengers without sinking?

Sampan manakah yang berupaya mengangkut semua penumpang tanpa tenggelam?

8(*d*)(iii) 3

.....

[1 *mark*]
[*1 markah*]

Total A8 12

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HALAMAN KOSONG

Section B

Bahagian B

[20 *marks*]

[20 *markah*]

Answer any **one** question from this section

Jawab mana-mana **satu** *soalan daripada bahagian ini*

9 Diagrams 9.1 (*a*) and 9.2 (*a*) show two bicycles moving at the same speed.

Rajah 9.1(a) dan Rajah 9.2 (a) menunjukkan dua buah basikal bergerak pada kelajuan yang sama.

Diagrams 9.1 (*b*) and 9.2 (*b*) show the condition of the tyres after the bicycles collided with a rock with the same collision time.

Rajah 9.1(b) dan Rajah 9.2(b) menunjukkan keadaan tayar basikal selepas berlanggar dengan seketul batu dengan masa perlanggaran yang sama.

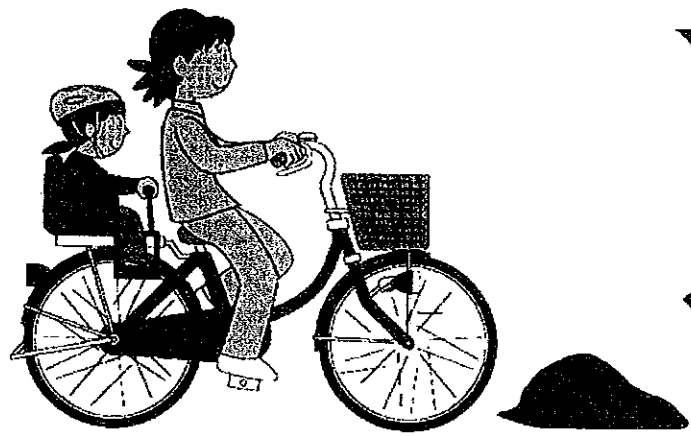


Diagram 9.1(*a*)

Rajah 9.1(a)

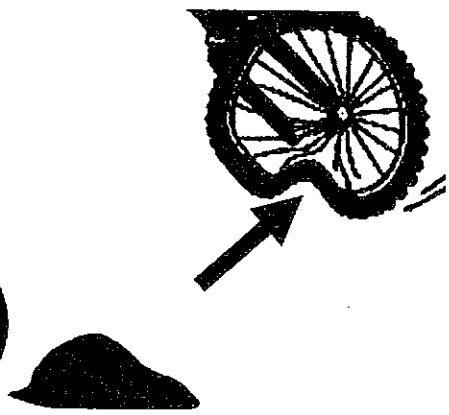


Diagram 9.1(*b*)

Rajah 9.1(b)

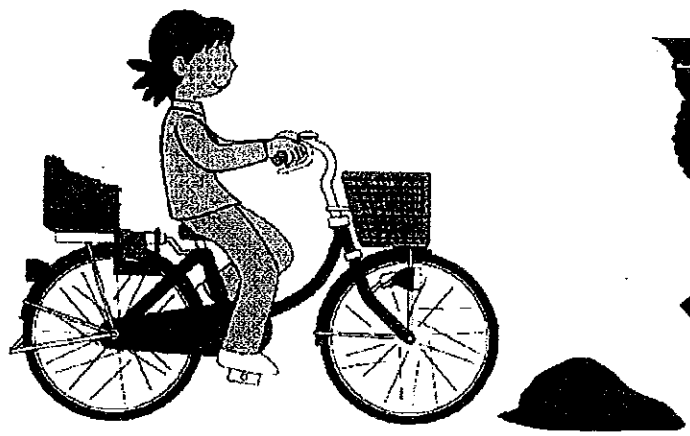


Diagram 9.2 (*a*)

Rajah 9.2 (a)

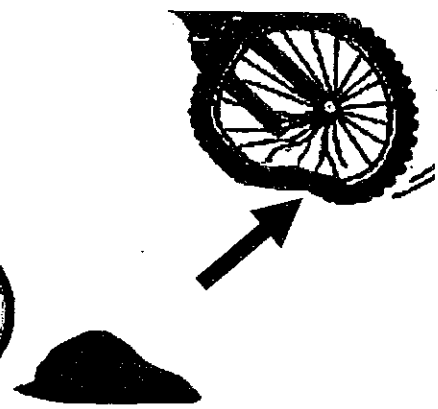


Diagram 9.2 (*b*)

Rajah 9.2 (b)

In both situations, the rider and the passenger experience a change in momentum.

Dalam kedua-dua situasi, penunggang dan penumpang mengalami perubahan momentum.

(*a*) What is the meaning of momentum? [1 *mark*]

Apakah yang dimaksudkan dengan momentum? [1 *markah*]

(*b*) Using Diagrams 9.1 and 9.2,

Dengan menggunakan Rajah 9.1 *dan* 9.2,

(i) compare the number of passengers [1 *mark*]

bandingkan bilangan penumpang [1 *markah*]

(ii) compare the damage of the tyres [1 *mark*]

bandingkan kerosakan yang dialami oleh tayar [1 *markah*]

(iii) relate the damage of the tyres and the total mass [1 *mark*]

hubungkaitkan kerosakan tayar dengan jumlah jisim [1 *markah*]

(iv) relate the damage of the tyres and the impulsive force [1 *mark*]

hubungkaitkan kerosakan tayar dengan daya impuls [1 *markah*]

(v) deduce the relationship between mass and impulsive force. [1 *mark*]

deduksikan hubungan antara jisim dengan daya impuls. [1 *markah*]

(*c*) Diagram 9.3 shows a helmet for a motorcyclist.

Rajah 9.3 menunjukkan sebuah topi keledar untuk penunggang motosikal.

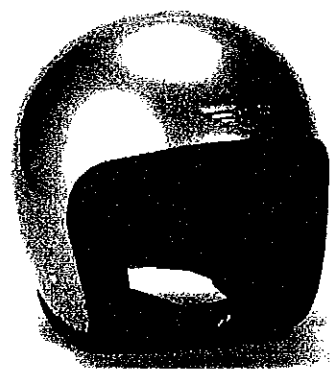


Diagram 9.3
Rajah 9.3

By using a suitable physics concept explain how the material of the helmet can prevent serious head injuries if an accident occurs. [4 *marks*]

Menggunakan konsep fizik yang sesuai, terangkan bagaimana bahan topi keledar tersebut dapat menghalang kecederaan kepala yang serius jika berlaku kemalangan. [4 *markah*]

(*d*) Diagram 9.4 shows a motorcycle.

Rajah 9.4 menunjukkan sebuah motosikal.

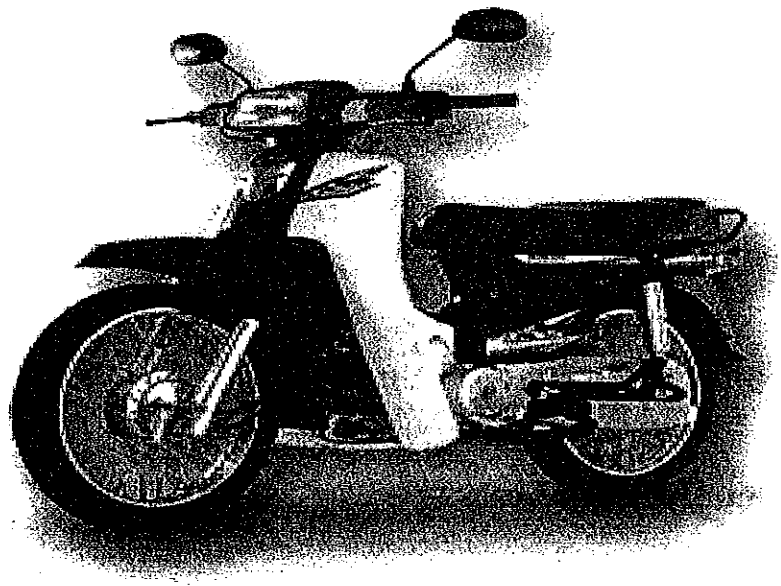


Diagram 9.4
Rajah 9.4

Using appropriate physics concepts, explain suitable modifications to the motorcycle so that it can be used in the Grand Prix at the Sepang Circuit.

Your answer should include the following aspects:

Menggunakan konsep fizik yang sesuai, terangkan modifikasi yang perlu dilakukan supaya motosikal itu boleh digunakan dalam perlumbaan motosikal Grand Prix di Litar Sepang.

Jawapan anda hendaklah merangkumi aspek-aspek berikut:

(i) frame of the motorcycle
rangka motosikal

(ii) shape of the motorcycle
rekabentuk motosikal

(iii) engine of the motorcycle
enjin motosikal

(iv) safety features for wet conditions
ciri-ciri keselamatan untuk keadaan jalan berair

(v) type of brake
jenis brek

[10 *marks*]
[10 *markah*]

10 Diagram 10.1 shows a ping-pong ball coated with metal paint, oscillating between two metal plates P and Q.

Rajah 10.1 menunjukkan bola pingpong bersadur logam berayun di antara dua plat logam P dan Q.

