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JABATAN PELAJARAN NEGERI SELANGOR
PERSIDANGAN KEBANGSAAN PENGETUA SEKOLAH MENENGAH

PROGRAM PENINGKATAN PRESTASI AKADEMIK (2) **4531/1**

SIJIL PELAJARAN MALAYSIA 2010

PHYSICS

Kertas 1
Sept./Okt.
1¼ jam

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

2. *Soalan adalah dalam bahasa Inggeris dan diikuti dengan bahasa Melayu yang sepadan.*

3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 32 halaman bercetak.

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

3 $s = ut + \frac{1}{2}at^2$

4 Momentum = mv

5 $F = ma$

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

7 Gravitational potential energy /
Tenaga keupayaan graviti $= mgh$

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

9 $\rho = \frac{m}{V}$

10 Pressure / *Tekanan*, $p = h\rho g$

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

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

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

14 $\frac{pV}{T}$ = constant / *pemalar*

15 $E = mc^2$

16 $v = f\lambda$

17 Power, $P = \frac{\text{energy}}{\text{time}}$

Kuasa, $P = \frac{tenaga}{masa}$

18 $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

19 $\lambda = \frac{ax}{D}$

20 $n = \frac{\sin i}{\sin r}$

21 $n = \frac{\text{real depth}}{\text{apparent depth}}$

$n = \frac{dalam\ nyata}{dalam\ ketara}$

22 $Q = It$

23 $V = IR$

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

25 $\frac{N_s}{N_p} = \frac{V_s}{V_p}$

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

27 $g = 10\ \text{m s}^{-2}$

28 $c = 3{\cdot}0 \times 10^8\ \text{m s}^{-1}$

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1 Which of the following sets of prefixes are arranged in ascending order?
Antara set-set imbuhan berikut, yang manakah disusun dalam susunan menaik?

A Micro, mili, kilo, mega

B Kilo, mega, mili, micro

C Micro, kilo, centi, mega

D Kilo, mega, micro, centi

2 Diagram 1 shows a micrometer screw gauge used to measure the thickness of 100 sheets of paper.
Rajah 1 *menunjukkan tolok skru mikrometer yang digunakan untuk mengukur ketebalan* 100 *helai kertas.*

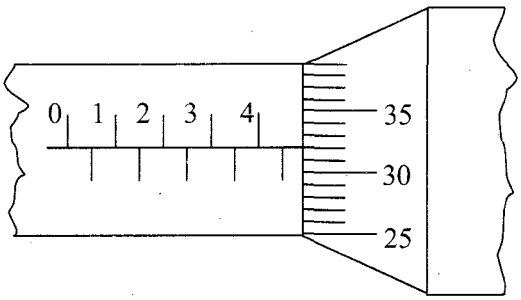

Diagram 1
Rajah 1

What is the thickness of one sheet of paper in mm?
Apakah ketebalan sehelai kertas dalam mm?

A 0·0432

B 0·0438

C 0·0482

D 0·0488

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3 Table 1 shows four sets of measurement of the same plank measured by four students. The actual thickness of the plank is 2·53 cm.

Jadual 1 *menunjukkan empat set pengukuran papan yang sama diukur oleh empat orang pelajar. Ketebalan sebenar sekeping papan itu adalah* 2·53 cm.

Student ***Pelajar***	**Measurement / cm** ***Ukuran* / cm**			
	1	**2**	**3**	**4**
A	2·50	2·50	2·50	2·50
B	2·53	2·53	2·53	2·53
C	2·52	2·53	2·54	2·53
D	2·71	2·73	2·74	2·74

Table 1
Jadual 1

Which student's measurement is **less precision** but **accurate**?

Pengukuran pelajar manakah yang **kurang persis** *tetapi* **jitu**?

4 A group of students carried out an experiment to investigate the relationship between two variables, the variables are as follows:

Sekumpulan pelajar menjalankan satu eksperimen untuk menyiasat hubungan antara dua pembolehubah, pembolehubah-pembolehubahnya adalah seperti berikut:

Manipulated variable : **P**
Pembolehubah dimanipulasikan

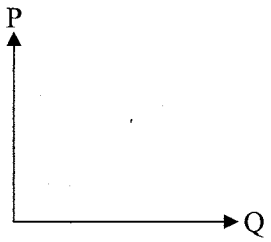
Responding variable : **Q**
Pembolehubah bergerak balas

Constant variable : **R**
Pembolehubah dimalarkan

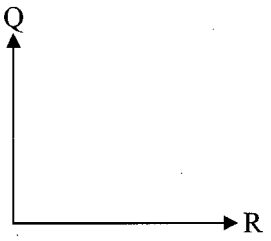
Which graph shows the relationship between the variables?

Graf manakah yang menunjukkan hubungan antara pembolehubah-pembolehubah itu?

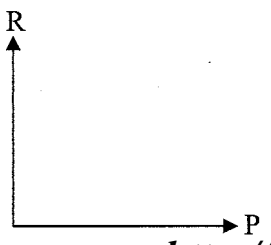
A



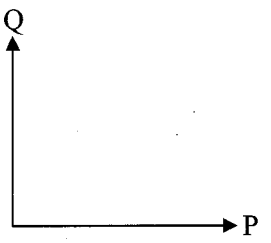
B



C



D



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5 Diagram 2 shows a track for 200 m event. An athlete has finished the race in 25 s.
Rajah 2 menunjukkan trek bagi acara larian 200 m. Seorang atlet telah menamatkan larian tersebut dalam masa 25 s.

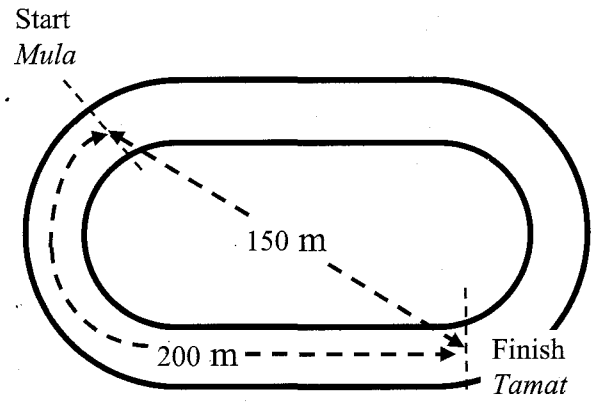


Diagram 2
Rajah 2

What is the velocity of the athlete in m s^{-1}?
Berapakah halaju atlet itu dalam m s^{-1}?

A $\frac{350}{25}$

B $\frac{200}{25}$

C $\frac{150}{25}$

D $\frac{25}{200}$

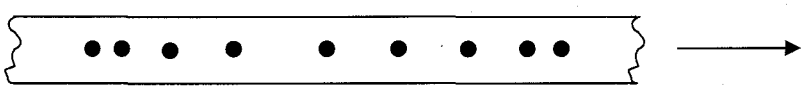
6 Which of the following ticker tapes show acceleration?
Antara pita detik berikut, yang manakah menunjukkan pecutan?

A

B

C

D



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7 Diagram 3 shows a velocity-time graph of a moving bicycle.
Rajah 3 menunjukkan graf halaju-masa bagi sebuah basikal yang bergerak.

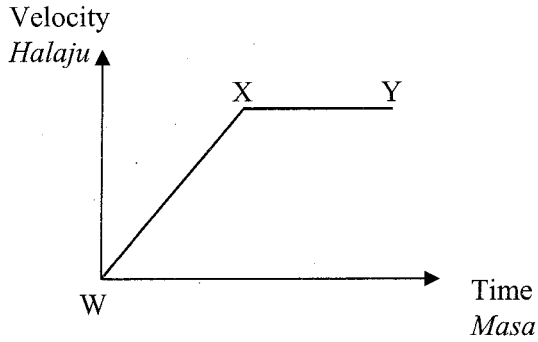

Diagram 3
Rajah 3

Which of the following describes the acceleration of the bicycle?
Antara yang berikut, yang manakah menerangkan pecutan basikal itu?

	WX	XY
A	Increasing *Bertambah*	Decreasing *Berkurang*
B	Increasing *Bertambah*	Uniform *Seragam*
C	Zero *Sifar*	Uniform *Seragam*
D	Uniform *Seragam*	Zero *Sifar*

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8 Diagram 4 shows a stroboscopic photograph of a ball falling towards the ground.
Rajah 4 menunjukkan gambar foto stroboskop sebiji bola yang sedang jatuh ke tanah.

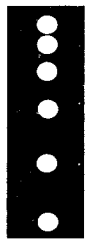

Diagram 4
Rajah 4

Which statement describes the motion of the ball?
Pernyataan manakah menerangkan gerakan bola itu?

A It falls with constant velocity
Ia jatuh dengan halaju malar

B It falls with decreasing velocity
Ia jatuh dengan halaju berkurangan

C It falls with constant acceleration
Ia jatuh dengan pecutan malar

D It falls with increasing acceleration
Ia jatuh dengan pecutan bertambah

9 Diagram 5 shows a heavy steam roller.
Rajah 5 menunjukkan sebuah jentera penggelek stim yang berat.

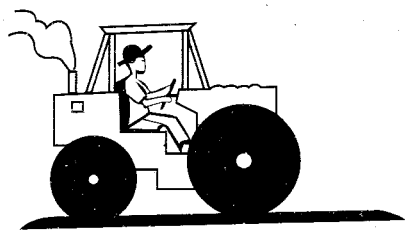

Diagram 5
Rajah 5

The difficulty to change the direction of the vehicle can be explained by
Kesukaran untuk menukar arah gerakan jentera boleh dijelaskan dengan

A the concept of inertia
konsep inersia

B the concept of equilibrium of forces
konsep keseimbangan daya

C the principle of conservation of energy
prinsip keabadian tenaga

D the principle of conservation of momentum
prinsip keabadian momentum

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10 Diagram 6 shows three forces P, Q and R acting on an object O. The object is in equilibrium state.
Rajah 6 menunjukkan tiga daya P, Q *dan* R *yang bertindak ke atas satu objek* O. *Objek tersebut berada dalam keadaan keseimbangan.*

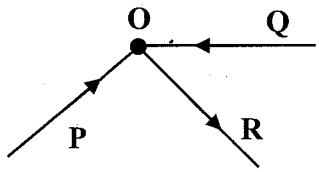
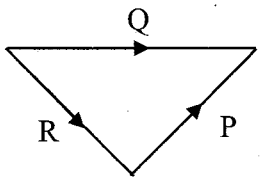
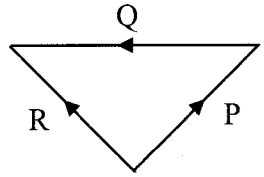
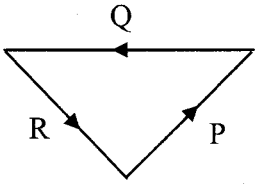


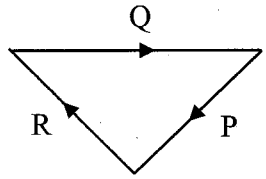
Diagram 6
Rajah 6

Which vector diagram shows the correct triangle of forces?
Rajah vektor yang manakah menunjukkan segi tiga daya yang betul?

A


B


C


D


11 The power of a device increases when it does
Kuasa sebuah alat bertambah apabila ia melakukan

A less work in a short period of time
kurang kerja dalam masa yang pendek

B less work in a long period of time
kurang kerja dalam masa yang panjang

C more work in a short period of time
lebih banyak kerja dalam masa yang pendek

D more work in a long period of time
lebih banyak kerja dalam masa yang panjang

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12 Diagram 7 shows a process of water supply from a tank on top of a hill to tank X on a tall building.
Rajah 7 menunjukkan proses bekalan air dari sebuah tangki di atas puncak bukit ke tangki X di atas sebuah bangunan tinggi.

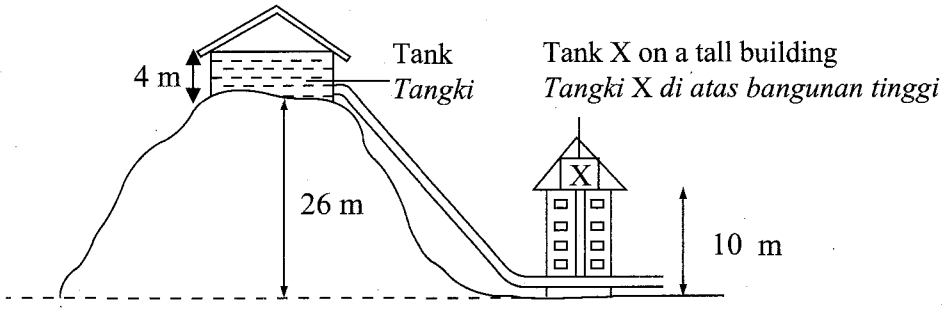

Diagram 7
Rajah 7

What is the pressure of the water at X?
[Density of water = 1 000 kg m^{-3}]

Berapakah tekanan air di X?
[*Ketumpatan air* = 1 000 kg m^{-3}]

A $1{\cdot}4 \times 10^5$ N m^{-2}

B $2{\cdot}0 \times 10^5$ N m^{-2}

C $2{\cdot}6 \times 10^5$ N m^{-2}

D $3{\cdot}0 \times 10^5$ N m^{-2}

13 Why is the atmospheric pressure at a higher altitude lower?
Mengapa tekanan atmosfera pada tempat yang tinggi altitudnya adalah rendah?

A Temperature is high
Suhu adalah tinggi

B Density of air is high
Ketumpatan udara adalah tinggi

C The layer of air is thin
Lapisan udara adalah nipis

D The volume of air does not change
Isi padu udara tidak berubah

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14 Diagram 8 shows a mercury column in a capillary tube. There is air trapped in the upper part of the tube.

Rajah 8 menunjukkan satu turus merkuri di dalam sebuah tiub kapilari. Terdapat udara terperangkap di bahagian atas tiub itu.

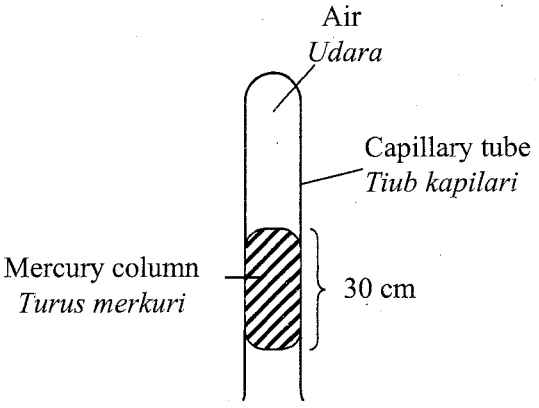

Diagram 8
Rajah 8

What is the air pressure in the tube? [Atmospheric pressure = 76 cm Hg]
Berapakah tekanan udara di dalam tiub itu? [*Tekanan atmosfera* = 76 cm Hg]

A 30 cm Hg

B 46 cm Hg

C 76 cm Hg

D 106 cm Hg

15 Which of the following instrument is used to measure the atmospheric pressure?
Antara alat berikut, yang manakah digunakan untuk mengukur tekanan atmosfera?