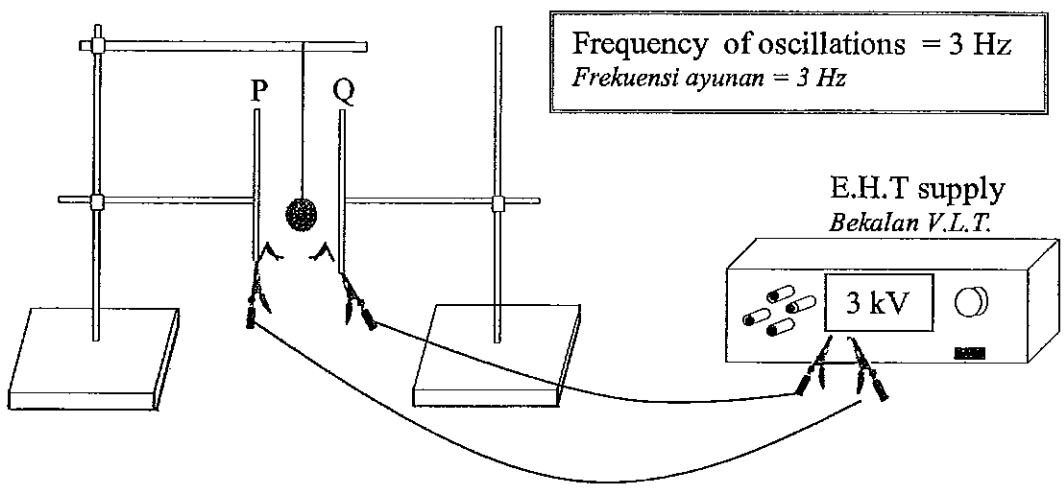


Diagram 10.1
Rajah 10.1

Diagram 10.2 shows the ping-pong ball oscillating between the plates P and Q when the distance between P and Q is increased.

Rajah 10.2 menunjukkan bola pingpong yang berayun di antara plat-plat P dan Q apabila jarak antara P dan Q bertambah..

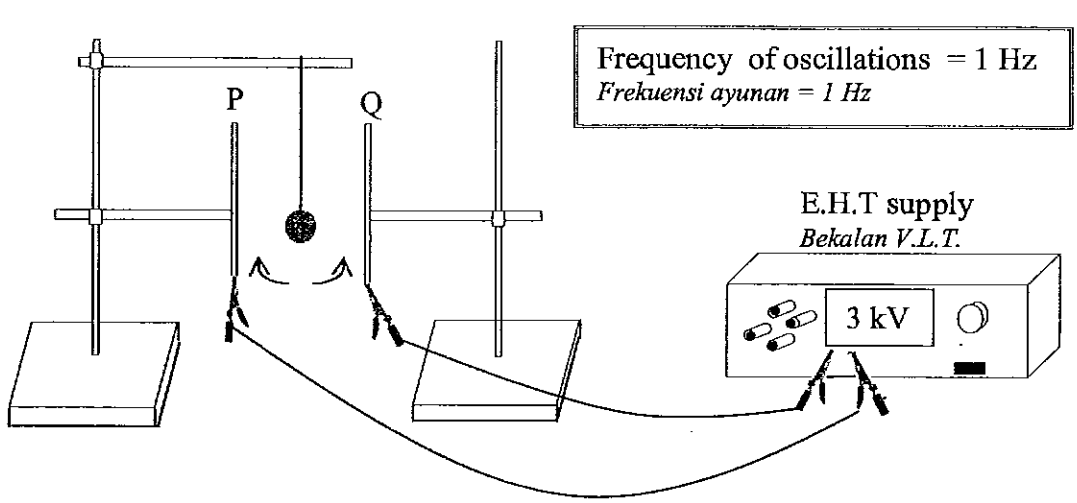


Diagram 10.2
Rajah 10.2

(*a*) (i) What is the meaning of electric field? [1 *mark*]

Apakah yang dimaksudkan dengan medan elektrik? [1 *markah*]

(ii) Using Diagram 10.1 and Diagram 10.2, compare the voltage between the plates P and Q, the distance between the plates P and Q and the frequency of oscillations of the ping-pong ball.

Relate the distance between the plates P and Q with the frequency of oscillations of the ping-pong ball to make a deduction regarding the relationship between the distance between the plates and the strength of the electric field. [5 *marks*]

Menggunakan Rajah 10.1 dan Rajah 10.2, bandingkan voltan di antara plat P dan Q, jarak antara plat P dan Q dan frekuensi ayunan bola pingpong.

Hubungkaitkan jarak antara plat P dan Q dengan frekuensi ayunan bola pingpong untuk membuat deduksi tentang hubungan jarak antara plat dengan kekuatan medan elektrik. [5 *markah*]

(*b*) Diagram 10.3 shows a petrol tanker.

Rajah 10.3 menunjukkan sebuah lori tangki petrol.

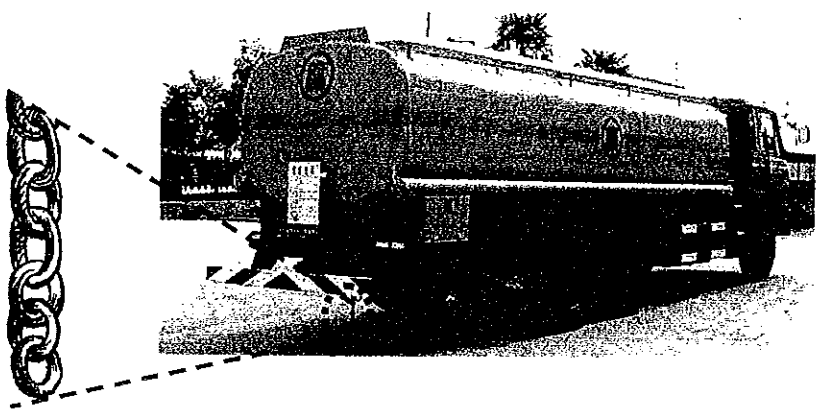


Diagram 10.3
Rajah 10.3

Explain why the petrol tanker has a metal chain on its underside. [4 *marks*]

Terangkan mengapa lori tangki petrol mempunyai rantai besi di bahagian bawah lori. [4 *markah*]

(c) An apartment building is going to be built in an open space.
As an electrical engineer, you have to make sure the building is safe for occupation.

Suggest suitable features needed in the building design for the following aspects:

Sebuah bangunan apartmen akan dibina di sebuah kawasan lapang.
Sebagai seorang jurutera elektrik, anda perlu memastikan supaya bangunan ini selamat untuk didiami.

Cadangkan ciri– ciri keselamatan yang perlu dalam rekabentuk bangunan tersebut untuk aspek-aspek berikut:

(i) wiring system

sistem pendawaian

(ii) lightning protection

pelindung kilat

(iii) safety of electrical appliances when used in the building

ciri- ciri keselamatan alat eletrik bila digunakan di dalam bangunan

(iv) energy efficiency in electrical usage.

kecekapan tenaga dalam penggunaan elektrik.

[10 *marks*]
[*10 markah*]

Section C
Bahagian C

[20 *marks*]
[20 *markah*]

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

11 Diagram 11.1 shows two kids walking on the beach during a hot day.

Rajah 11.1 menunjukkan dua kanak-kanak berjalan di tepi pantai pada hari yang panas.

Diagram 11.1
Rajah 11.1

(*a*) Name the process of energy transfer from the sun to the earth. [1 *mark*]

Namakan proses di mana tenaga dipindahkan dari matahari ke bumi. [*1 markah*]

(b) Explain why the kids prefer to walk along the waterfront rather than on the sand. [4 *marks*]

Terangkan kenapa kanak-kanak itu lebih suka berjalan di pesisir pantai berbanding di atas pasir. [4 *markah*]

(c) A solar water heater receives energy from the sun to heat up the water in its storage tank. Table 11 shows four roof solar heater designs P, Q, R and S with different specifications.

Study all the specifications, explain the suitability of their characteristics for a water heater system and then determine the most suitable design. Give reasons for your choice. [10 *marks*]

Pemanas air solar menerima tenaga dari matahari untuk memanaskan air di dalam tangki penstoran. Jadual 11 menunjukkan empat rekabentuk pemanas solar bumbung P, Q, R dan S dengan spesifikasi yang berbeza.

Kaji spesifikasi keempat-empat rekabentuk, terangkan kesesuaian ciri-ciri untuk sistem pemanas air dan seterusnya tentukan rekabentuk yang paling sesuai. Beri sebab untuk pilihan anda. [*10 markah*]