A Barometer
Barometer

B Manometer
Manometer

C Hydrometer
Hidrometer

D Galvanometer
Galvanometer

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16 Diagram 9 shows a hydraulic system.
Rajah 9 menunjukkan sebuah sistem hidraulik.

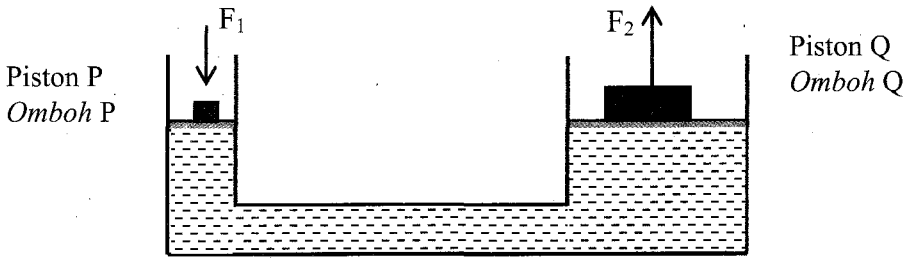

Diagram 9
Rajah 9

Which comparison is true?
Perbandingan yang manakah benar?

A Pressure on piston P > Pressure on piston Q
Tekanan di omboh P > *Tekanan di omboh* Q

B Pressure on piston P = Pressure on piston Q
Tekanan di omboh P = *Tekanan di omboh* Q

C Pressure on piston P < Pressure on piston Q
Tekanan di omboh P < *Tekanan di omboh* Q

17 Diagram 10 shows a wooden block floating on water.
Rajah 10 menunjukkan blok kayu yang terapung di air.

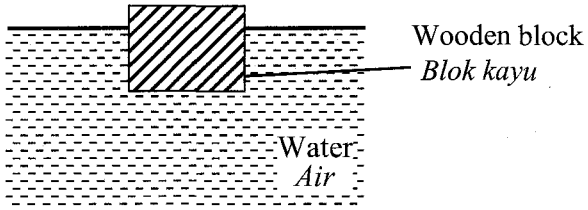

Diagram 10
Rajah 10

The weight of wooden block is
Berat blok kayu adalah

A less than buoyant force
kurang dari daya julangan

B more than buoyant force
lebih dari daya julangan

C equal to buoyant force
sama dengan daya julangan

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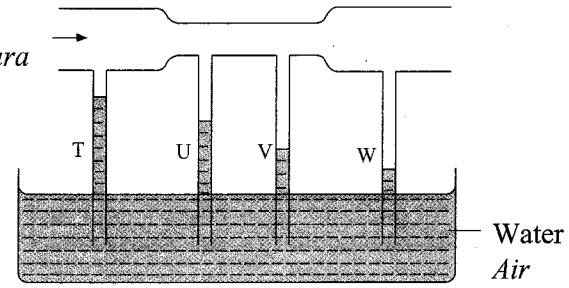
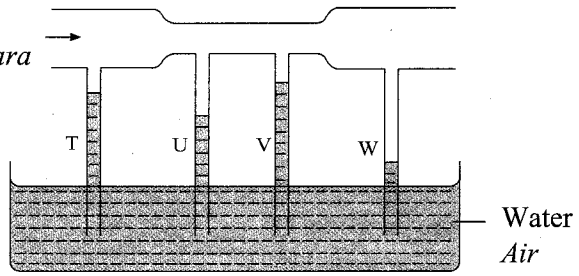
18 Which of the following diagram shows the correct water level in tube T, U, V and W?
Antara rajah berikut, yang manakah menunjukkan aras air yang betul pada tiub T, U, V *dan* W?

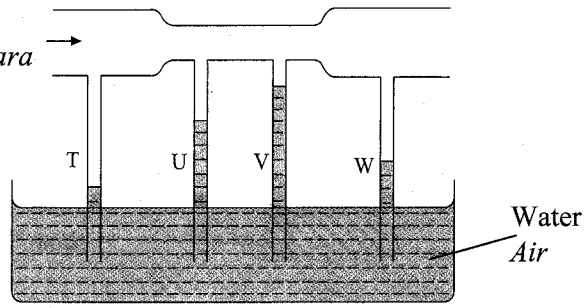
A



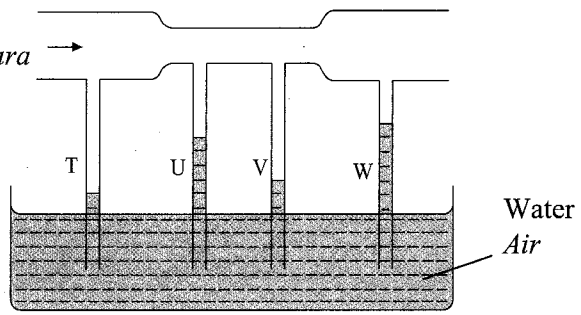
B



C



D



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19 Diagram 11 shows a mercury thermometer which has not been calibrated. The length of mercury column in the thermometer is 5 cm at 0 °C and 55 cm at 100 °C.

Rajah 11 *menunjukkan sebuah termometer merkuri yang belum ditentukur. Panjang turus merkuri pada termometer ialah* 5 cm *pada* 0 °C *dan* 55 cm *pada* 100 °C.

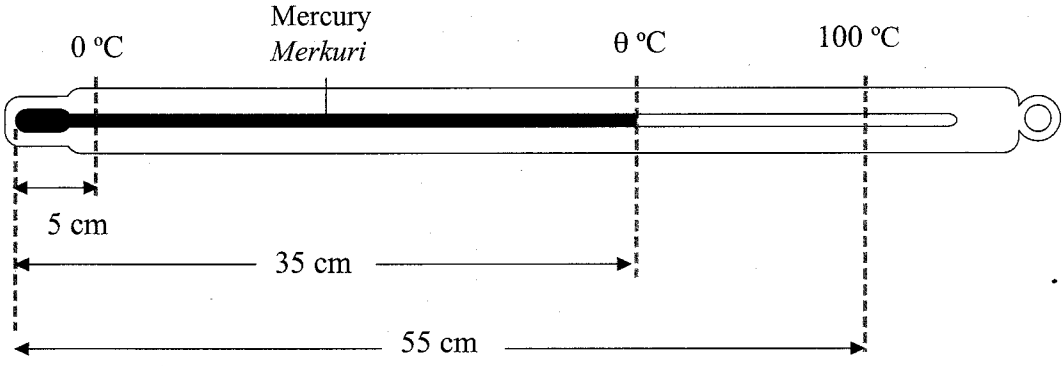

Diagram 11
Rajah 11

When the thermometer is placed in hot water, the length of the mercury column is 35 cm.
What is the temperature of the hot water?

Apabila termometer itu dimasukkan ke dalam air panas, panjang turus merkuri menjadi 35 cm. *Berapakah suhu air panas tersebut*?

A 35·0 °C

B 40·0 °C

C 60·0 °C

D 70·0 °C

20 The temperature of 5 kg water rises by 50 °C when heated.
What is the rise in temperature if 8 kg water is heated by the same amount of heat?

Suhu bagi 5 kg *air meningkat sebanyak* 50 °C *apabila dipanaskan.*
Berapakah peningkatan suhu jika 8 kg *air dipanaskan dengan jumlah haba yang sama*?

A 6·25 °C

B 31·25 °C

C 51·60 °C

D 80·00 °C

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21 Diagram 12 shows a cooling curve of a substance which is initially at gas state.
Rajah 12 *menunjukkan lengkung penyejukan suatu bahan yang pada asalnya dalam keadaan gas.*

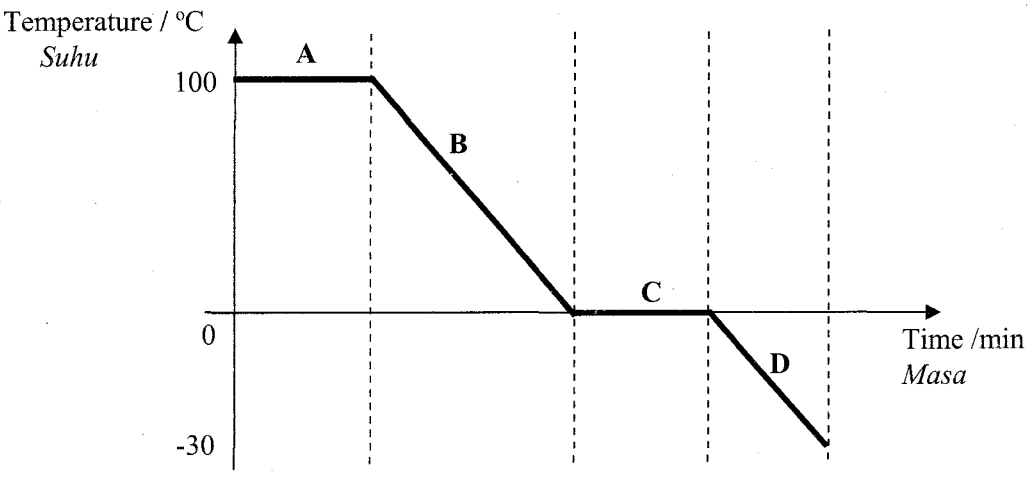

Diagram 12
Rajah 12

At which phase, is the substance in the state of solid and liquid at the same time?
Pada fasa manakah, bahan itu dalam keadaan pepejal dan cecair pada masa yang sama?

22 Diagram 13 shows block L and block M of different material which are in thermal equilibrium.
Rajah 13 *menunjukkan bongkah* L *dan bongkah* M *daripada bahan berlainan yang berada dalam keseimbangan terma.*

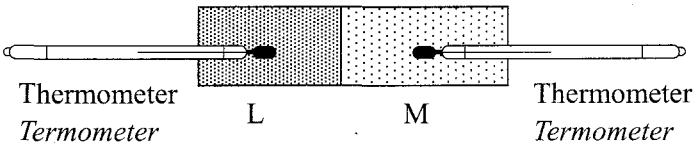

Diagram 13
Rajah 13

Which of following statements is true?
Antara pernyataan berikut, yang manakah benar?

A The net rate of heat transferred is zero
Kadar bersih pemindahan haba adalah sifar

B Temperature of L is higher than temperature of M
Suhu L *lebih tinggi daripada suhu* M

C Specific heat capacity of L = specific heat capacity of M
Muatan haba tentu L = *muatan haba tentu* M

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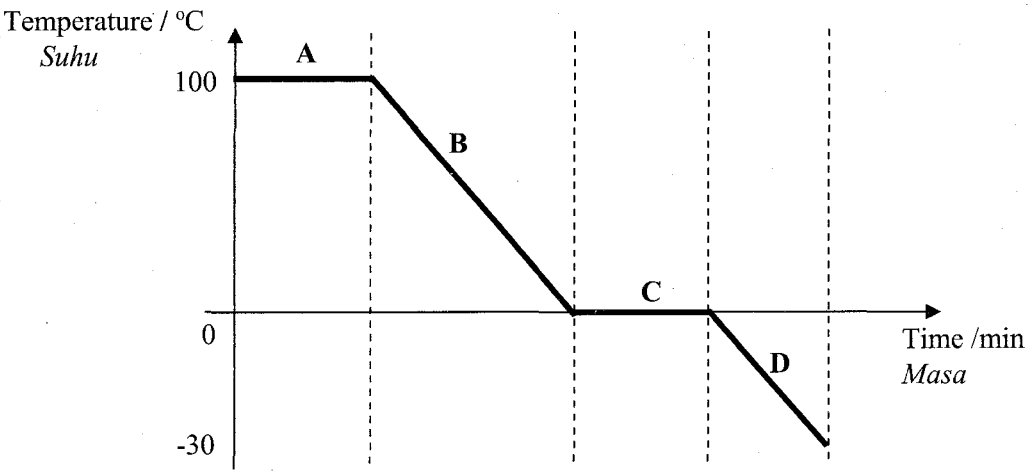

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Pada fasa manakah, bahan itu dalam keadaan pepejal dan cecair pada masa yang sama?

22 Diagram 13 shows block L and block M of different material which are in thermal equilibrium.
Rajah 13 *menunjukkan bongkah* L *dan bongkah* M *daripada bahan berlainan yang berada dalam keseimbangan terma.*

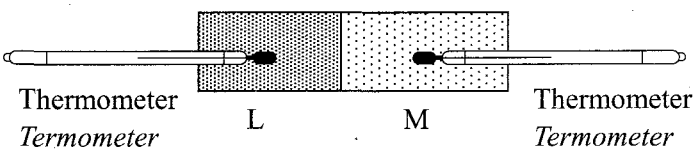

Diagram 13
Rajah 13

Which of following statements is true?
Antara pernyataan berikut, yang manakah benar?

A The net rate of heat transferred is zero
Kadar bersih pemindahan haba adalah sifar

B Temperature of L is higher than temperature of M
Suhu L *lebih tinggi daripada suhu* M

C Specific heat capacity of L = specific heat capacity of M
Muatan haba tentu L = *muatan haba tentu* M

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23 After a long journey the air pressure in a car tyre is increased. This can be explain by
Selepas satu perjalanan yang jauh, tekanan udara di dalam kereta akan bertambah. Ini dapat diterangkan oleh

A Boyle's law
Hukum Boyle

B Charles law
Hukum Charles

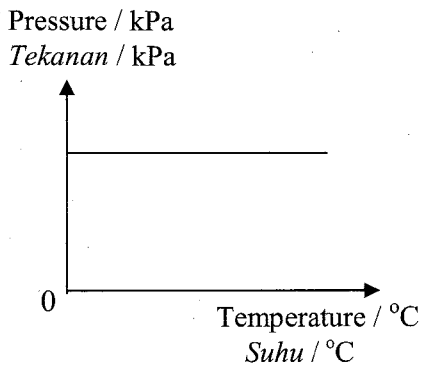
C Pressure law
Hukum Tekanan

D Lenz's law
Hukum Lenz

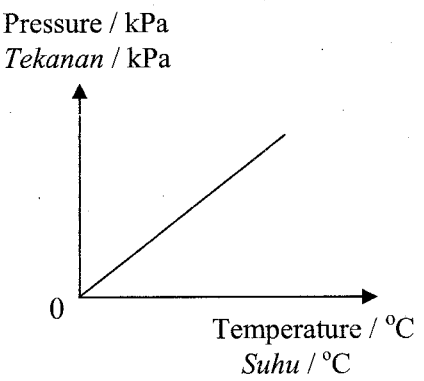
24 An experiment is carried out to investigate the change of pressure with temperature for a fixed mass of gas in a conical flask.
Which graphs shows the correct relationship between pressure and temperature?

Satu eksperimen dijalankan untuk menyiasat perubahan tekanan dengan suhu bagi suatu gas yang berjisim tetap dalam satu kelalang.
Graf yang manakah menunjukkan hubungan antara tekanan dengan suhu yang betul?