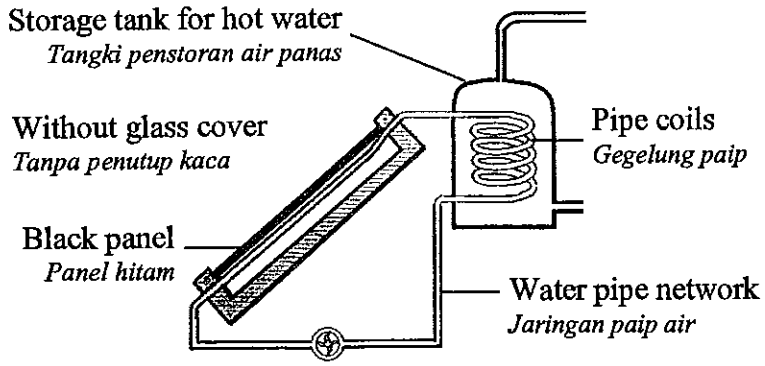
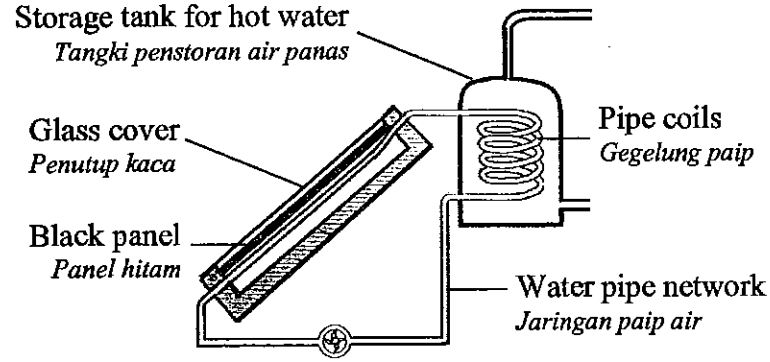
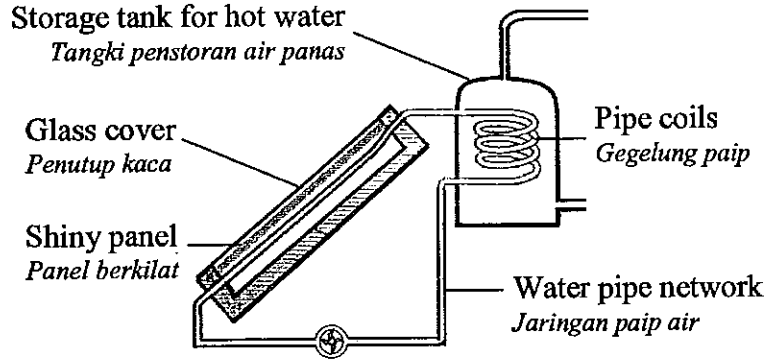
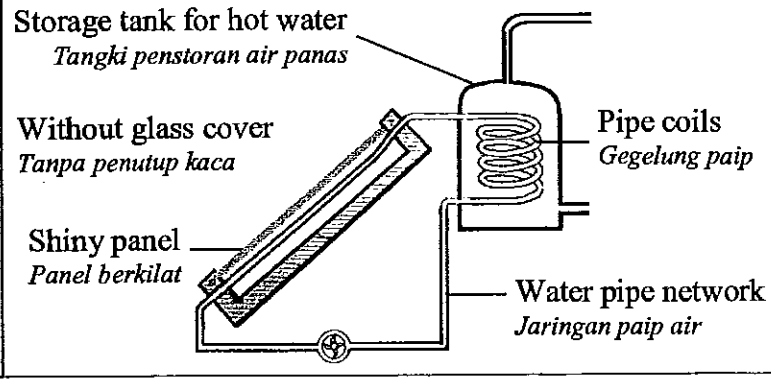
Solar heater *Pemanas solar*	Design *Reka Bentuk*	Specific heat capacity of water pipes / J kg^{-1} $°C^{-1}$ *Muatan haba tentu paip air/ J kg^{-1} $°C^{-1}$*
P		880
Q		370
R		127
S		557

Table 11
Jadual 11

(d) A 500 g metal object at 90°C is placed in a beaker containing 2 kg of water at 30°C. The final temperature of the water is 50°C.
[specific heat capacity of water = 4200 J kg^{-1} $°C^{-1}$]

Satu objek logam dengan jisim 500 g pada suhu 90°C di masukkan ke dalam bikar yang mengandungi 2 kg air yang bersuhu 30°C. Suhu akhir air ialah 50°C.
[Muatan haba tentu air = 4200 J kg^{-1} $°C^{-1}$].

(i) Calculate the amount of heat absorbed by the water. [2 marks]
Hitung haba yang diserap oleh air. [*2 markah*]

(ii) Calculate the specific heat capacity of the metal. [3 marks]
Hitung muatan haba tentu bagi logam tersebut. [*3 markah*]

12 *(a)* Diagram 12.1 shows a guitar with strings of different thicknesses. Sound is heard when the string is plucked. Sound waves are longitudinal waves.

Rajah 12.1 menunjukkan sebuah gitar dengan tali yang berlainan ketebalan. Bunyi akan didengari apabila tali gitar dipetik. Gelombang bunyi adalah gelombang membujur.

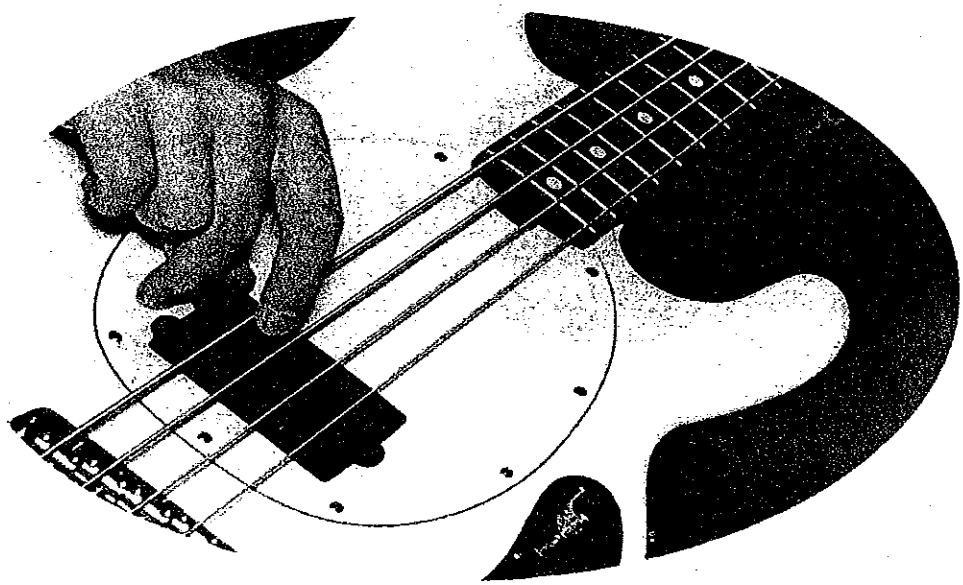


Diagram12.1

Rajah 12.1

(i) What is the meaning of longitudinal waves? [1 *mark*]

Apakah yang dimaksudkan dengan gelombang membujur? [*1 markah*]

(ii) State **one** difference between the propagation of longitudinal waves and transverse waves. [1 *mark*]

Nyatakan satu perbezaan di antara perambatan gelombang membujur dan gelombang melintang. [*1 markah*]

(iii) What changes need to be done so that the sound produced by the guitar is louder and of higher pitch? Explain your answer. [3 *marks*]

Apakah perubahan yang perlu dilakukan supaya bunyi dari gitar lebih kuat dan langsing. Terangkan jawapan anda. [*3 markah*]

(*b*) Diagram 12.2 shows a system for transmission of radio signals from a radio station to a radio set user.

Rajah 12.2 menunjukkan satu sistem untuk penghantaran isyarat radio dari stesen radio ke set radio pengguna.

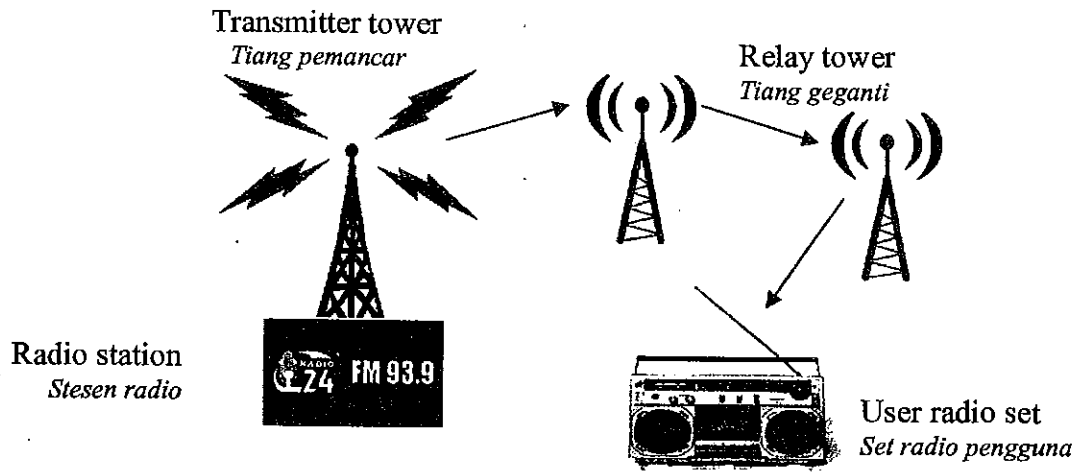


Diagram 12.2
Rajah 12.2 .

Table 12 shows the characteristics of four waves, R, S, T and U.

Jadual 12 menunjukkan ciri-ciri empat jenis gelombang R, S, T dan U.

Type of waves *Jenis gelombang*	Speed in air *Laju di udara*	Wavelength range / m *Julat panjang gelombang / m*	Energy dissipated *Tenaga yang hilang*	Effect of ionosphere on wave *Kesan ionosfera ke atas gelombang*
R	3×10^8 m s^{-1}	10^5 to 10^3	More *Lebih*	Penetrates the ionosphere *Menembusi ionosfera*
S	3×10^8 m s^{-1}	10^3 to 10^{-1}	Less *Kurang*	Reflected by the ionosphere *Dipantulkan oleh ionosfera*
T	330 m s^{-1}	10^{-3} to 10^{-4}	More *Lebih*	Penetrates the ionosphere *Menembusi ionosfera*
U	330 m s^{-1}	10^{-1} to 10^{-2}	Less *Kurang*	Reflected by the ionosphere *Dipantulkan oleh ionosfera*

Table 12
Jadual 12

You are required to investigate the characteristics of the waves described in Table 12.

Explain the suitability of each characteristic of the waves for transmission of radio signals.

Determine the most suitable wave to be used and explain your choice.

[10 *marks*]

Anda dikehendaki mengkaji ciri-ciri gelombang dalam Jadual 12.

Jelaskan kesesuaian setiap ciri gelombang untuk penghantaran signal radio.