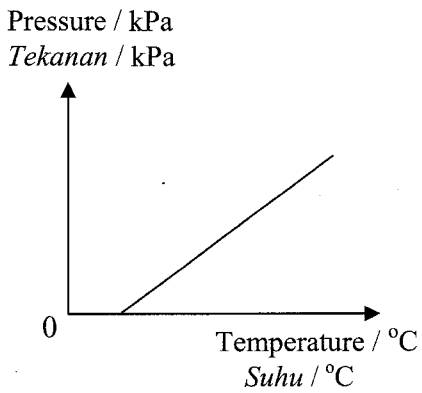
A



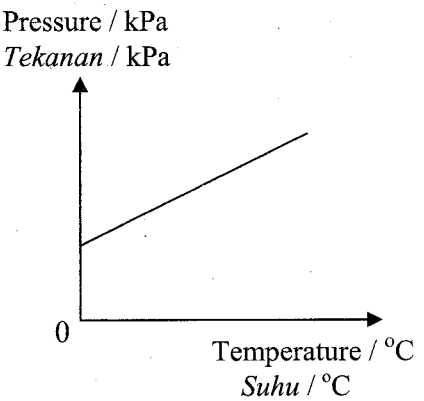
B



C



D



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25 Alcohol is used as a thermometric liquid at North pole because of its
Alkohol digunakan sebagai cecair dalam termometer di kutub Utara kerana

A of its low density
ketumpatannya rendah

B of its low freezing point
takat bekunya rendah

C of its high specific heat capacity
muatan haba tentu yang tinggi

D of its ability to wet the glass tube
kebolehannya membasahi tiub kaca

26 Diagram 14 shows the formation of an image from an object by a convex lens.
Rajah 14 *menunjukkan pembentukan imej daripada suatu objek oleh kanta cembung.*

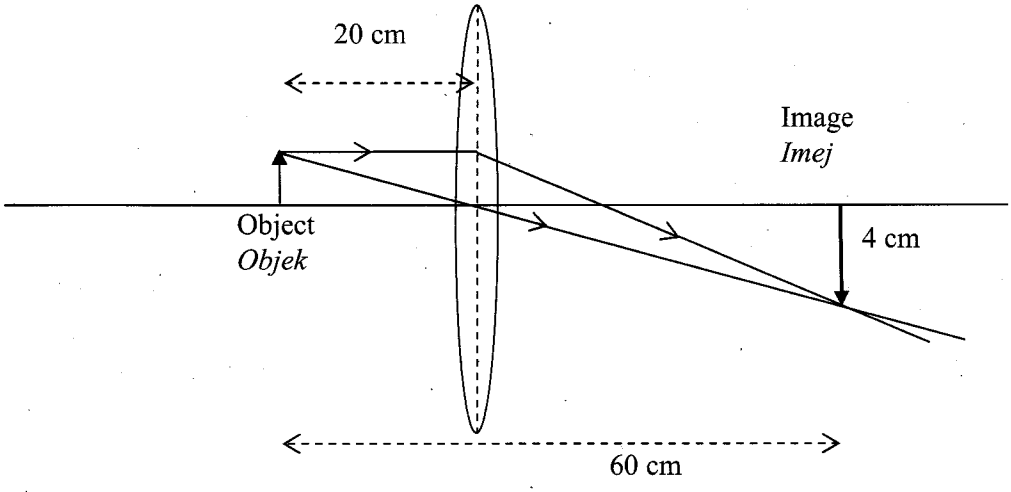

Diagram 14
Rajah 14

What is the height of the object if the height of its image is 4 cm?
Berapakah tinggi objek itu jika tinggi imejnya adalah 4 cm?

A 0·3 cm

B 1·3 cm

C 2·0 cm

D 3·0 cm

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27 Diagram 15 shows the word "**sport**" viewed through lens X and lens Y from two different pairs of spectacles.

Rajah 15 *menunjukkan perkataan "***sport***" yang dilihat melalui kanta* X *dan kanta* Y *daripada dua pasang cermin mata yang berlainan.*

Diagram 15
Rajah 15

What type is lens X and lens Y?
Apakah jenis kanta X *dan kanta* Y?

	Lens X ***Kanta* X**	**Lens Y** ***Kanta* Y**
A	Convex *Cembung*	Convex *Cembung*
B	Concave *Cekung*	Concave *Cekung*
C	Concave *Cekung*	Convex *Cembung*
D	Convex *Cembung*	Concave *Cekung*

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28 Diagram 16 shows an arrangement of lenses for a simple astronomical telescope at normal adjustment. The focal length of the eyepiece, P and objective lens, Q, are f_P and f_Q respectively.

Rajah 16 *menunjukkan susunan kanta-kanta bagi sebuah teleskop astronomi ringkas pada pelarasan normal. Panjang fokus kanta mata,* P *dan kanta mata objektif,* Q, *masing-masing ialah* f_P *dan* f_Q.

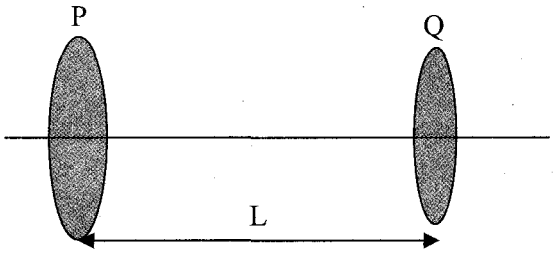


Diagram 16
Rajah 16

Which of the following is correct?
Antara yang berikut, yang manakah betul?

A $L = f_Q + f_P$

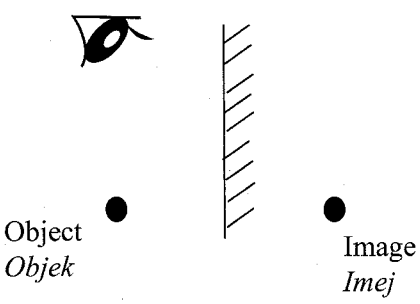
B $L > f_Q + f_P$

C $L > f_Q - f_P$

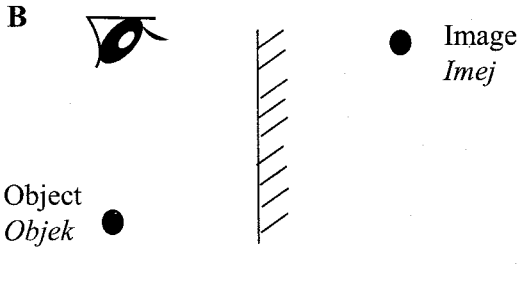
D $L = f_Q - f_P$

29 Which of the following shows the correct ray diagram in producing the image for a plane mirror?
Antara yang berikut, yang manakah menunjukkan rajah sinar yang betul bagi pembentukan imej sebuah cermin satah?

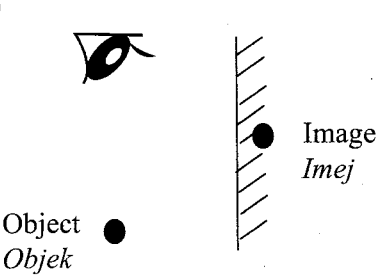
A



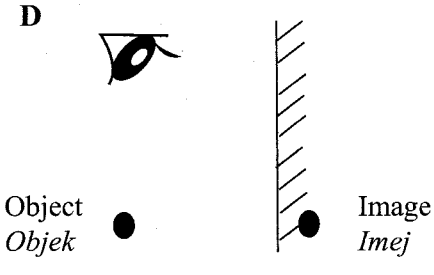
B



C



D



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30 Diagram 18 shows a displacement–time graph of an oscillating spring.
Rajah 18 *menunjukkan graf sesaran–masa bagi suatu ayunan spring.*

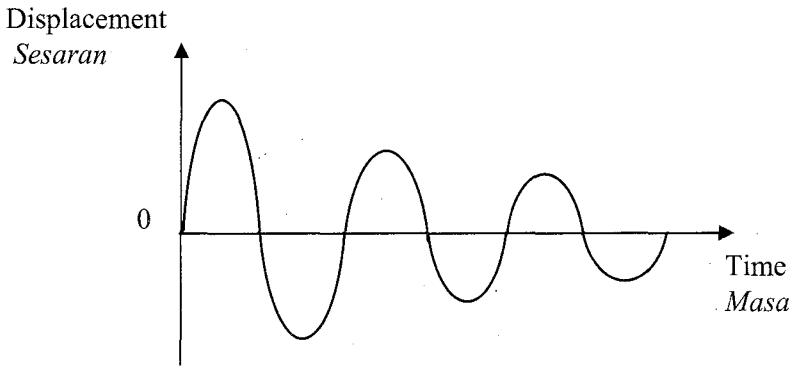

Diagram 18
Rajah 18

The spring undergoes
Spring itu sedang mengalami

A damping
pelembapan

B resonance
resonans

C interference
interferens

D forced oscillation
ayunan paksaan

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31 Diagram 19 shows a boy shouting between two high cliff. He heard an echo after 1·0 s.
Rajah 19 *menunjukkan seorang budak lelaki menjerit antara dua tebing tinggi. Dia mendengar gema lepas* 1·0 s.

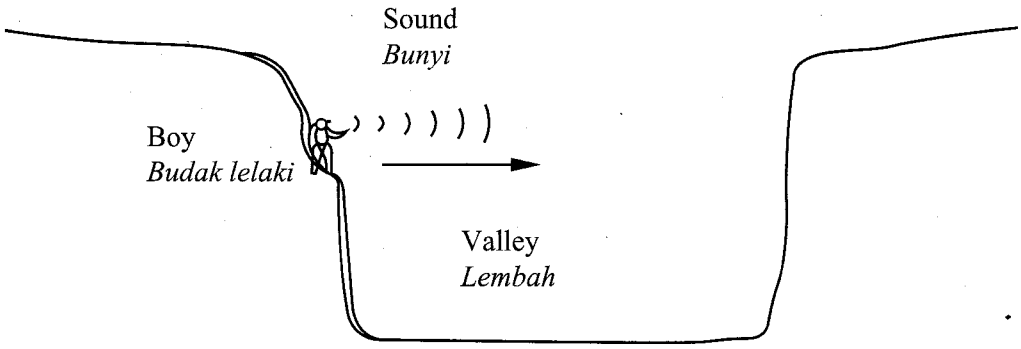

Diagram 19
Rajah 19

What is the width of the valley if the sound velocity travels at 340 m s^{-1}?
Berapakah lebar lembah tersebut jika halaju gelombang bunyi ialah 340 m s^{-1}?

A 85 m

B 170 m

C 340 m

D 680 m

32 Diagram 20 shows an interference pattern of two coherent water sources, X and Y.
At which points, **A**, **B**, **C** or **D** does destructive interference occured?
Rajah 20 *menunjukkan satu corak interferens terbentuk daripada dua punca gelombang yang koheren* X *dan* Y.
Pada titik manakah, **A**, **B**, **C** *atau* **D** *berlakunya interferens memusnah*?

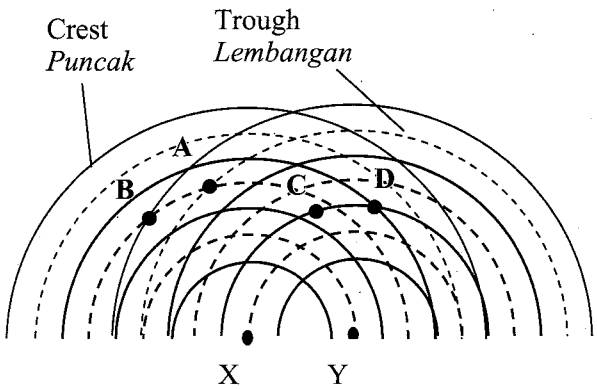

Diagram 20
Rajah 20

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33 Which physical quantity does **not** change if water waves propagate from deep area to shallow area?
Kuantiti fizik manakah yang **tidak** *berubah jika gelombang air merambat daripada kawasan dalam ke kawasan cetek?*

A Velocity
Halaju

B Frequency
Frekuensi

C Amplitude
Amplitud

D Wavelength
Panjang gelombang

34 Diagram 21 shows a house at the bottom of a hill receiving radio waves from a transmission station.
Rajah 21 *menunjukkan sebuah rumah di kaki bukit menerima gelombang radio daripada stesen pemancar.*

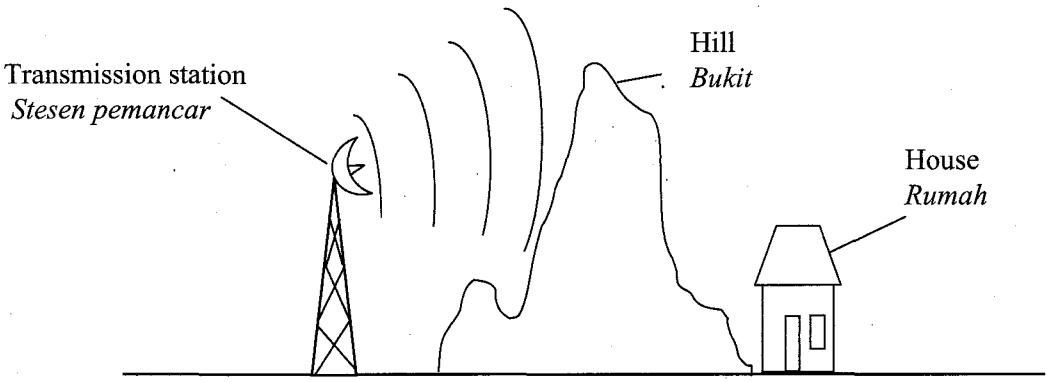

Diagram 21
Rajah 21

This phenomenon happens because the radio waves is
Fenomena ini berlaku disebabkan oleh gelombang radio

A diffracted
dibelau

B refracted
dibias

C reflected
dipantul

D dispersed
diserak

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35 Diagram 22 shows P, Q, R and S as components of an electromagnetic spectrum.
Rajah 22 menunjukkan P, Q, R *dan* S *sebagai komponen-komponen dalam spektrum elektromagnet.*

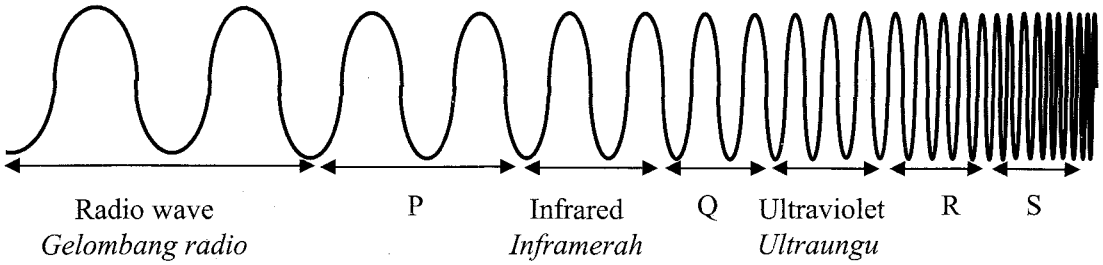

Diagram 22
Rajah 22

Which of the following is true for P, Q, R and S?
Antara yang berikut, yang manakah betul bagi P, Q, R *dan* S?

	P	Q	R	S
A	Microwave *Gelombang mikro*	X-rays *Sinar-X*	Visible light *Cahaya nampak*	Gamma rays *Sinar Gama*
B	Gamma rays *Sinar Gama*	Visible light *Cahaya nampak*	X-rays *Sinar-X*	Microwave *Gelombang mikro*
C	Gamma rays *Sinar Gama*	X-rays *Sinar-X*	Visible light *Cahaya nampak*	Microwave *Gelombang mikro*
D	Microwave *Gelombang mikro*	Visible light *Cahaya nampak*	X-rays *Sinar-X*	Gamma rays *Sinar Gama*

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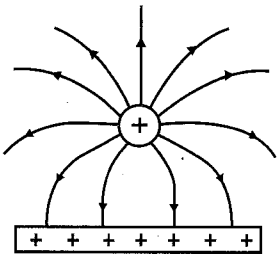
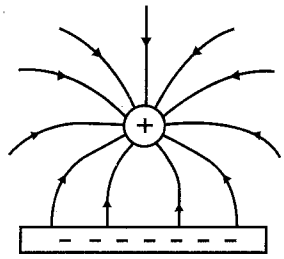
36 Which diagram shows the correct electric field pattern?
Rajah manakah yang menunjukkan corak medan elektrik yang betul?

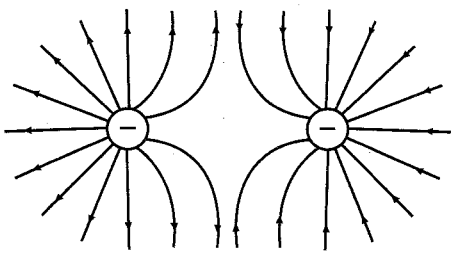
A



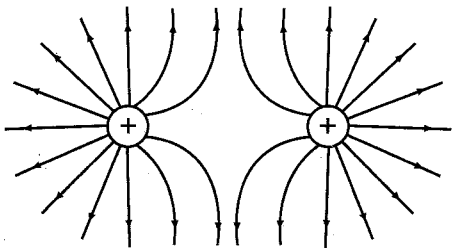
B



C

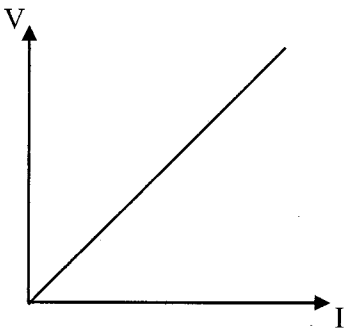


D

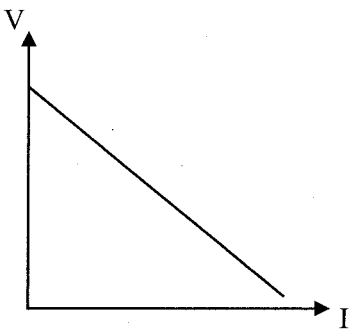


37 Which graph shows the relationship between potential difference, V, and current, I, for a conductor that obeys Ohm's law?
Graf manakah menunjukkan hubungan beza keupayaan, V, *dengan arus,* I, *bagi suatu konduktor yang mematuhi hukum Ohm?*

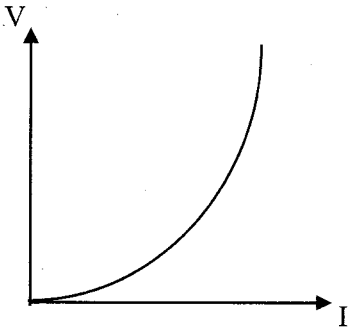
A



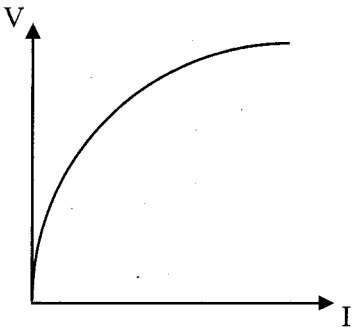
B



C



D



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38 Diagram 23 shows a bar magnet being pushed into a solenoid.
Rajah 23 menunjukkan sebatang magnet bar ditolak ke arah satu solenoid.

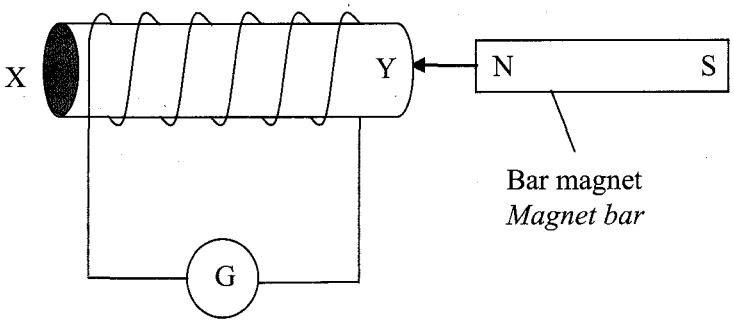

Diagram 23
Rajah 23

Which of the following are correct about poles X and Y?
Antara yang berikut, kutub X *dan kutub* Y *manakah yang betul*?

	X	Y
A	North *Utara*	North *Utara*
B	North *Utara*	South *Selatan*
C	South *Selatan*	North *Utara*
D	South *Selatan*	South *Selatan*

39 The direction of an induced current when there is a relative motion between a conductor and a magnetic field can be determined by
Arah arus aruhan apabila terdapat gerakan relatif antara satu konduktor dengan satu medan magnet boleh ditentukan oleh

A right-hand grip rule
petua genggaman tangan-kanan

B Fleming's right-hand rule
petua tangan-kanan Fleming

C Fleming's left-hand rule
petua tangan-kiri Fleming

D Maxwell's Cork Screw rule
petua Skru Gabus Maxwell

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40 Diagram 24 shows a dry cell in an electric circuit.
Rajah 24 menunjukkan sel kering di dalam satu litar elektrik.

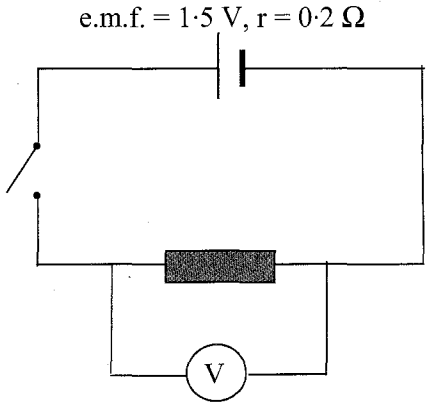

Diagram 24
Rajah 24

What is the reading of the voltmeter when the switch is on?
Apakah bacaan voltmeter apabila suis dihidupkan?

A 0 V

B 1·5 V

C More than 1·5 V
Lebih daripada 1·5 V

D Less than 1·5 V
Kurang daripada 1·5 V

41 Which of the following instruments does **not** apply the effect of electromagnet in its working principle?
Antara alat berikut, yang manakah **tidak** *mengaplikasikan kesan elektromagnet dalam prinsip kerjanya*?

A Ticker timer
Jangka masa detik

B Speaker
Pembesar suara

C Circuit breaker
Pemutus litar

D Electric bell
Loceng elektrik

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42 Diagram 25 shows an electric circuit.
Rajah 25 menunjukkan satu litar elektrik.

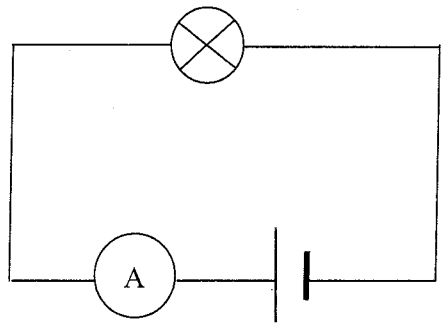

Diagram 25
Rajah 25

What will happen to the ammeter reading when another identical bulb is connected parallel to the bulb in the circuit?
Apakah yang akan berlaku kepada bacaan ammeter apabila satu lagi mentol yang serupa disambungkan secara selari kepada mentol dalam litar?

A Increases
Bertambah

B Decreases
Berkurang

C No change
Tidak berubah

43 A 10 Ω resistor is connected across the terminals of a 9 V battery.
What is the power dissipated in the resistor?
Satu perintang 10 Ω *disambungkan merentasi terminal sebiji bateri* 9 V.
Berapakah kuasa yang dilesapkan dalam perintang?

A 0·9 W

B 8·1 W

C 11·1 W

D 90·0 W

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44 Diagram 26 shows a transformer connected to a computer.
Rajah 26 menunjukkan satu transformer yang disambungkan kepada sebuah komputer.

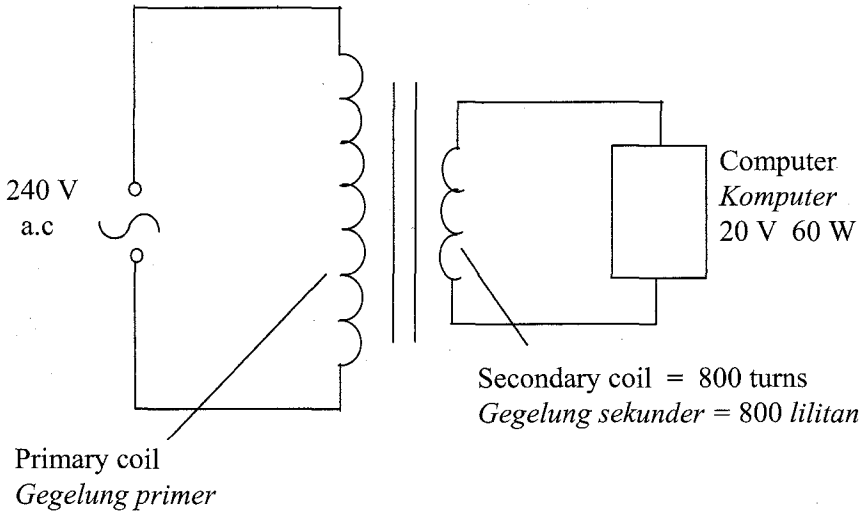

Diagram 26
Rajah 26

What is the number of turns of the primary coil?
Berapakah bilangan lilitan gegelung primer?

A 9 600

B 3 200

C 160

D 67

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45 Diagram 27 shows a model of transmission of electricity.
Rajah 27 menunjukkan model penghantaran elektrik.

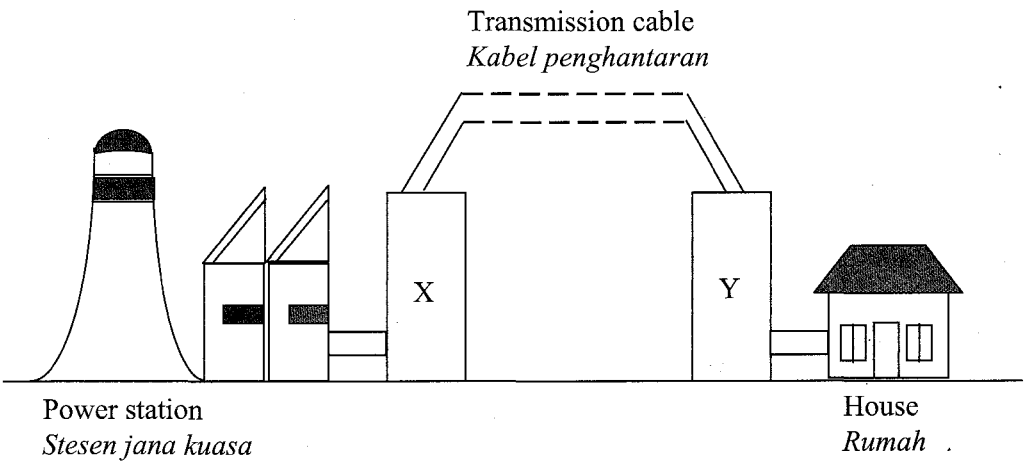

Diagram 27
Rajah 27

Which are the correct transformer for X and Y?
Transformer yang manakah betul bagi X dan Y?

	X	Y
A	Step-up transformer *Transformer injak naik*	Step-up transformer *Transformer injak naik*
B	Step-up transformer *Transformer injak naik*	Step-down transformer *Transformer injak turun*
C	Step-down transformer *Transformer injak turun*	Step-down transformer *Transformer injak turun*
D	Step-down transformer *Transformer injak turun*	Step-up transformer *Transformer injak naik*

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46 Diagram 28 shows a circuit connected to the cathode ray oscilloscope (CRO).
Rajah 28 *menunjukkan satu litar yang disambungkan kepada osiloskop sinar katod* (*OSK*).

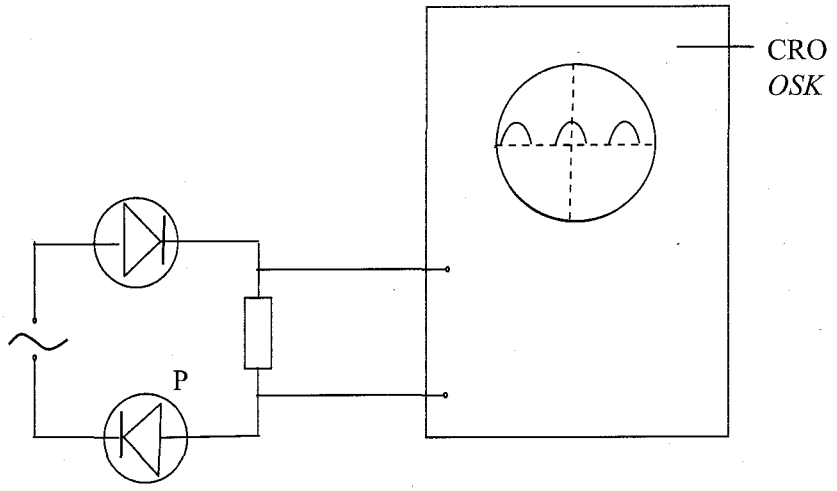
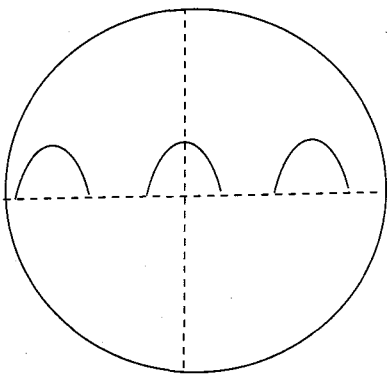


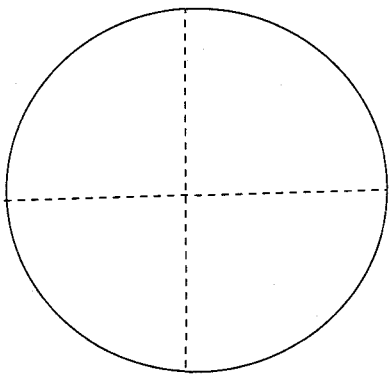
Diagram 28
Rajah 28

Which of the following traces displayed on the CRO is correct when diode P is reversed?
Antara surihan berikut, yang manakah betul dipaparkan pada OSK apabila diod P *disongsangkan*?