Tentukan jenis gelombang yang paling sesuai dan jelaskan pilihan anda. [10 *markah*]

(c) Diagram 12.3 shows a ship in fog near a cliff. When the ship sounded its horn with a frequency of 100 Hz, the ship's receiver system recorded its echo 4 seconds later.
[Speed of sound waves in the air = 330 m s^{-1}]

Rajah 12.3 menunjukkan sebuah kapal yang berada berhampiran satu tebing dalam cuaca berkabus. Apabila kapal membunyikan hon dengan frekuensi 100 Hz, sistem penerima kapal mengesan gema dari bunyi hon 4 saat kemudian.
[*Laju gelombang bunyi di udara = 330 m* s^{-1}]

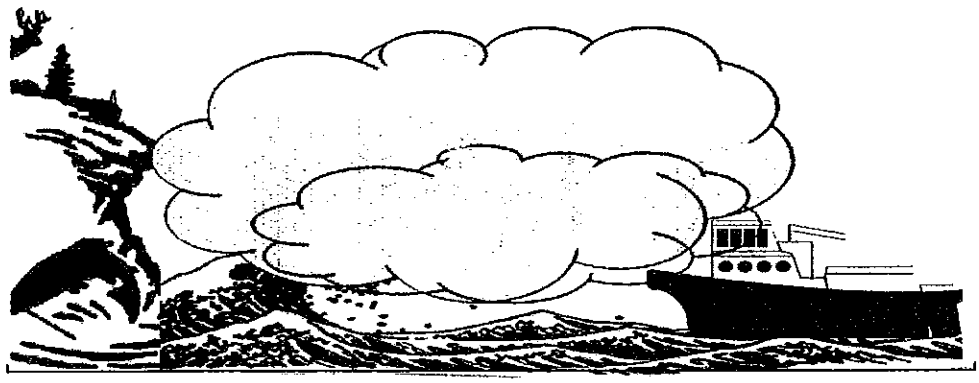


Diagram 12.3
Rajah 12.3

Calculate
Hitungkan

(i) the wavelength of the sound waves produced by the horn. [2 *marks*]
panjang gelombang bagi gelombang bunyi yang dihasilkan oleh hon. [2 *markah*]

(ii) the distance of the ship from the cliff. [2 *marks*]
jarak kapal dari tebing. [2 *markah*]

(iii) If the stopping distance for the ship is 500 m, will the ship collide with the cliff? [1 mark]

Adakah kapal akan berlanggar dengan tebing jika jarak untuk berhenti bagi kapal ialah 500 m? [1 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION TO 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 daripada* **Bahagian A**. *Jawapan kepada* **Bahagian A** *hendaklah ditulis 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 paper provided by the invigilators. Answer questions in **Section B** and **Section C** in detail. Answers should be clear and logical. Equations, diagrams, tables, graphs and other suitable methods can be used to explain your answer.
Jawab **satu** *soalan daripada* **Bahagian B** *dan* **satu** *soalan daripada* **Bahagian C**. *Jawapan kepada* **Bahagian B** *dan* **Bahagian C** *hendaklah ditulis dalam kertas yang disediakan oleh pengawas peperiksaan. Anda diminta menjawab dengan lebih terperinci untuk* **Bahagian B** dan **Bahagian C**. *Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

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 that you have written down. Then write down the new answer.
Jika anda hendak menukar sesuatu jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

6. The diagrams in the questions provided are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.

7. A list of formulae is provided on page 2.
Satu senarai formula disediakan di halaman 2.

8. The marks allocated for each question or sub-section of a question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

9. You may use a scientific calculator. However, steps in calculation must be shown.
Anda dibenarkan menggunakan kalkulator saintifik. Walau bagaimanapun, langkah mengira perlu ditunjukkan.

10. You are advised to spend 90 minutes to answer questions in **Section A**, 30 minutes for **Section B** and 30 minutes for **Section C.**
Anda dinasihati supaya mengambil masa 90 minit untuk menjawab soalan dalam **Bahagian A,** *30 minit untuk* **Bahagian B** *dan* 30 *minit untuk* **Bahagian C.**

11. Attach all your answers together and hand them in to the invigilator at the end of the examination.
Lekatkan semua kertas jawapan dan serahkan kepada pengawas peperiksaan di akhir peperiksaan.

4531/3
Physics
Paper 3
Sept 2012
1 ½ hours

NAME:.....

INDEX NO. : ..... CLASS: .....

MAKTAB RENDAH SAINS MARA

SIJIL PELAJARAN MALAYSIA
TRIAL EXAMINATION 2012

PHYSICS

Paper 3

One hour and thirty minutes

DO NOT OPEN THIS QUESTION BOOKLET UNTIL TOLD TO DO SO

1. Write down your name, college no. and your class in the space provided.
   Tulis nama, no. maktab dan kelas anda pada ruang yang disediakan.

2. The questions are written in English and *bahasa Melayu*.
   Kertas soalan ini adalah dalam dwibahasa.

3. Candidates are required to read the information at the back of the booklet.
   Calon dikehendaki membaca maklumat di halaman belakang buku soalan ini.

For Examiner's Use			
Section	Question	Marks	Score
A	1	16	
	2	12	
B	1	12	
	2	12	
Total			

This booklet consists of 19 printed pages and 1 blank page

Section A
Bahagian A

[28 *marks*]
[28 *markah*]

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

1 A student carries out an experiment to investigate the relationship between the acceleration, a and a force by the load, F for a trolley.

Diagram 1.1 shows the experimental set-up used by the student. A force of 1.0 N by the load, F acts on the string. The ticker-timer is switched on and the trolley is then released.

Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara pecutan, a dan daya dari beban, F bagi sebuah troli.

Rajah 1.1 menunjukkan susunan radas untuk eksperimen tersebut. Satu daya 1.0 N dari beban, F yang digantung bertindak pada hujung tali tersebut. Jangkamasa detik dihidupkan dan kemudian troli dilepaskan.

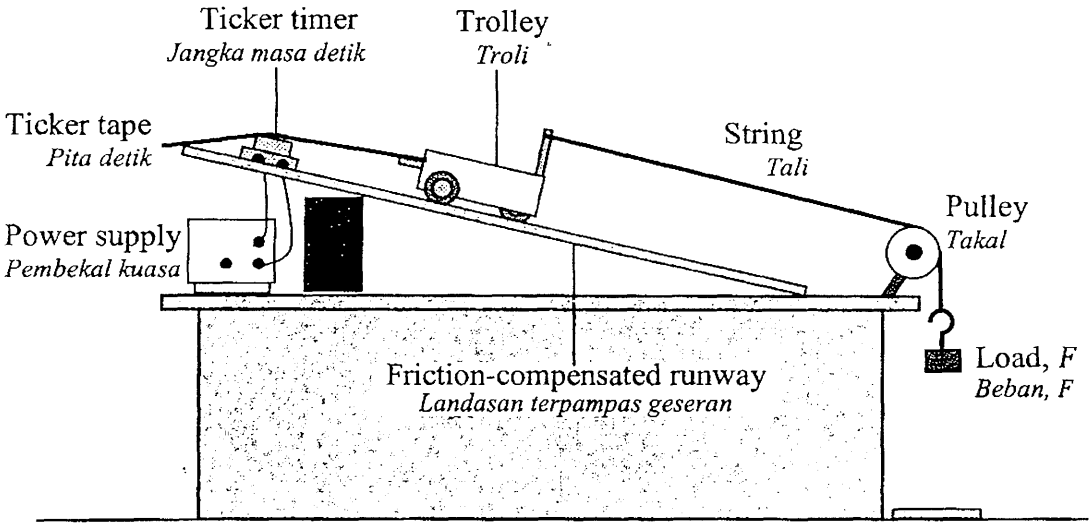


Diagram 1.1
Rajah 1.1

The ticker-tape obtained is cut into 6 strips of 10 ticks as shown on Diagram 1.2 on page 3.

Pita detik yang telah diperolehi dipotong kepada 6 jalur yang mengandungi 10 detik seperti yang ditunjukkan pada Rajah 1.2 pada halaman 3 .

The procedure is repeated with weights of load, F = 1.5 N, 2.0 N , 2.5 N and 3.0 N. The cut-ticker-tapes obtained from experiment are shown in Diagrams 1.3, 1.4, 1.5, 1.6 and 1.7 on pages 4, 5, 6 and 7 respectively.

Eksperimen diulang dengan menggunakan berat beban, F = 1.5 N, 2.0 N 2.5 N dan 3.0 N. Potongan pita detik yang diperolehi daripada eksperimen ditunjukkan pada Rajah 1.3, 1.4, 1.5, 1.6 dan 1.7 di halaman 4,5,6 dan 7.