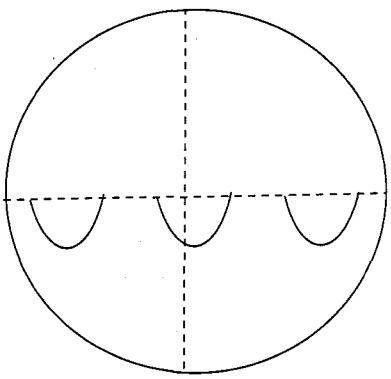
A



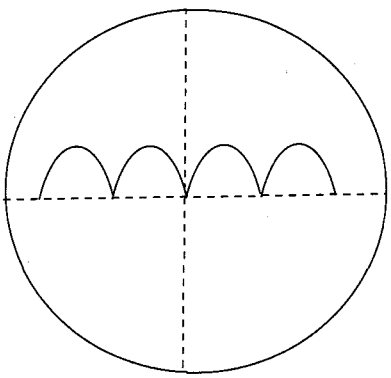
B



C



D



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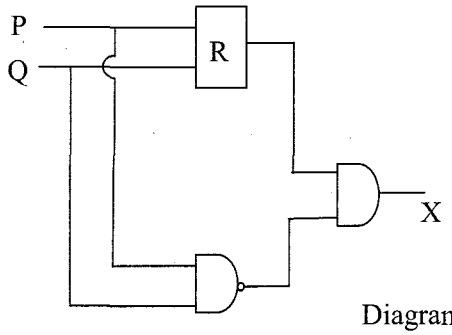
47 Diagram 29 shows a combinations of logic gates and a truth table.
Rajah 29 menunjukkan kombinasi get-get logik dan jadual kebenaran.



Input		Output
P	Q	X
0	0	0
0	1	1
1	0	1
1	1	0

Diagram 29
Rajah 29

What is logic gate R?
Apakah get logik R?

A OR
ATAU
B NOR
TAK ATAU
C AND
DAN
D NAND
TAK DAN

48 Diagram 30 shows the decay curve of a radioactive material.
Rajah 30 menunjukkan lengkungan penyusutan suatu bahan radioaktif.

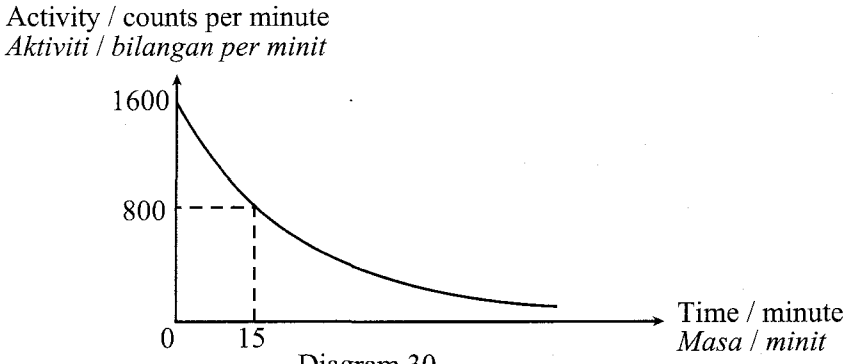


Diagram 30
Rajah 30

What is the activity after 1 hour?
Berapakah aktivitinya selepas 1 *jam*?

A 400
B 200
C 100
D 50

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49 The equation shows the nuclear fission of Uranium-235.
Persamaan menunjukkan pembelahan nukleus bagi Uranium-235.

$$^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{P}_{54}Xe + {}^{94}_{Q}Sr + 2\ {}^{1}_{0}n$$

What are the values of P and Q?
Apakah nilai P *dan nilai* Q?

	P	Q
A	142	36
B	141	38
C	140	38
D	139	36

50 Diagram 31 shows the path of a radioactive particle, X passing through two charged plates.
Rajah 31 *menunjukkan lintasan satu zarah radioaktif,* X *melalui dua plat bercas.*

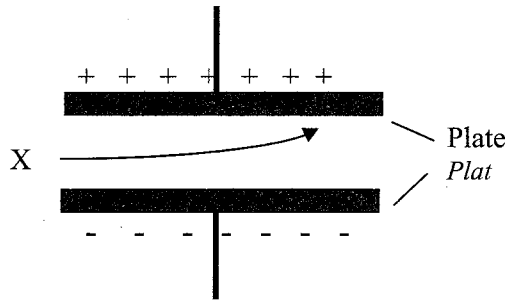

Diagram 31
Rajah 31

What is X?
Apakah X?

A α- particle
zarah - α

B β- particle
zarah - β

C X - ray
sinar – X

D γ - ray
sinar - γ

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **50** questions.
   Kertas soalan ini mengandungi **50** *soalan.*

2. Answer **all** questions.
   Jawab **semua** *soalan.*

3. Each question is followed by either **three** or **four** options. Choose the best option for each question and blacken the correct space on the objective answer sheet.

   Tiap-tiap soalan diikuti oleh sama ada **tiga** *atau* **empat** *pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang betul pada kertas jawapan objektif .*

4. Blacken only **one** space for each question.
   Hitamkan **satu** *ruangan sahaja bagi setiap soalan.*

5. If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.

   Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.

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

7. You may use a non-programmable scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

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

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NO. KAD PENGENALAN | | | | | | | | | | | | | |

ANGKA GILIRAN | | | | | | | | | |

Nama ..... Tingkatan .....

JABATAN PELAJARAN NEGERI SELANGOR
PERSIDANGAN KEBANGSAAN PENGETUA SEKOLAH MENENGAH

PROGRAM PENINGKATAN PRESTASI AKADEMIK (2) 4531/2

SIJIL PELAJARAN MALAYSIA 2010

PHYSICS

Kertas 2
Sept./Okt.
2½ jam

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan* **nombor kad pengenalan**, **angka giliran**, **nama** *dan* **tingkatan** *anda pada petak yang disediakan.*

2. *Kertas soalan ini adalah dalam dwibahasa.*

3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*

4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*

5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

4531/2

Untuk Kegunaan Pemeriksa

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	
Jumlah			

Kertas soalan ini mengandungi 32 halaman bercetak.

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

3 $s = ut + \frac{1}{2}at^2$

4 Momentum = mv

5 $F = ma$

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

7 Gravitational potential energy / *Tenaga keupayaan graviti* $= mgh$

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

9 Power, $P = \frac{\text{energy}}{\text{time}}$

Kuasa, $P = \frac{tenaga}{masa}$

10 $\rho = \frac{m}{V}$

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

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

13 $\frac{pV}{T}$ = constant / *pemalar*

14 $p_1V_1 = p_2V_2$

15 $n = \frac{\sin i}{\sin r}$

16 $n = \frac{\text{real depth}}{\text{apparent depth}}$

$n = \frac{dalam\ nyata}{dalam\ ketara}$

17 $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

18 Linear magnification / *Pembesaran linear*, $m = \frac{v}{u}$

19 $v = f\lambda$

20 $\lambda = \frac{ax}{D}$

21 $Q = It$

22 $E = VQ$

23 $V = IR$

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

25 $g = 10\ \text{m s}^{-2}$

26 $\frac{N_s}{N_p} = \frac{V_s}{V_p}$

27 Efficiency / *Kecekapan*

$= \frac{I_s V_s}{I_p V_p} \times 100\%$

28 $E = mc^2$

29 $c = 3{\cdot}0 \times 10^8\ \text{m s}^{-1}$

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Section A
Bahagian A

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

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

1 Diagram 1 shows circular water waves produced by a vibrating dipper in a ripple tank with the frequency of 10 Hertz and propagates towards a barrier.
Rajah 1 *menunjukkan gelombang air membulat yang dihasilkan oleh pencelup yang bergetar dalam sebuah tangki riak yang berfrekuensi* 10 *Hertz dan merambat ke arah satu penghadang.*

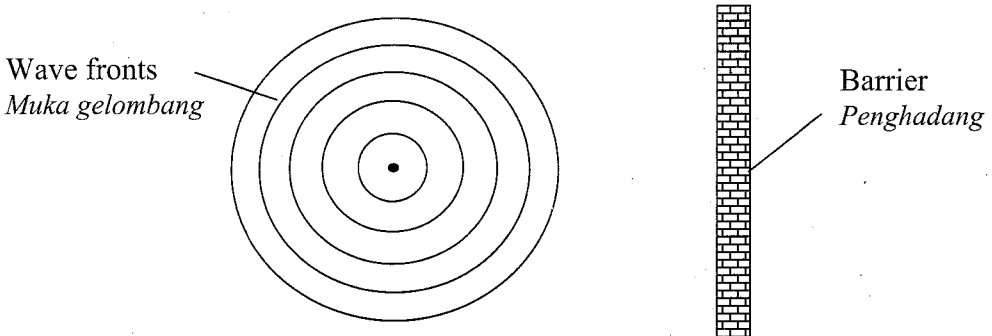

Diagram 1
Rajah 1

(*a*) Complete the sentence below by ticking (√) in the correct box.
Lengkapkan ayat di bawah dengan menandakan (√) dalam kotak yang betul.

Water wave is
Gelombang air adalah

☐ transverse wave
gelombang melintang

☐ longitudinal wave
gelombang membujur

1(*a*) 1

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

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(*b*) State the wave phenomenon that occurred.
Nyatakan fenomena gelombang yang berlaku.

.....

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

1(*b*) 1

(*c*) State the change in the amplitude and frequency of the water wave after it hit the barrier.
Nyatakan perubahan amplitud dan frekuensi gelombang air selepas ia melanggar penghadang.

Amplitude:
Amplitud:

.....

Frequency:
Frekuensi:

.....

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

1(*c*) 2

Total A1 4

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2 Diagram 2 shows a mass of 0·8 kg T-shirt that is hung on a clothes line.
Rajah 2 menunjukkan sehelai baju-T yang berjisim 0·8 kg digantung pada tali penyidai.

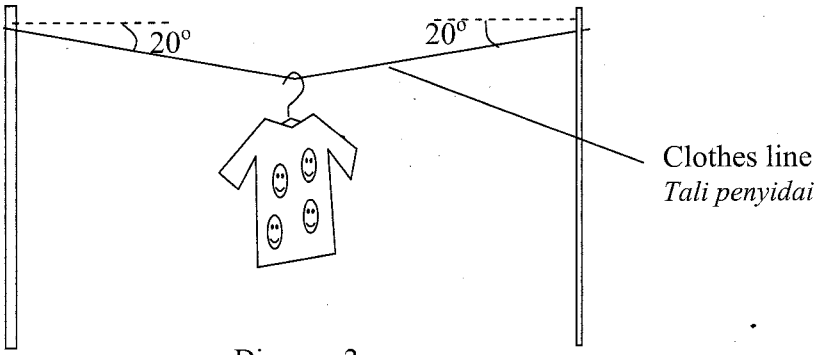

Diagram 2
Rajah 2

(*a*) What is the base unit of the force?
Apakah unit asas bagi daya?

2(*a*) 1

.....

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

(*b*) Mark and label in Diagram 2,
Tanda dan labelkan dalam Rajah 2,

(i) the tension force of the line, T, that acts on the clothes line when the T-shirt is hung.
daya ketegangan tali, T, *yang bertindak ke atas tali penyidai apabila baju-*T *itu digantung.*

2(*b*) 2

(ii) the weight of the T-shirt, W.
*berat baju-*T, W.

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

(*c*) Using the concept of forces in equilibrium, calculate the tension force, T.
Menggunakan konsep keseimbangan daya, kirakan daya ketegangan, T.

2(*c*) 2

Total A2 5

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

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3 Diagram 3 shows a type of nuclear reaction where the number of neutrons produced is X.

Rajah 3 menunjukkan sejenis tindak balas nuklear dimana bilangan neutron yang terhasil ialah X.

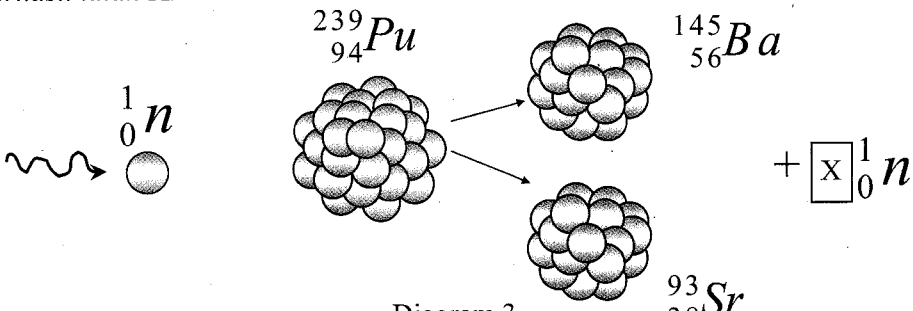

Diagram 3
Rajah 3

(*a*) Name the type of nuclear reaction.
Namakan jenis tindak balas nuklear ini.

.....

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

3(*a*) 1

(*b*) State the value of X.
Nyatakan nilai X.

.....

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

3(*b*) 1

(*c*) Total atomic mass before reaction is $3{\cdot}985 \times 10^{-25}$ kg and total atomic mass after reaction is $3{\cdot}982 \times 10^{-25}$ kg.
Jumlah jisim atom sebelum tindak balas ialah $3{\cdot}985 \times 10^{-25}$ kg *dan jumlah jisim atom selepas tindak balas ialah* $3{\cdot}982 \times 10^{-25}$ kg.

Calculate,
Hitungkan,

(i) the mass defect,
cacat jisim,

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

3(*c*)(i) 2

(ii) the amount of energy released.
jumlah tenaga yang terbebas.

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

3(*c*)(ii) 2

Total A3 6

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4 Diagram 4 shows a temperature-time graph for the heating of a 50 g substance. The initial state of the substance is solid.

Rajah 4 menunjukkan satu graf suhu-masa bagi pemanasan 50 g satu bahan. Keadaan permulaan bahan itu adalah pepejal.

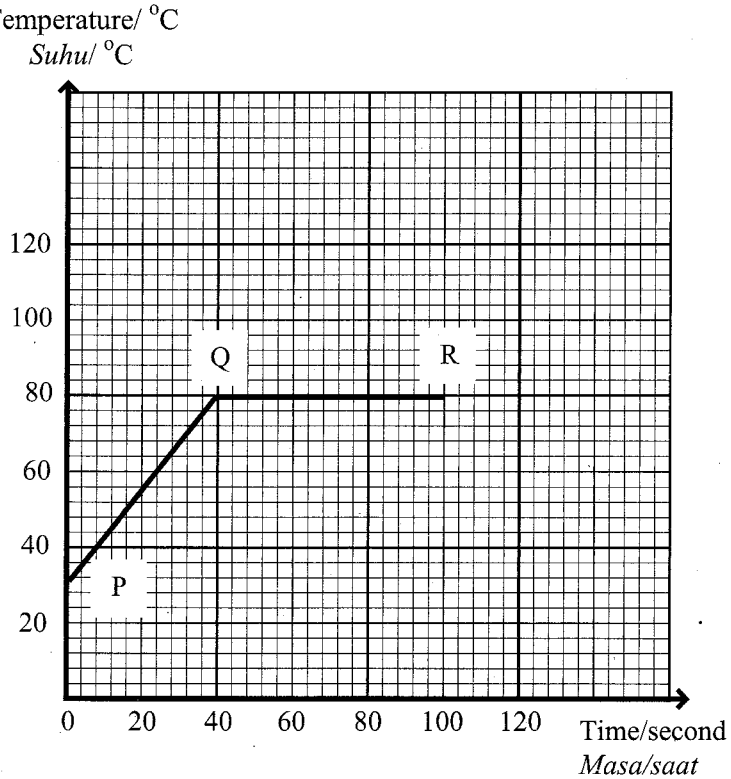

Diagram 4
Rajah 4

(*a*) (i) What is the meaning of temperature?
Apakah yang dimaksudkan dengan suhu?