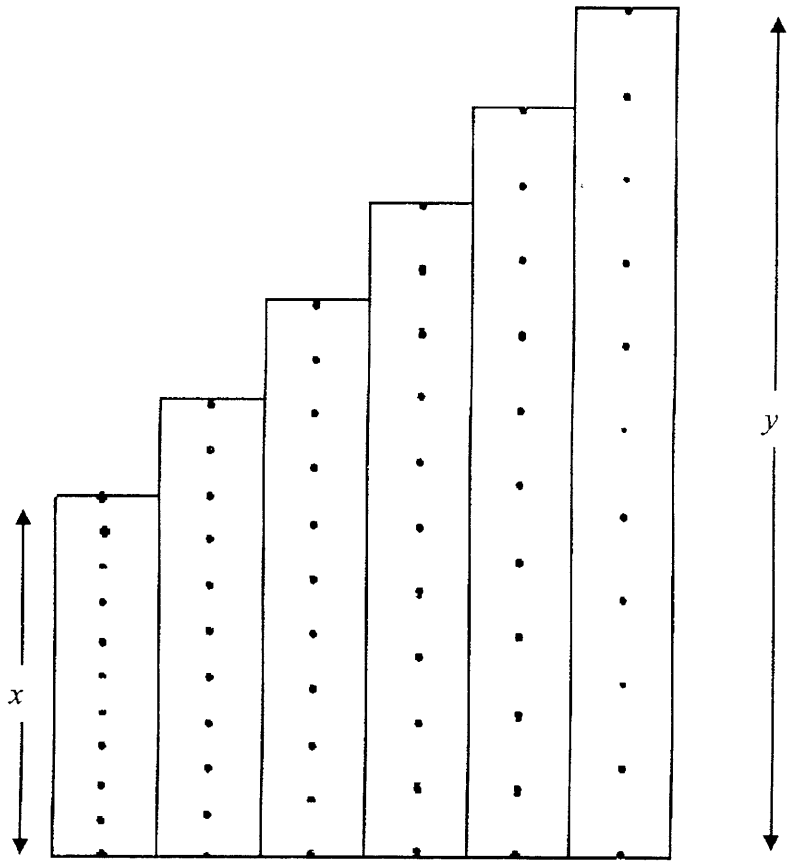


Diagram 1.2
Rajah 1.2

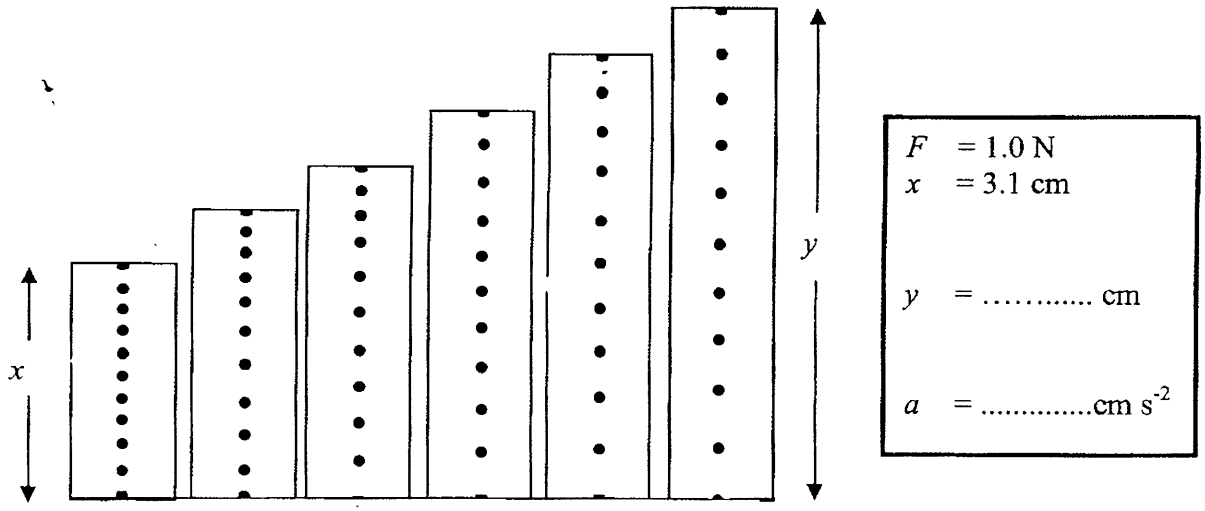


Diagram 1.3
Rajah 1.3

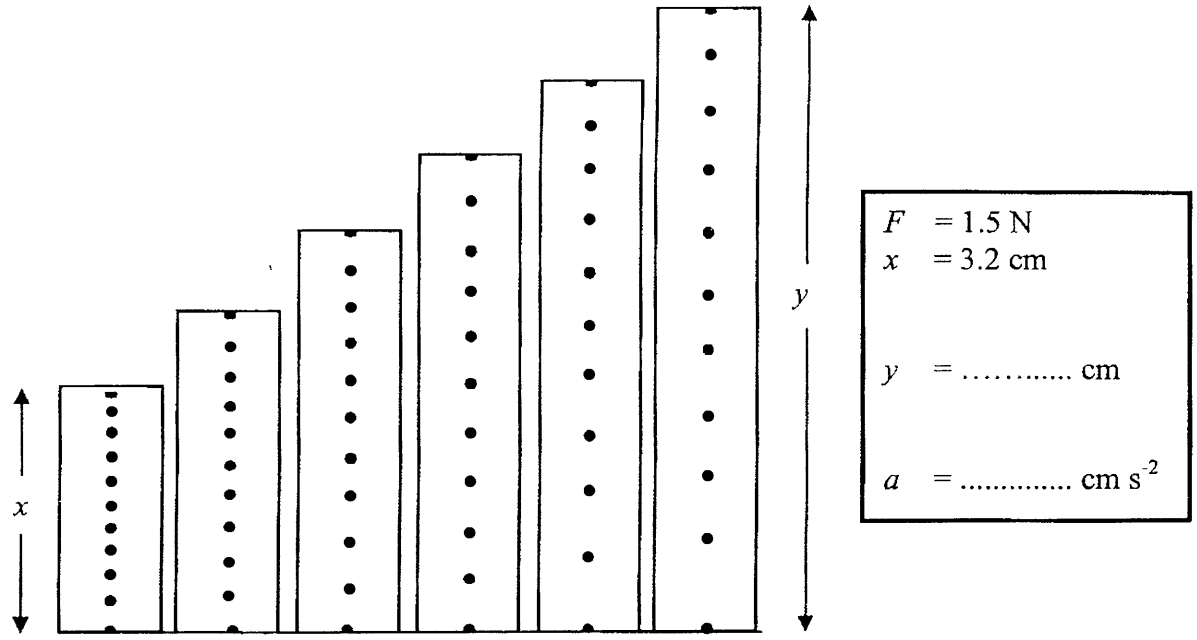


Diagram 1.4
Rajah 1.4

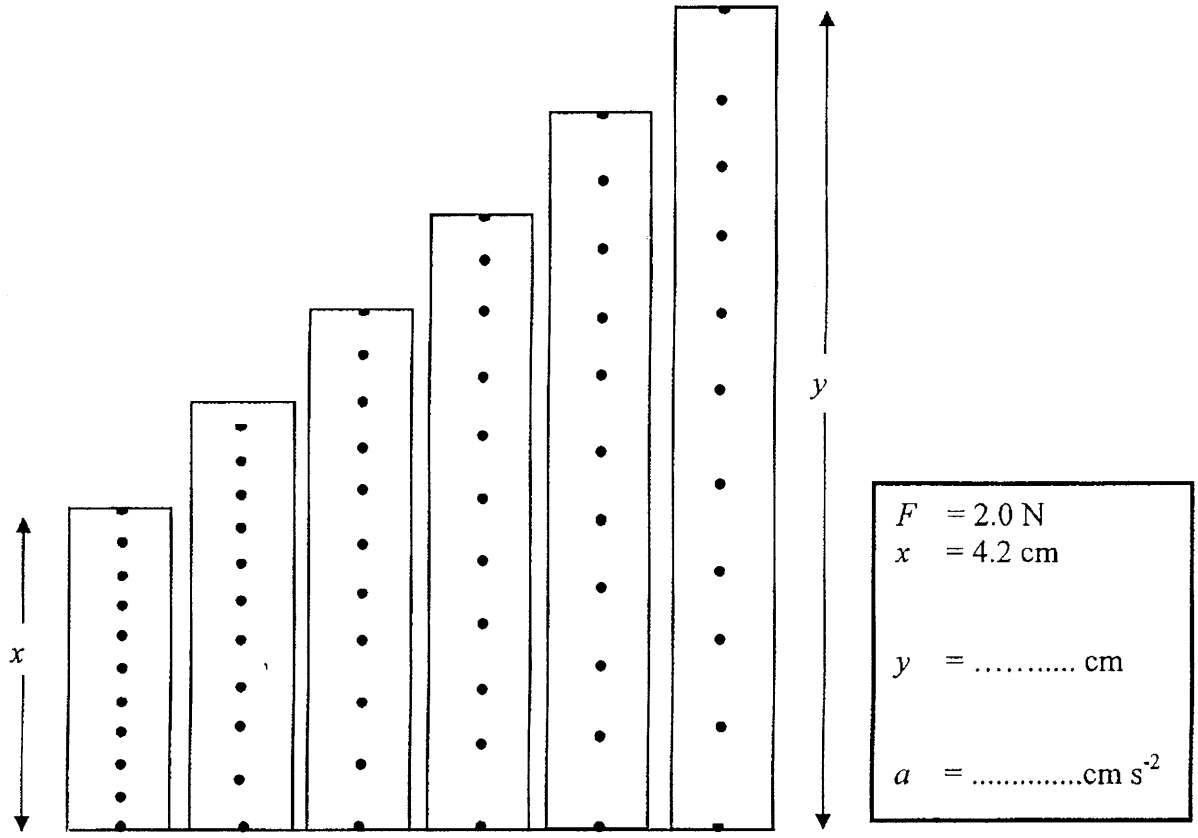


Diagram 1.5
Rajah 1.5

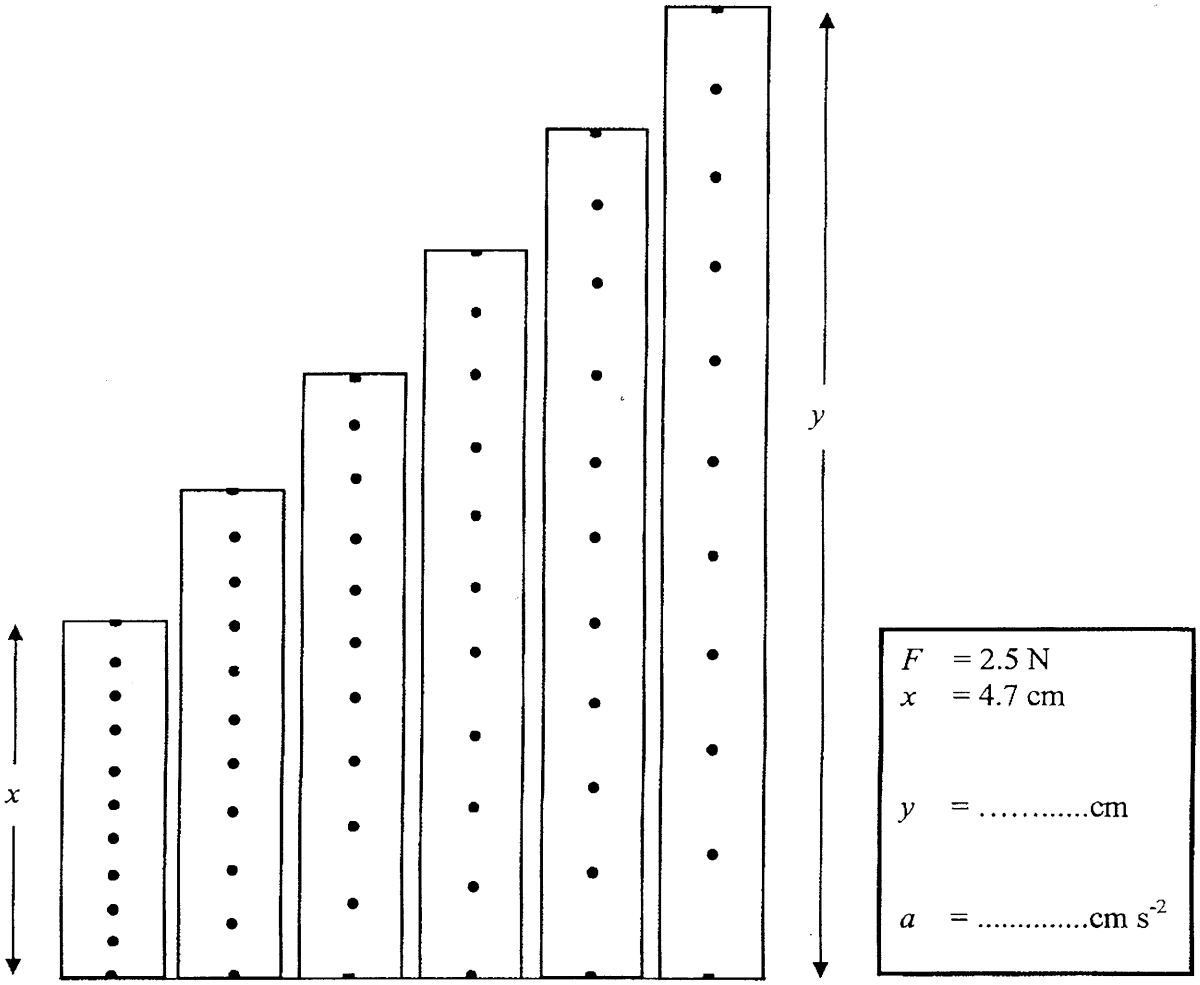


Diagram 1.6
Rajah 1.6

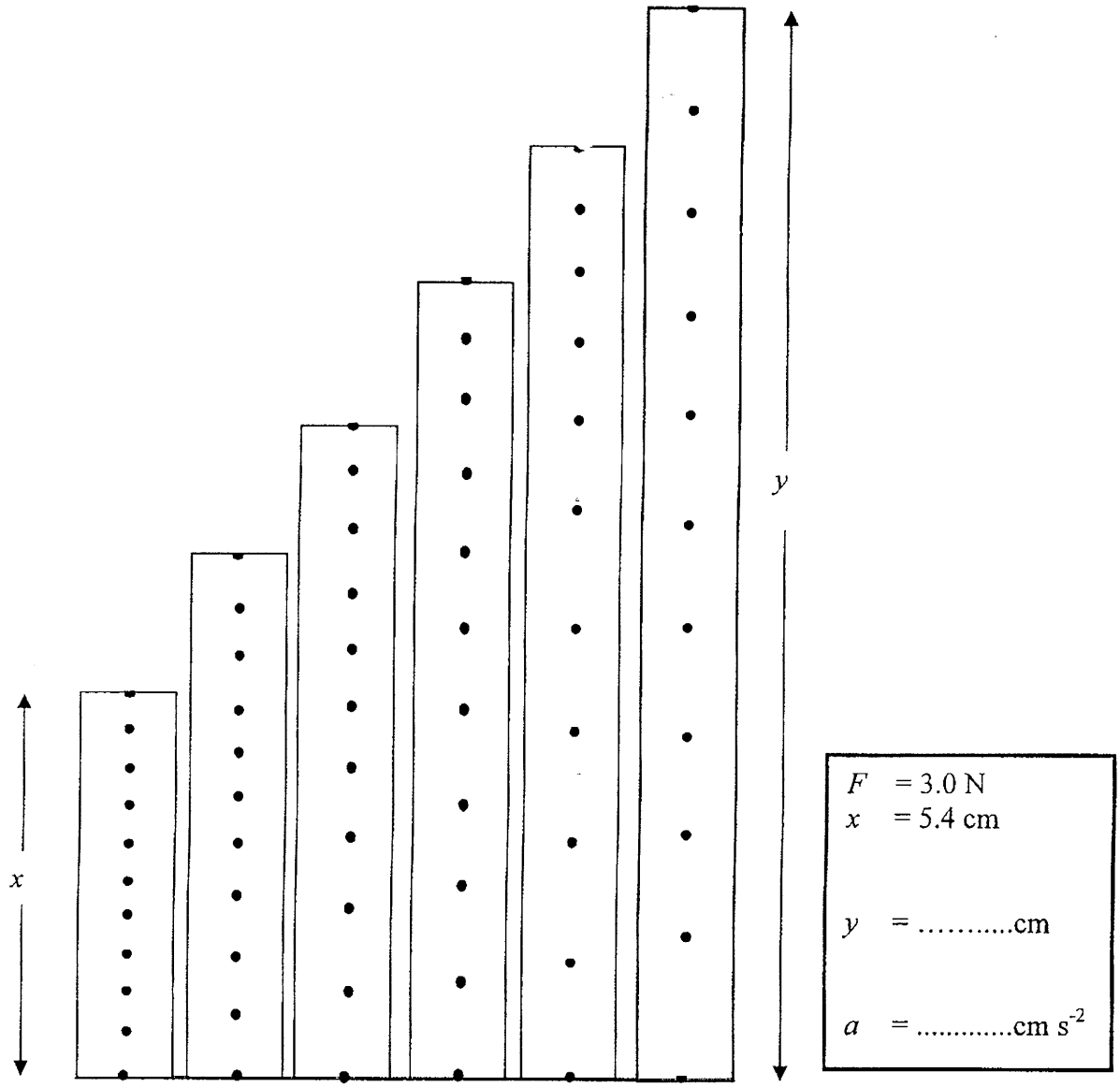


Diagram 1.7
Rajah 1.7

For Examiner's Use

(*a*) For the experiment described on pages 2 and 3, identify:

Bagi eksperimen yang diterangkan di halaman 2 dan 3, kenal pasti:

(i) The manipulated variable

Pembolehubah dimanipulasikan

.....

[1 *mark*]
[1 *markah*]

1(*a*)(i) 1

(ii) The responding variable

Pembolehubah bergerak balas

.....

[1 *mark*]
[1 *markah*]

1(*a*)(ii) 1

(iii) The constant variable

Pembolehubah dimalarkan

.....

[1 *mark*]
[1 *markah*]

1(*a*)(iii) 1

(*b*) Based on Diagrams 1.3, 1.4, 1.5, 1.6 and 1.7 on pages 4, 5, 6 and 7:

Berdasarkan Rajah 1.3, 1.4, 1.5, 1.6 dan 1.7 di halaman 4, 5,6 dan 7:

(i) Record the reading of *y* for each chart.

Catat bacaan y untuk setiap carta.

[2 *marks*]
[2 *markah*]

1(*b*)(i) 2

(ii) Calculate the values of acceleration *a*, for each value of *x* and y in (*b*)(i), by using the following equation:

Hitungkan nilai-nilai pecutan a, bagi setiap nilai x dan y di b(i) dengan menggunakan persamaan berikut:

$$a = 5\,(y - x) \quad \text{cm s}^{-2}$$

Record and tabulate the value of *a*, at (*c*).

Rekod dan jadualkan nilai a di (c).

[2 *marks*]
[2 *markah*]

1(*b*)(ii) 2

For Examiner's Use

(*c*) Tabulate your results for all values of F, x, y and a in the space below.

Jadualkan keputusan anda bagi F, x, y dan *a pada ruang di bawah.*

1(*c*) 3

[3 *marks*]
[3 *markah*]

(*d*) On the graph paper on page 10, plot a graph of a against F.

Pada kertas graf di halaman 10, lukis graf a melawan F.

1(*d*) 5

[5 *marks*]
[5 *markah*]

(*e*) Based on your graph in **1**(*d*), state the relationship between a and F.

Berdasarkan graf anda di **1**(*d*) *, nyatakan hubungan antara a dan F.*

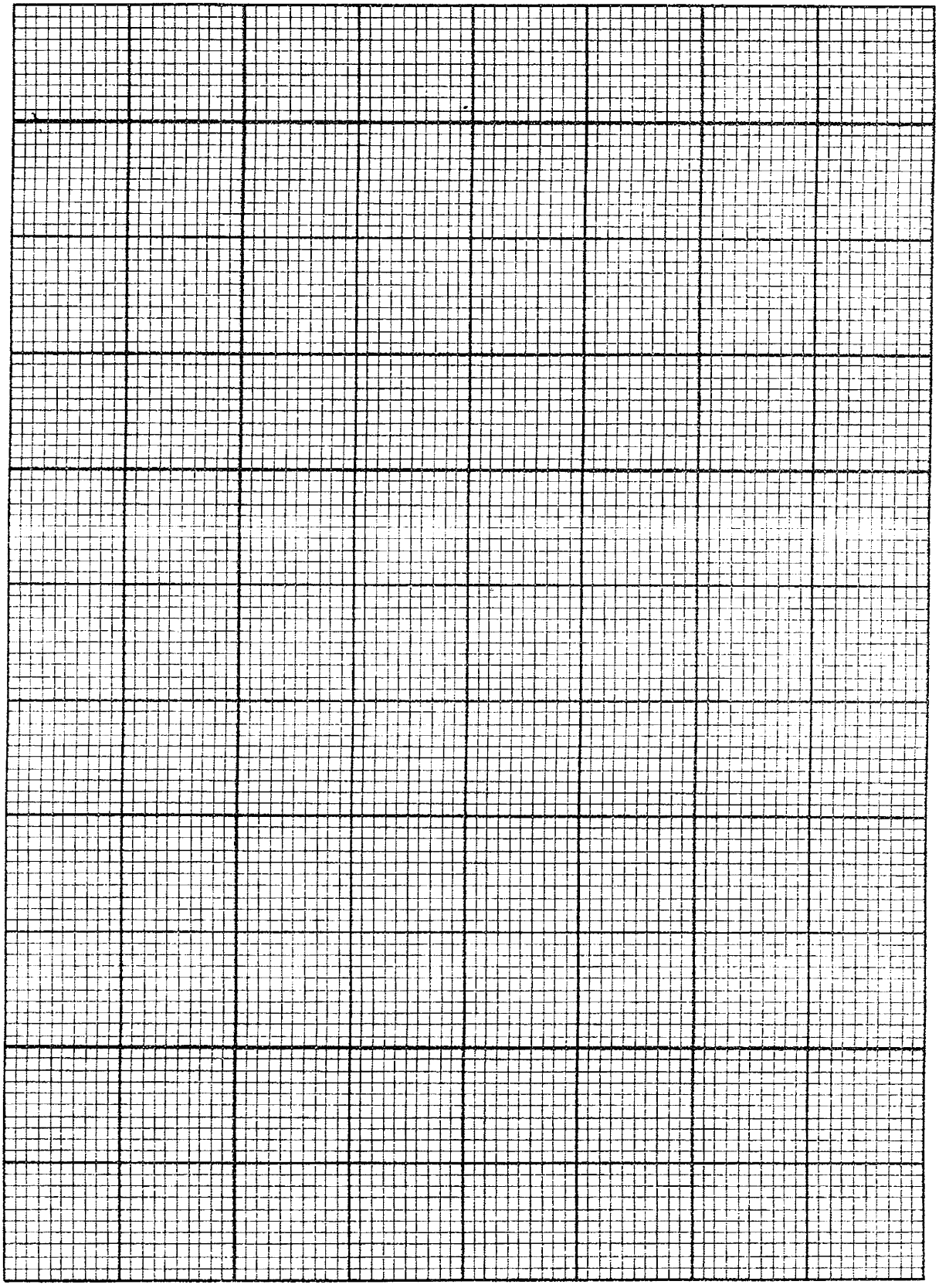
1(*e*) 1

.....

[1 *mark*]
[1 *markah*]

Total A1 16

Graph of a against F
Graf a melawan F



For Examiner's Use

2 A student carries out an experiment to investigate the relationship between the potential difference, V and current, I of a dry cell and determine its electromotive force, E and internal resistance, r.

The results of the experiment are shown in the graph V against I in Diagram 2.1 on page 12.

Seorang pelajar menjalankan eksperimen untuk menyiasat hubungan di antara beza keupayaan, V, dengan arus, I bagi sebiji sel kering dan menentukan daya gerak elektrik, E dan rintangan dalam, r.

Keputusan eksperimen itu ditunjukkan oleh graf V melawan I pada Rajah 2.1 pada halaman 12.

(*a*) Based on the graph in Diagram 2.1 :

Berdasarkan graf dalam Rajah 2.1:

(i) What happens to V when I increases?

Apakah yang berlaku kepada V apabila I bertambah ?

2(*a*)(i) 1

.....

[1 *mark*]
[1 *markah*]

(ii) The electromotive force can be determined from the intercept at vertical axis.

Determine the value of V when $I = 0.0$ A.
Show on the graph how you determine the value of V.

Daya gerak elektrik boleh ditentukan melalui pintasan pada paksi menegak.

Tentukan nilai V apabila I = 0.0 A.
Tunjukkan pada graf itu bagaimana anda menentukan nilai V.

2(*a*)(ii) 2

$E =$ .....

[2 *marks*]
[2 *markah*]

(*b*) (i) Calculate the gradient, m, of the graph V against I.
Show on the graph how you calculate the value of m.

Hitungkan kecerunan, m, bagi graf V melawan I.
Tunjukkan pada graf itu bagaimana anda menghitung nilai m.

2(*b*)(i) 3

$m =$.....

[3 *marks*]
[3 *markah*]

Graph of V against I
Graf V melawan I

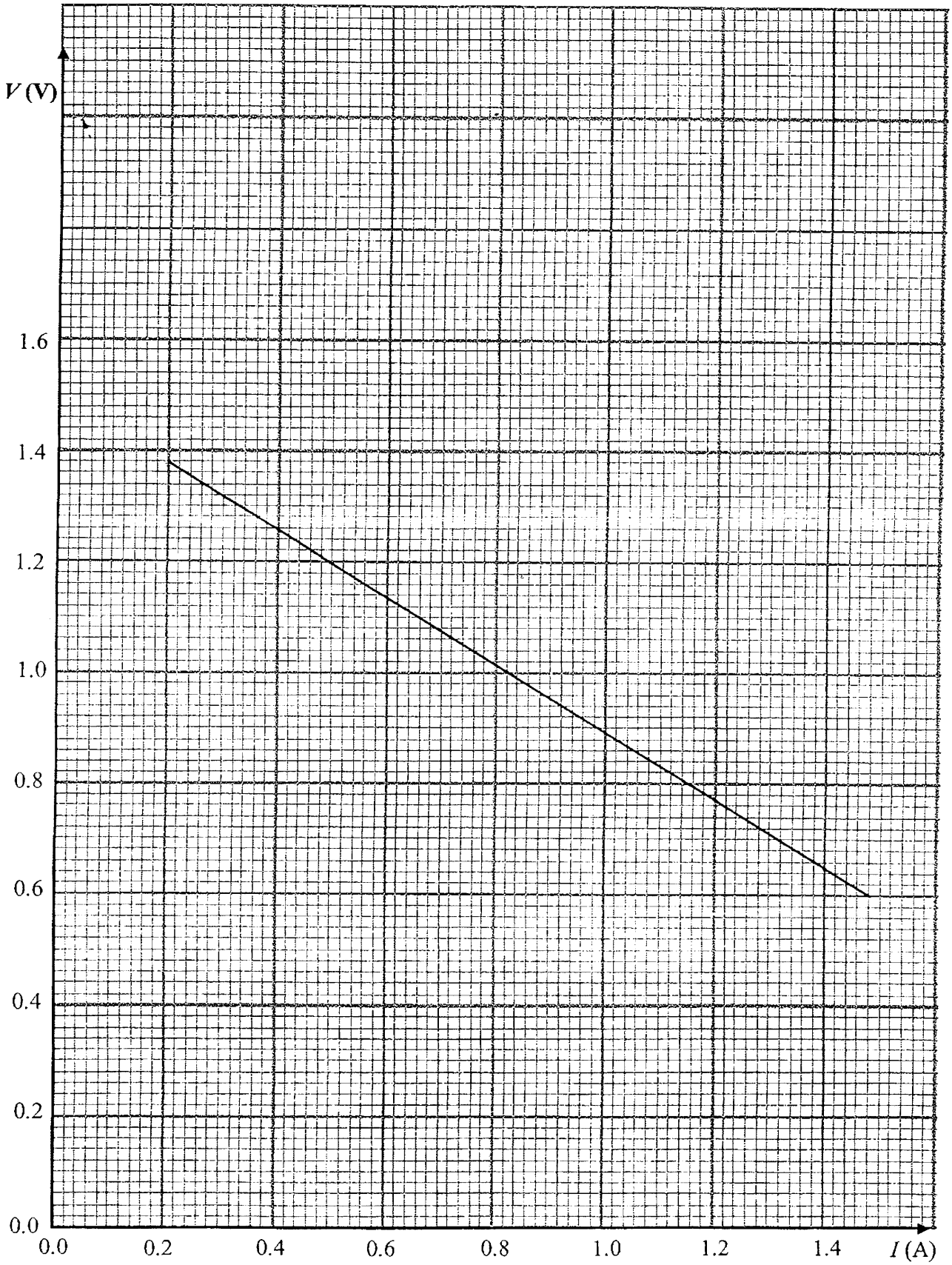


Diagram 2.1
Rajah 2.1

For Examiner's Use

(*b*) (ii) The internal resistance, r of the dry cell is given by formula:

Rintangan dalam, r bagi sel kering tersebut diberi oleh rumus:

$r = -m$ where, m is the gradient of the graph

di mana, m ialah kecerunan graf.

Calculate the internal resistance, r of the dry cell.

Hitungkan rintangan dalam, r sel kering tersebut.

2(*b*)(ii)

1

r = ...

[1 *mark*]
[1 *markah*]

(iii) The dry cell is connected to a circuit.

Sel kering tersebut disambungkan pada satu litar.

Using the formula,

Menggunakan rumus,

$E = I(R + r)$ where, I is the current
R is the resistance of the circuit

di mana, I ialah arus
R ialah rintangan litar

and using the values of E in (*a*)(ii), r in (*b*)(ii) and 20 Ω for R, calculate the electric current, I in the circuit.

dan menggunakan nilai E di (a)(ii) r di (b)(ii) dan 20 Ω untuk R, hitungkan arus elektrik , I dalam litar tersebut.

2(*b*)(iii)

2

I = ...

[2 *mar*
[*2mar*]

(*c*) (i) This experiment is repeated by connecting two identical dry cells in series in the circuit.

Eksperimen ini diulang dengan menggunakan dua sel kering yang serupa disambung secara sesiri di dalam litar.

2(*c*)(i) 1

What happens to the gradient of the graph, *m*?