4(*a*)(i) 1

.....

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

(ii) What is the melting point of the substance?
Apakah takat lebur bahan itu?

4(*a*)(ii) 1

.....

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

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(*b*) What is the physical state of the substance at QR?
Apakah keadaan fizikal bahan pada QR?

.....

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

4(*b*) 1

(*c*) Determine the time taken for the substance to change from solid state to liquid state.
Tentukan masa yang diambil untuk bahan berubah daripada keadaan pepejal kepada keadaan cecair.

.....

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

4(*c*) 1

(*d*) Calculate the heat energy required to raise the temperature of the substance from 30 °C to 80 °C. Given the specific heat capacity of the substance as 1720 J kg^{-1} $°C^{-1}$.
Hitungkan tenaga haba yang diperlukan untuk meningkatkan suhu bahan itu dari 30 °C *ke* 80 °C. *Diberi muatan haba tentu bahan sebagai* 1720 J kg^{-1} $°C^{-1}$.

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

4(*d*) 3

Total A4 7

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5 Diagram 5.1 and Diagram 5.2 show two identical thistle funnels that are covered with rubber sheets and is immersed in measuring cylinders filled with liquid P which density is 0·8 g cm^{-3}. A manometer is connected to the thistle funnel using rubber tube. The depth, h_1 and h_2 are measured from the surface of the liquid P to the rubber sheet.

Rajah 5.1 *dan Rajah* 5.2 *menunjukkan corong tisel yang ditutup dengan kepingan getah dan direndamkan ke dalam silinder penyukat yang mengandungi cecair* P *yang ketumpatannya adalah* 0·8 g cm^{-3}. *Sebuah manometer disambungkan kepada corong tisel dengan tiub getah. Kedalaman* h_1 *dan* h_2 *diukur dari permukaan cecair* P *ke kepingan getah.*

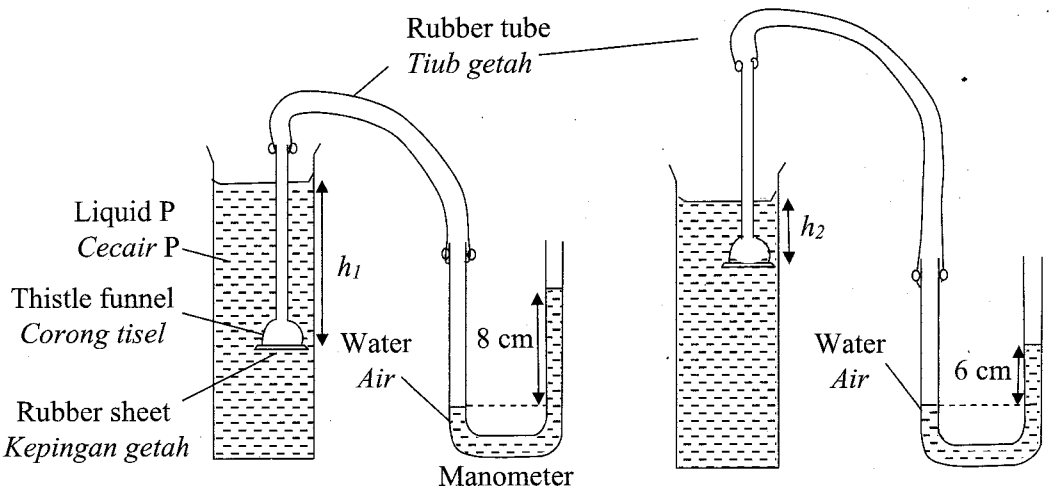

Diagram 5.1
Rajah 5.1

Diagram 5.2
Rajah 5.2

5(*a*)

(*a*) State the function of manometer?
Nyatakan kegunaan manometer?

.....

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

(*b*) Observe Diagram 5.1 and Diagram 5.2.
Perhatikan Rajah 5.1 *dan Rajah* 5.2.

5(*b*)(i)

(i) Compare h_1 and h_2.
Bandingkan h_1 *dan* h_2.

.....

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

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(ii) Compare the difference in height of the water level in the manometer.
Bandingkan perbezaan ketinggian paras air di dalam manometer.

.....

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

5(*b*)(ii) 1

(iii) Name the physical quantity that represents the difference in height of the water in manometer.
Namakan kuantiti fizik yang mewakili perbezaan ketinggian air dalam manometer.

.....

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

5(*b*)(iii) 1

(iv) Relate the answers in **5**(*b*)(i) and **5**(*b*)(ii).
Hubung kait jawapan dalam **5**(*b*)(i) *dan* **5**(*b*)(ii).

.....

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

5(*b*)(iv) 1

(v) Relate the depth of the liquid and the physical quantity in **5**(*b*)(iii).
Hubung kait kedalaman cecair dengan kuantiti fizik dalam **5**(*b*)(iii).

.....

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

5(*b*)(v) 1

(*c*) Liquid P with density 0·8 g cm^{-3} in Diagram 5.2 is then replaced by liquid Q with density 1·0 g cm^{-3}. Predict what will happen to the difference in height of the water in manometer and give your reason.
Cecair P *berketumpatan* 0·8 g cm^{-3} *dalam Rajah* 5.2 *kemudian digantikan dengan cecair* Q *yang berketumpatan* 1·0 g cm^{-3}. *Ramalkan apa yang akan berlaku kepada perbezaan ketinggian air dalam manometer dan berikan sebab anda.*

.....

.....

.....

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

5(*c*) 2

Total A5 8

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6 Diagram 6.1 and Diagram 6.2 show identical copper rods placed on bare copper wire between the poles of magnets. Copper rod is at the initial position when the switch is off. When the switch in each circuit is on, the ammeter pointer deflects and the copper rod moves to the final position as shown in Diagram 6.1 and Diagram 6.2.

Rajah 6.1 *dan Rajah* 6.2 *menunjukkan rod kuprum diletakkan di atas dawai kuprum tak bertebat di antara kutub-kutub magnet. Rod kuprum berada di kedudukan awal apabila suis dimatikan. Bila suis dalam setiap litar dihidupkan, penunjuk ammeter terpesong dan rod kuprum bergerak ke kedudukan akhir seperti yang ditunjukkan dalam Rajah* 6.1 *dan Rajah* 6.2.

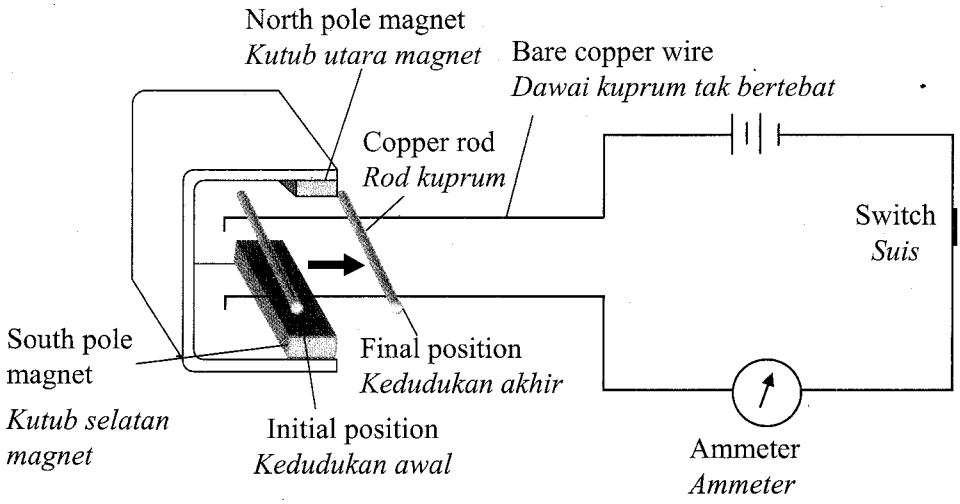

Diagram 6.1
Rajah 6.1

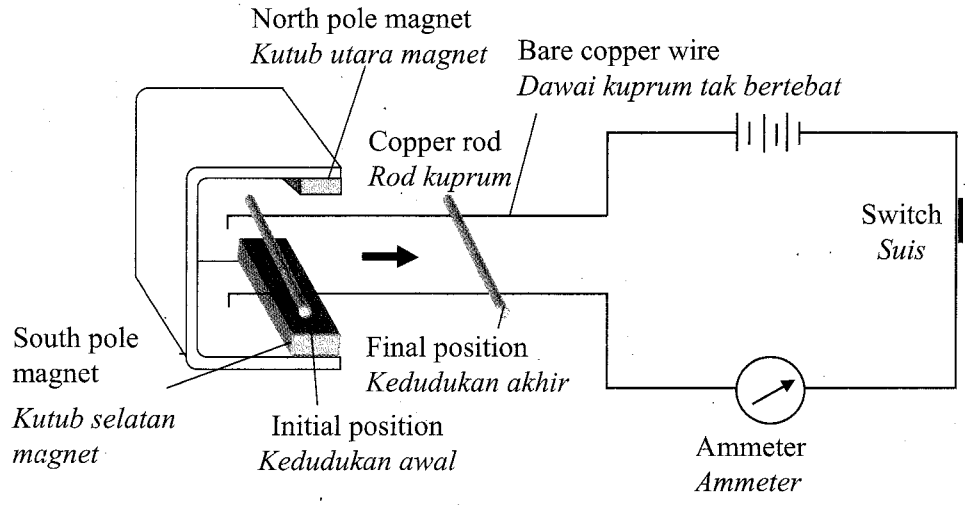

Diagram 6.2
Rajah 6.2

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(*a*) Using Diagram 6.1 and Diagram 6.2.
Menggunakan Rajah 6.1 *dan Rajah* 6.2.

(i) Compare the number of batteries used.
Bandingkan bilangan bateri yang digunakan.

.....

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

6(*a*)(i) 1

(ii) Compare the degree of deflection of the ammeter pointer.
Bandingkan sudut pesongan penunjuk ammeter.

.....

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

6(*a*)(ii) 1

(iii) Compare the amount of current flow in each circuit.
Bandingkan jumlah arus yang mengalir dalam setiap litar.

.....

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

6(*a*)(iii) 1

(iv) Compare the final positions of the copper rods.
Bandingkan kedudukan akhir rod-rod kuprum itu.

.....

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

6(*a*)(iv) 1

(*b*) State **one** physics quantity that causes the rods to move.
Nyatakan **satu** *kuantiti fizik yang menyebabkan rod-rod itu bergerak.*

.....

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

6(*b*) 1

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(*c*) Relate the amount of current flow and the magnitude of the physics quantity that you stated in **6**(*b*).

Hubung kait jumlah arus yang mengalir dan magnitud kuantiti fizik yang anda nyatakan dalam **6**(*b*).

6(*c*) 1

.....

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

(*d*) Name the rule use to determine the direction of the movement of the copper rod.

Namakan peraturan yang digunakan untuk menentukan arah gerakan rod kuprum itu.

6(*d*) 1

.....

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

(*e*) State **one** other factor that affects the magnitude of the physics quantity you stated in **6**(*b*).

Nyatakan **satu** *faktor lain yang mempengaruhi magnitud kuantiti fizik yang dinyatakan dalam* **6**(*b*).

6(*e*) 1

.....

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

Total A6 8

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7 Diagram 7.1 shows a circuit that consist of two batteries, 1·5 V each and two identical resistors, R. The ammeter reading is 1·5 A.

Rajah 7.1 *menunjukkan satu litar yang terdiri daripada dua bateri,* 1·5 V *setiap satu dan dua perintang,* R *yang serupa. Bacaan ammeter ialah* 1·5 A.

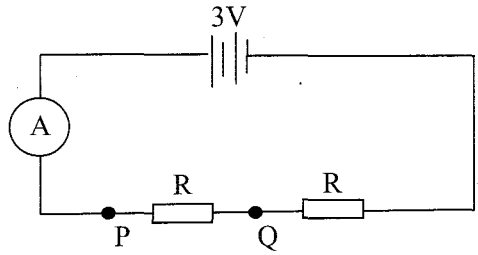

Diagram 7.1
Rajah 7.1

(*a*) Complete the sentence below by ticking (√) in the correct box.
Lengkapkan ayat di bawah dengan menandakan (√) dalam kotak yang betul.

The resistor in Diagram 7.1 is connected in
Perintang dalam Rajah 7.1 *disambung secara*

☐ series circuit / *litar sesiri.*

☐ parallel circuit / *litar selari.*

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

7(*a*) 1

(*b*) What will happen to the ammeter reading when a copper wire is connected between P and Q?
Give the reason.
Apakah yang akan berlaku pada bacaan ammeter apabila dawai kuprum disambungkan pada P *dan* Q?
Berikan sebabnya.

.....

.....

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

7(*b*) 2

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(c) Diagram 7.2 shows a circuit that consist of a bulb rated 3 V, 6 W with potential difference, 3 V. When the switch is on, current 2 A will flow and the bulb will light up with normal brightness.

Rajah 7.2 *menunjukkan satu litar yang terdiri daripada sebiji mentol berkadar* 3 V, 6 W *dengan beza keupayaan* 3 V. *Apabila suis dihidupkan, arus* 2 A *akan mengalir dan mentol akan menyala dengan kecerahan normal.*

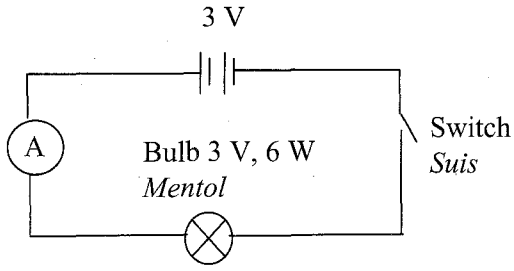

Diagram 7.2
Rajah 7.2

Diagram 7.3 shows a circuit that consist of two bulbs rated 3 V, 6 W each with the potential difference, 3 V.

Rajah 7.3 *menunjukkan litar yang terdiri daripada dua mentol yang setiapnya berkadaran* 3 V, 6 W *dengan beza keupayaan* 3 V.

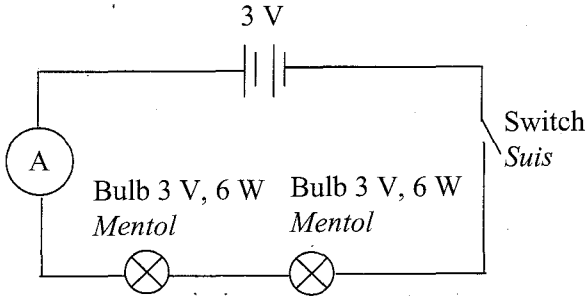

Diagram 7.3
Rajah 7.3

(i) Based on Diagram 7.2, calculate the resistance of the bulb.
Berdasarkan Rajah 7.2, *hitungkan rintangan mentol.*

7(c)(i)
1

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

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(ii) Based on Diagram 7.3, calculate the current flow.
Berdasarkan Rajah 7.3, *hitungkan arus yang mengalir.*

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

7(*c*)(ii) 3

(iii) Based on Diagram 7.2 and Diagram 7.3, compare the brightness of the bulbs.
Berdasarkan Rajah 7.2 *dan Rajah* 7.3, *bandingkan kecerahan mentol-mentol itu.*

.....