Apakah yang berlaku kepada kecerunan graf, m ?

.....

[1 mark]
[*1 markah*]

(ii) Give one reason for the answer in 2(c)(i)

2(*c*)(ii) 1

Berikan satu sebab untuk jawapan di 2(c)(i)

.....

[1 mark]
[*1 markah*]

(*d*) State **one** precaution that can be taken to improve the accuracy of the readings in this experiment.

*Nyatakan **satu** langkah berjaga-jaga yang boleh diambil untuk memperbaiki ketepatan bacaan dalam eksperimen ini.*

2(*d*) 1

.....

.....

[1 mark]
[*1 markah*]

Total A2 12

Section B
Bahagian B

[12 *marks*]
[*12 markah*]

Answer any **one** question from this section
Jawab mana-mana **satu** *soalan daripada bahagian ini.*

3 Diagram 3.1 and Diagram 3.2 show a glass of hot water and a glass of hot chocolate respectively. The initial temperature of both are the same. Both glasses are left out to cool. After 15 minutes it is noticed that the chocolate drink is cooler.

Rajah 3.1 dan Rajah 3.2 menunjukkan gelas mengandungi air panas dan segelas air coklat panas. Kedua - duanya dibiarkan menyejuk. Selepas 15 minit di dapati bahawa air coklat lebih sejuk berbanding air di dalam Rajah 3.1.

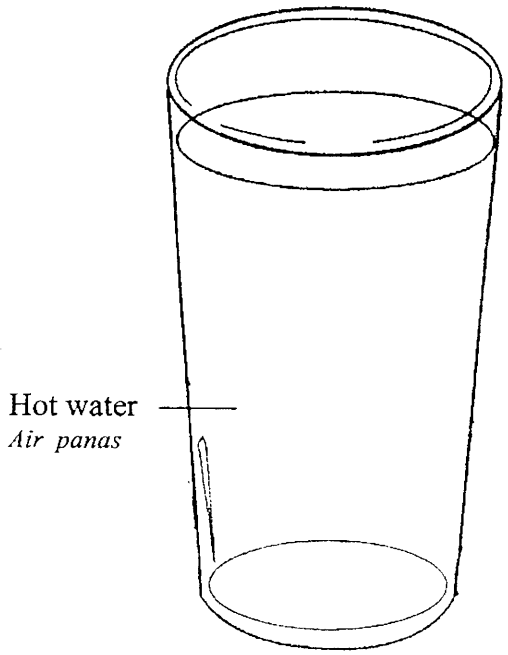


Diagram 3.1
Rajah 3.1

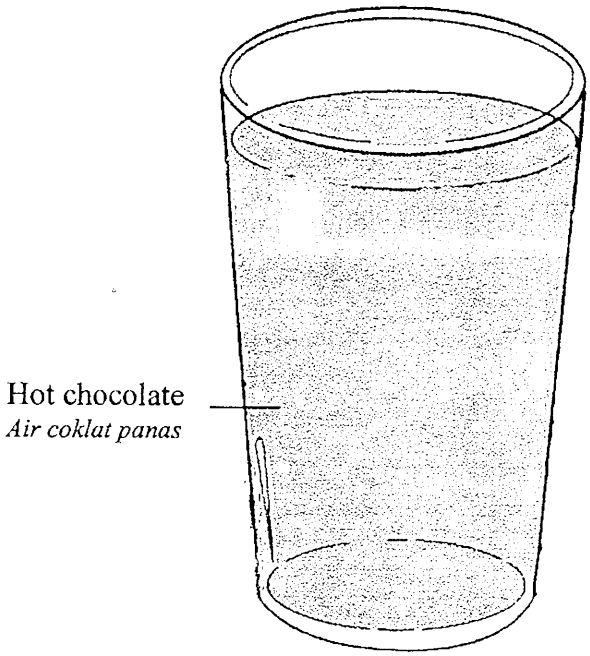


Diagram 3.2
Rajah 3.2

Based on the information and observation :
Berdasarkan maklumat dan pemerhatian tersebut :

(a) State **one** suitable inference. [1 mark]
Nyatakan ***satu*** *inferens yang sesuai.* [1 *markah*]

(b) State **one** suitable hypothesis. [1 *mark*]
Nyatakan ***satu*** *hipotesis yang sesuai.* [1 *markah*]

(c) With the use of apparatus such as immersion heater, salt, electronic balance and other apparatus, describe **one** experiment framework to investigate the hypothesis stated in 3(b).

*Dengan menggunakan radas seperti pemanas rendam, garam, penimbang elektronik dan lain-lain radas, terangkan **satu** eksperimen untuk menyiasat hipotesis yang dinyatakan di 3(b).*

In your description, state clearly the following:

Dalam penerangan anda , nyatakan dengan jelas perkara berikut:

(i) The aim of the experiment.

Tujuan eksperimen.

(ii) The variables in the experiment.

Pembolehubah dalam eksperimen.

(iii) The list of apparatus and materials.

Senarai radas dan bahan.

(iv) The arrangement of the apparatus.

Susunan radas.

(v) The procedure of the experiment which should include **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.

*Prosedur eksperimen yang mesti termasuk **satu** kaedah mengawal pembolehubah dimanipulasikan dan **satu** kaedah mengukur pembolehubah bergerakbalas.*

(vi) The way to tabulate the data.

Cara untuk menjadualkan data.

(vii) The way to analyse the data.

Cara menganalisis data.

[10 *marks*]
[10 *markah*]

4 Diagram 4.1 shows a gentle breeze blowing the blades of a dynamo.
Diagram 4.2 shows a strong wind blowing the same dynamo blades.

Rajah 4.1 menunjukkan angin perlahan meniup bilah kipas sebuah dinamo.
Rajah 4.2. menunjukkan angin kuat meniup bilah kipas dynamo yang sama.

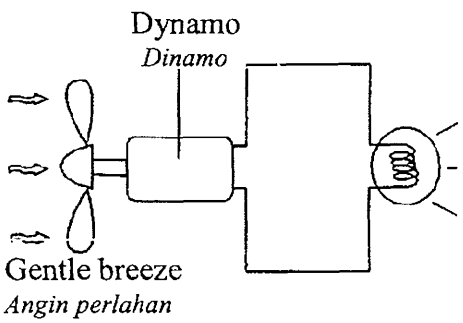


Diagram 4.1
Rajah 4.1

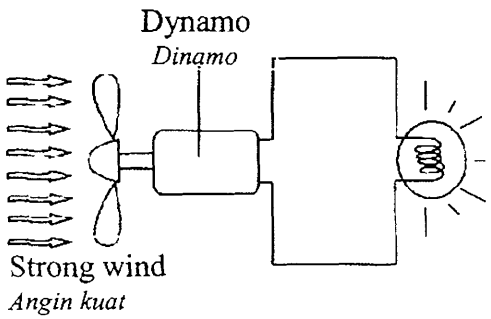


Diagram 4.2
Rajah 4.2

Observe the brightness of the bulbs in both Diagrams.

Perhatikan kecerahan mentol dalam kedua-dua Rajah.

Based on the observation:

Berdasarkan pemerhatian tersebut :

(a) State **one** suitable inference. [1 *mark*]

*Nyatakan **satu** inferens yang sesuai.* [1 *markah*]

(b) State **one** suitable hypothesis. [1 *mark*]

*Nyatakan **satu** hipotesis yang sesuai.* [1 *markah*]

(c) With the use of apparatus such as magnet bar, solenoid and other suitable apparatus describe **one** experiment to investigate the hypothesis stated in **4**(*b*).

Dengan menggunakan radas seperti magnet bar, solenoid dan lain-lain radas, terangkan ***satu*** *eksperimen untuk menyiasat hipotesis yang dinyatakan di* ***4****(b).*

In your description, state clearly the following:

Dalam penerangan anda , nyatakan dengan jelas perkara berikut :

(i) The aim of the experiment.

Tujuan eksperimen.

(ii) The variables in the experiment.

Pembolehubah dalam eksperimen.

(iii) The list of apparatus and materials.

Senarai radas dan bahan.

(iv) The arrangement of the apparatus.

Susunan radas.

(v) The procedure of the experiment which should include **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.

Prosedur eksperimen yang mesti termasuk ***satu*** *kaedah mengawal pembolehubah dimanipulasikan dan* ***satu*** *kaedah mengukur pembolehubah bergerakbalas.*

(vi) The way to tabulate the data.

Cara untuk menjadualkan data.

(vii) The way to analyse the data. [10 *marks*]

Cara untuk menganalisis data. [10 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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** questions in **Section A.** Write your answers for **Section A** in the spaces provided in the question paper.

   *Jawab **semua** soalan dalam **Bahagian A.** Jawapan anda bagi **Bahagian A** hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*

3. Answer **one** question from **Section B**. Write your answers for **Section B** on the paper provided by the invigilators. Answer questions in **Section B** in detail. Answers should be clear and logical. You may use equations, figures, tables, graphs and other suitable methods to explain your answers.

   *Jawab **satu** soalan daripada Bahagian B. Jawapan bagi **Bahagian B** hendaklah ditulis pada helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda diminta menjawab dengan lebih terperinci pada Bahagian B. Jawapan mestilah jelas dan logik. 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. The diagrams in the questions are not drawn to scale unless stated.

   Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.

6. The marks allocated for each question or sub-part of a question are shown in brackets.

   Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.

   Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

8. You may use a non-programmable scientific calculator.

   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

9. You are advised to spend 60 minutes to answer questions in **Section A** and 30 minutes for **Section B** .

   *Anda dinasihatkan supaya mengambil masa 60 minit untuk menjawab soalan dalam **Bahagian A** dan 30 minit untuk **Bahagian B.***

10. Hand in your answer at the end of the examination.

    Serahkan kertas jawapan anda di akhir peperiksaan.