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

7(*c*)(iii) 1

(iv) You are given two identical batteries, 1·5 V each and two identical bulbs rated 3 V, 6 W each. Based on your knowledge in 7(*c*)(ii) and7(*c*)(iii), draw a complete electrical circuit diagram where both the bulbs will light up with normal brightness.
Anda dibekalkan dua bateri serupa yang setiap satunya 1·5 V *dan dua mentol serupa yang setiap satunya berkadar* 3 V, 6 W. *Berdasarkan pengetahuan anda di* 7(*c*)(ii) *dan* 7(*c*)(iii), *lukis satu rajah litar elektrik yang lengkap yang mana kedua-dua mentol akan menyala dengan kecerahan yang normal.*

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

7(*c*)(iv) 2

Total A7 10

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Lihat halaman sebelah

8 Diagram 8.1 shows an automatic switch circuit that will light up a street lamp during night-time.

Rajah 8.1 *menunjukkan litar suis automatik yang menyalakan lampu jalan pada waktu malam.*

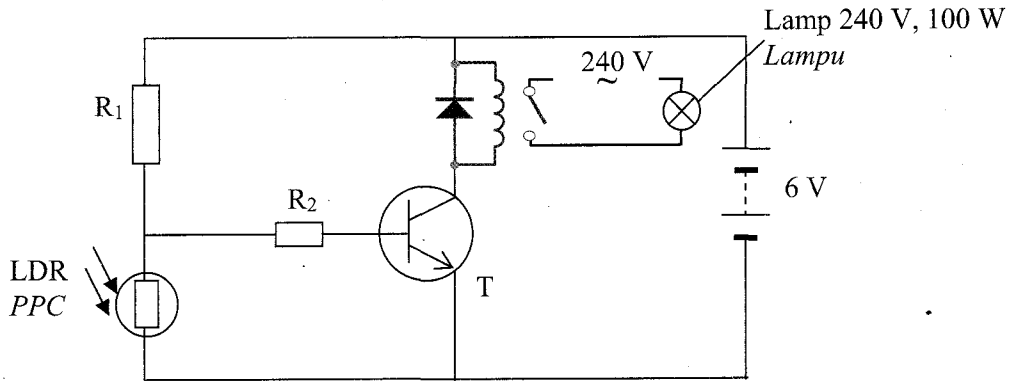

Diagram 8.1
Rajah 8.1

(*a*) Name the type of transistor T?
Namakan jenis transistor T?

8(*a*) 1

.....

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

(*b*) State the function of resistance R_2?
Nyatakan fungsi perintang R_2?

8(*b*) 1

.....

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

(*c*) State what will happen to the resistance of the light-dependent resistor (LDR) when the light intensity is low?
Nyatakan apakah yang berlaku kepada rintangan perintang peka cahaya (PPC) apabila keamatan cahaya adalah rendah?

8(*c*) 1

.....

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

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(*d*) State what will happen to the street lamp when the positions of R_1 and LDR are switched.
Explain why.

Nyatakan apa akan berlaku kepada lampu jalan apabila R_1 *dan PPC ditukar kedudukan?*
Terangkan mengapa.

.....

.....

.....

.....

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

8(*d*)
3

(*e*) Diagram 8.2 shows a transistor circuit.
Rajah 8.2 *menunjukkan sebuah litar transistor.*

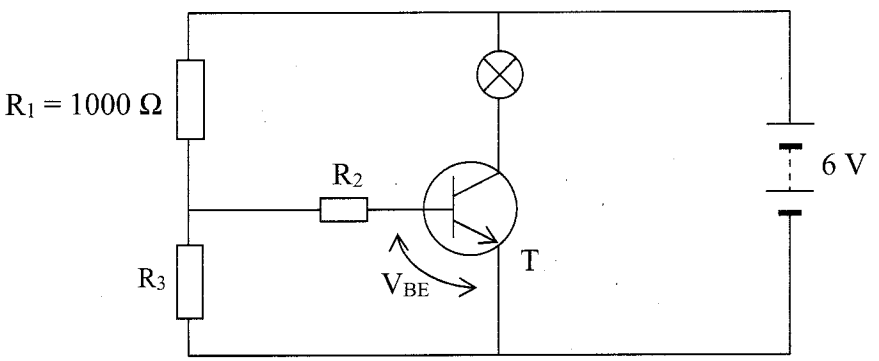

Diagram 8.2
Rajah 8.2

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Lihat halaman sebelah
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You are given three resistors R_3 with resistance 50 Ω, 100 Ω and 200 Ω each. Calculate the voltage across the base-emitter, V_{BE} for each of the resistor.

Anda diberi tiga perintang R_3 *yang setiapnya berintangan* 50 Ω, 100 Ω *dan* 200 Ω. *Hitungkan beza keupayaan merentasi tapak-pengeluar,* V_{BE} *bagi setiap perintang itu.*

(i) V_{BE} for 50 Ω
V_{BE} *untuk* 50 Ω

(ii) V_{BE} for 100 Ω
V_{BE} *untuk* 100 Ω

(iii) V_{BE} for 200 Ω
V_{BE} *untuk* 200 Ω

8(*e*)(i)(ii)(iii)
4

[4 *marks*]
[4 *markah*]

(*f*) The bulb will light up if the V_{BE} is greater than 0·7 V. Based on your answers in **8**(*e*), choose the most suitable resistor to be used as resistor R_3.
Give **one** reason for your answer.

Mentol akan menyala jika V_{BE} *adalah lebih besar dari* 0·7 V. *Berdasarkan jawapan anda dalam* **8**(*e*), *pilih perintang yang paling sesuai untuk digunakan sebagai perintang* R_3.
Berikan **satu** *sebab bagi jawapan anda.*

8(*f*)
2

.....

.....

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

Total A8
12

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Section B
Bahagian B

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

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

9 Diagram 9.1 and Diagram 9.2 show the identical objects located at different positions in front of identical concave mirrors. Real images with different sizes are produced.
Rajah 9.1 *dan Rajah* 9.2 *menunjukkan objek yang serupa diletakkan pada kedudukan yang berbeza di hadapan cermin cekung yang serupa. Imej-imej yang nyata tetapi berlainan saiz telah dihasilkan.*

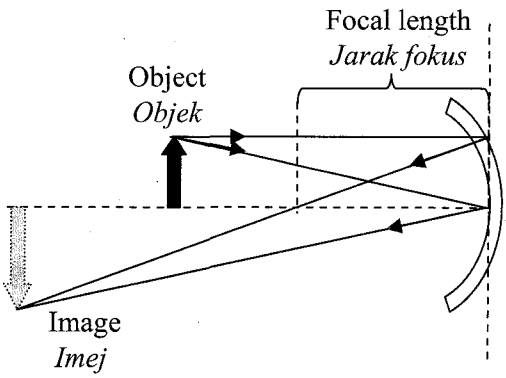

Diagram 9.1
Rajah 9.1

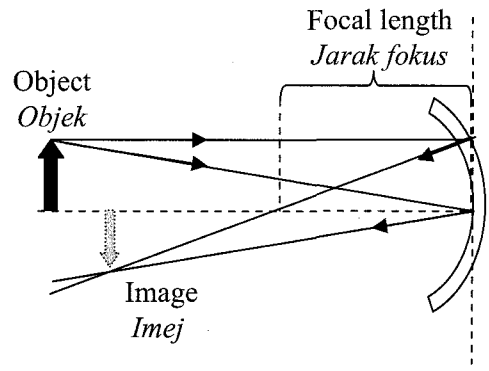

Diagram 9.2
Rajah 9.2

(*a*) (i) What is the meaning of real image?
Apakah maksud imej nyata?

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

(ii) Using Diagram 9.1 and Diagram 9.2, compare the object distance, the size of image formed and the image distance.
Relate the object distance and the size of the image formed to make a deduction on the relationship between the object distance and the magnification scale.
Menggunakan Rajah 9.1 *dan Rajah* 9.2, *bandingkan jarak objek, saiz imej yang terbentuk dan jarak imej.*
Hubung kait jarak objek dengan saiz imej yang terbentuk untuk membuat kesimpulan tentang hubungan antara jarak objek dengan skala pembesaran.

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

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(*b*) Diagram 9.3 shows a photograph of a concave mirror producing upright and magnified image of a hand.

Rajah 9.3 *menunjukkan gambar foto sebuah cermin cekung yang menghasilkan imej tangan yang tegak dan dibesarkan.*

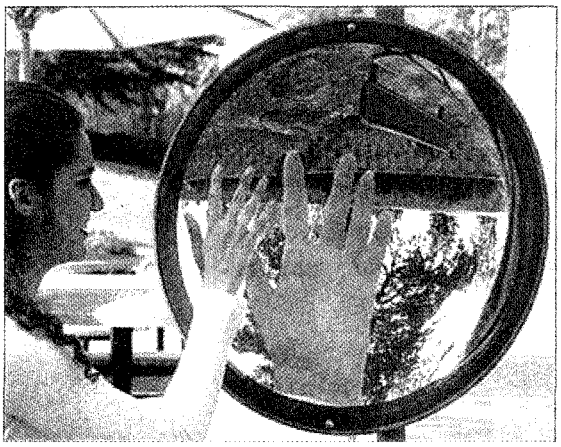

Diagram 9.3
Rajah 9.3

Draw a ray diagram to show the formation of the image formed as shown in Diagram 9.3.

Lukiskan satu gambar rajah sinar yang menunjukkan pembentukan imej seperti yang ditunjukkan pada Rajah 9.3.

[4 *marks*]
[4 *markah*]

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(*c*) Diagram 9.4 shows a ray diagram of a slide projector.
Rajah 9.4 *menunjukkan gambar rajah sinar sebuah projektor slaid.*

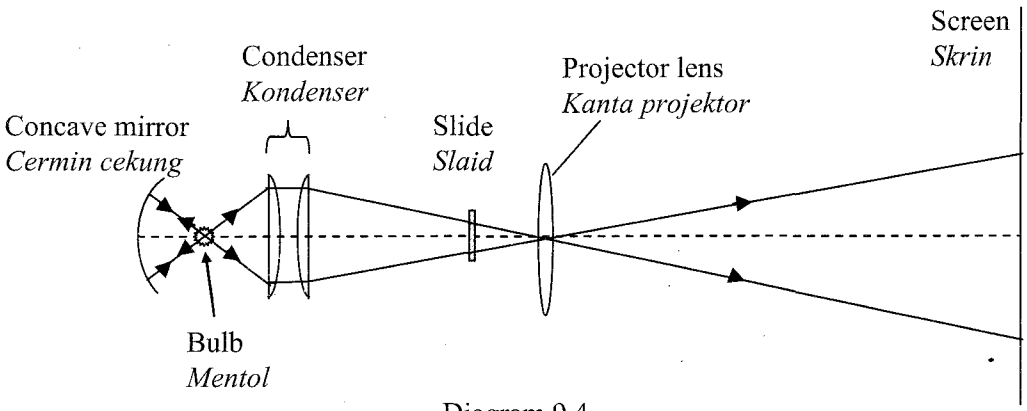

Diagram 9.4
Rajah 9.4

The slide projector is needed in your school hall. You are required to modify the slide projector so that it can produce clearer image and can be seen by 800 students.
Suggest and explain based on the following aspects:
Projektor slaid diperlukan untuk penggunaan dalam dewan sekolah. Anda dikehendaki mengubahsuai projektor slaid itu untuk menghasilkan imej yang lebih jelas dan boleh dilihat oleh 800 *orang pelajar.*
Cadang dan terangkan berdasarkan aspek-aspek berikut:

(i) The power of the bulb used.
Kuasa mentol yang digunakan.

(ii) The position of the bulb from the concave mirror.
Kedudukan mentol dari cermin cekung.

(iii) The curvature of the concave mirror.
Kelengkungan cermin cekung.

(iv) The position of the slide from the projector lens.
Kedudukan slaid dari kanta projektor.

(v) Position of the screen from the projector.
Kedudukan skrin dari projektor.

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

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10 Diagram 10.1 and Diagram 10.2 show how induced current are produced in solenoids.
Rajah 10.1 *dan Rajah* 10.2 *menunjukkan bagaimana arus aruhan dihasilkan dalam solenoid.*

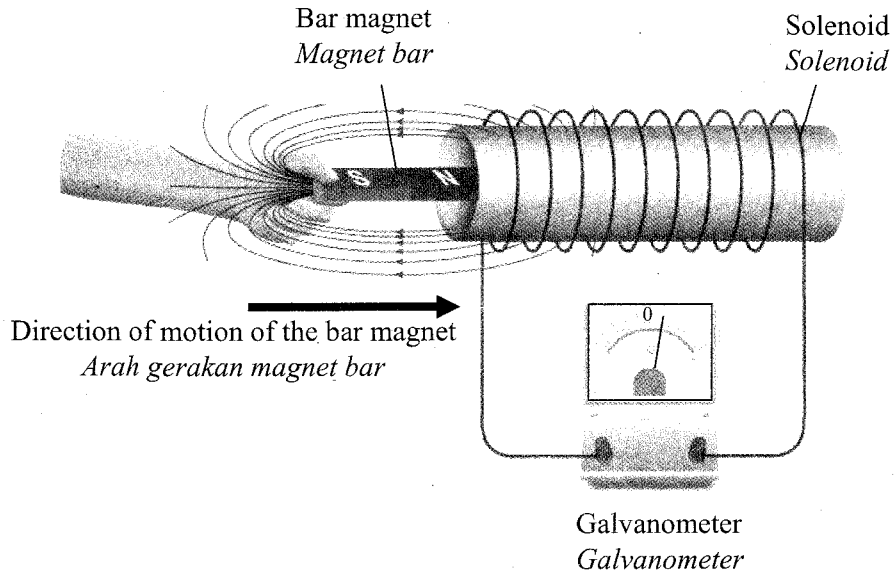

Diagram 10.1
Rajah 10.1

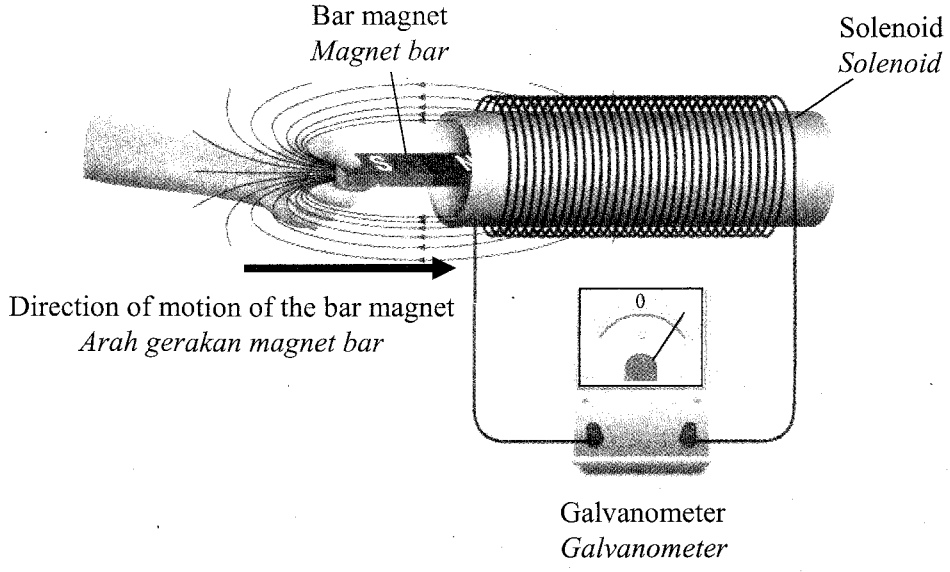

Diagram 10.2
Rajah 10.2

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(*a*) What is the meaning of induced current?
Apakah maksud arus aruhan?

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

(*b*) Using Diagram 10.1 and 10.2, compare
Menggunakan Rajah 10.1 *dan* 10.2, *bandingkan*

(i) The number of turns of the solenoid.
Bilangan lilitan solenoid.

(ii) The deflection of the galvanometer pointer.
Pesongan jarum galvanometer.

(iii) The rate of cutting of the magnetic flux.
Kadar pemotongan fluks magnet.

(iv) The magnitude of induced current produced.
Magnitud arus aruhan yang dihasilkan.

[4 *marks*]
[4 *markah*]

(*c*) Based on your answers in **10**(*b*),
Berdasarkan jawapan anda dalam **10**(*b*),

(i) Relate the number of turns of the solenoid and the rate of cutting of the magnetic flux.
Hubung kait bilangan lilitan solenoid dan kadar pemotongan fluks magnet.

(ii) Relate the rate of cutting of magnetic flux and the magnitude of the induced current produced and hence name the physics law involved.
Hubung kait kadar pemotongan fluks magnet dan magnitud arus aruhan yang dihasilkan dan seterusnya namakan hukum fizik yang terlibat.

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

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(*d*) Diagram 10.3 shows a simple step-up transformer.
Rajah 10.3 *menunjukkan sebuah transformer injak naik yang ringkas.*

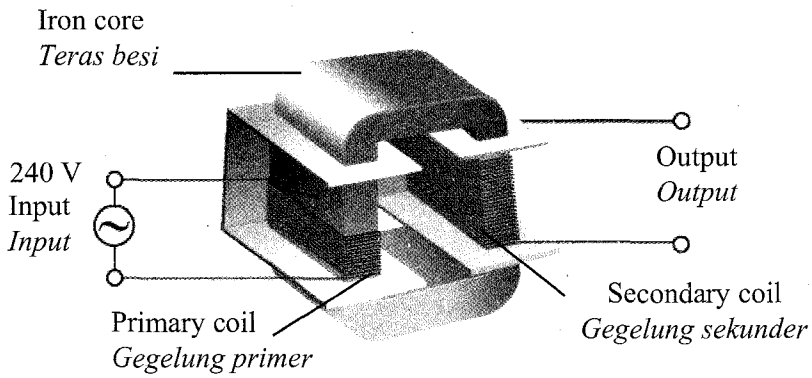

Diagram 10.3
Rajah 10.3

(i) Explain why step-up transformers are used in the transmission of electricity.
Terangkan mengapa transformer injak naik digunakan dalam penghantaran elektrik.

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

(ii) You are required to modify the transformer in Diagram 10.3 so that it can be used as a laptop adapter with high efficiency and output of 20 V direct current.
Your suggestions and explanation should be based on the following aspects:
Anda dikehendaki mengubahsuai transformer pada Rajah 10.3 *supaya ia boleh digunakan sebagai adapter komputer riba yang berkecekapan tinggi dengan mengeluarkan output arus terus* 20 V.
Cadangan dan penjelasan anda haruslah berdasarkan aspek-aspek berikut:

- Type of the core used.
Jenis teras yang digunakan.

- Materials and diameter of the wire used.
Bahan-bahan dan diameter dawai yang digunakan.

- Ratio of the number of turns in the primary coil to the secondary coil.
Nisbah bilangan lilitan gegelung primer kepada gegelung sekunder.

- The arrangement of the primary coil and the secondary coil.
Susunan gegelung primer dan gegelung sekunder.

- The number of diodes used.
Bilangan diod yang digunakan.

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

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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 a submarine floating in sea water due to the effect of buoyant force.
Rajah 11.1 *menunjukkan sebuah kapal selam yang sedang terapung dalam air laut disebabkan oleh kesan daya tujah.*

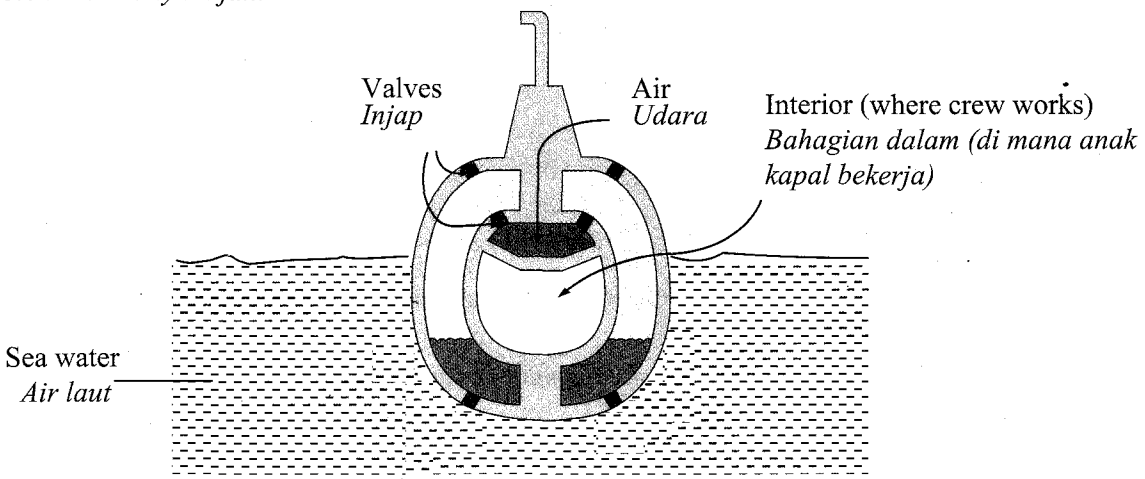

Diagram 11.1
Rajah 11.1

(*a*) What is the meaning of buoyant force?
Apakah maksud daya tujah?

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

(*b*) Explain how a submarine is able to submerge into deep sea water.
Terangkan bagaimana sebuah kapal selam dapat menyelam dalam air laut yang dalam.

[4 *marks*]
[4 *markah*]

(*c*) You are asked to investigate the characteristics of four submarines shown in Table 11.1. Explain the suitability of each characteristic of the submarines and determine the submarine which can travel faster, stay longer in deeper sea water and able to carry more crew. Give reasons for your choice.
Anda dikehendaki mengkaji ciri-ciri bagi empat buah kapal selam seperti yang ditunjukkan dalam Jadual 11.1.
Terangkan kesesuaian setiap ciri kapal selam itu dan tentukan kapal selam yang boleh bergerak lebih laju, berada lebih lama dalam air laut yang lebih dalam dan yang mampu membawa lebih ramai anak kapal.
Berikan alasan bagi pilihan anda.

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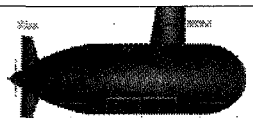
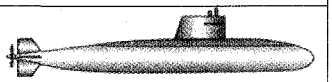
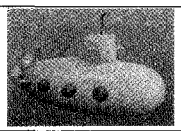
	The volume of ballast tank *Isi padu tangki balast*	The number of air tanks cylinder carried *Bilangan silinder tangki udara yang dibawa*	Maximum water pressure that can be tolerated *Tekanan air maksima yang boleh diterima*	The shape of submarine *Bentuk kapal selam*
W	3 000 liter / 3 000 *liter*	15 cylinders / 15 *silinder*	4·5 Atm	
X	2 500 liter / 2 500 *liter*	30 cylinders / 30 *silinder*	6·0 Atm	
Y	350 liter / 350 *liter*	3 cylinders / 3 *silinder*	6·1 Atm	
Z	400 liter / 400 *liter*	1 cylinder / 1 *silinder*	2·5 Atm	

Table 11.1
Jadual 11.1

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

(*d*) Diagram 11.2 shows an oil drum that floats stationary in water. The density of water is 1 000 kg m^{-3}.
Rajah 11.2 *menunjukkan sebuah tong minyak yang terapung pegun dalam air. Ketumpatan air ialah* 1 000 kg m^{-3}.

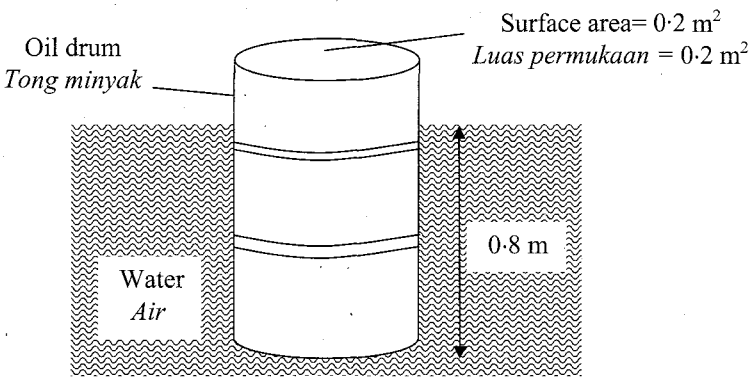


Diagram 11.2
Rajah 11.2

Calculate
Hitungkan

(i) the volume of the oil drum immersed in water,
isi padu tong minyak yang terendam dalam air,

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

(ii) the buoyant force acting on the oil drum,
daya tujah yang bertindak pada tong minyak itu,

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

(iii) the mass of the oil drum.
jisim tong minyak itu.

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

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12 Radioisotopes can be used as tracers to detect leakage from pipes underground. Diagram 12.1 shows a leak that occurred in an underground water pipe.

Radioisotop boleh digunakan sebagai penyurih untuk mengesan kebocoran paip-paip di bawah tanah. Rajah 12.1 *menunjukkan kebocoran yang berlaku pada paip air di bawah tanah.*

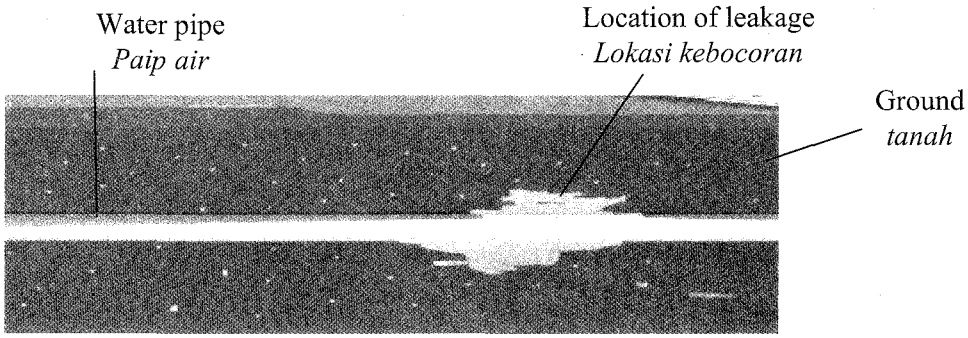

Diagram 12.1
Rajah 12.1

(*a*) What is meaning of radioisotopes?
Apakah maksud radioisotop?

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

(*b*) With the aid of diagram, explain how radioisotopes can be used to detect the location of the leakage as shown in Diagram 12.1.

Terangkan bagaimana radioisotop boleh digunakan untuk mengesan lokasi kebocoran seperti yang ditunjukkan pada Rajah 12.1.

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

(*c*) Table 12.1 shows the characteristics of five radioisotopes.
Jadual 12.1 *menunjukkan ciri-ciri lima radioisotop.*

Radioisotope *Radioisotop*	Characteristics of radioisotopes *Ciri-ciri radioisotop*		
	Type of ray *Jenis sinaran*	Half-life *Separuh hayat*	State of matter *Keadaan jirim*
P	Beta *Beta*	28 years 28 *tahun*	Solid *Pepejal*
Q	Gamma *Gama*	5 years 5 *tahun*	Solid *Pepejal*
R	Gamma *Gama*	8 days 8 *hari*	Liquid *Cecair*
S	Beta *Beta*	5 days 5 *hari*	Gas *Gas*
T	Gamma *Gama*	6 hours 6 *jam*	Liquid *Cecair*

Table 12.1
Jadual 12.1

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Explain the suitability of each characteristic of the radioisotope and determine the most suitable radioisotope to be used in detecting leaks from the underground water pipes.
Give reasons for your choice.

Terangkan kesesuaian setiap ciri radioisotop dan tentukan radioisotop yang paling sesuai digunakan untuk mengesan kebocoran paip air di bawah tanah.
Beri sebab untuk pilihan anda.

[8 *marks*]
[8 *markah*]

(*d*) Diagram 12.2 shows the decay chain of Radon-222.
Rajah 12.2 *menunjukkan rantaian reputan bagi Radon-222.*

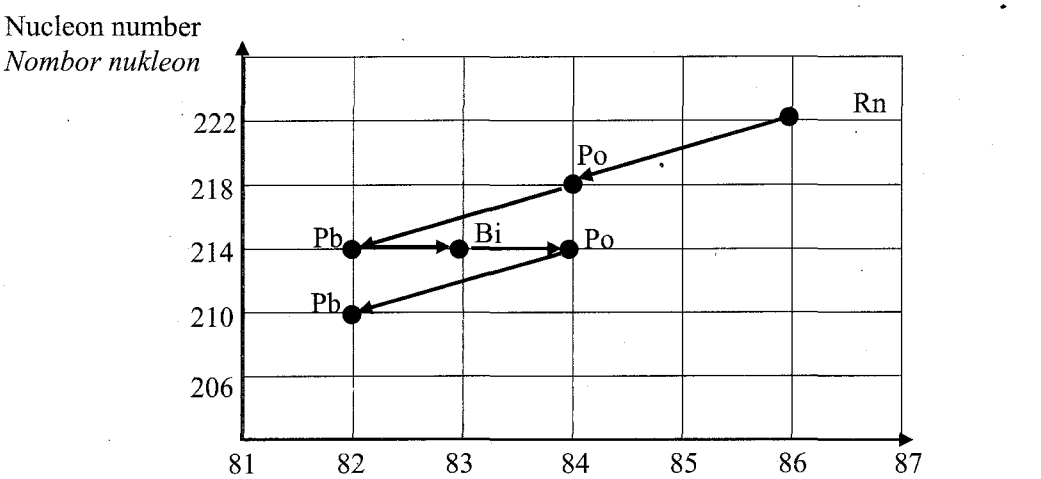

Diagram 12.2
Rajah 12.2

(i) What is the number of neutrons in Rn-222?
Berapakah bilangan neutron bagi Rn-222?

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

(ii) Write an equation to show the decay of Rn-222 to Po-218.
Tuliskan satu persamaan untuk menunjukkan reputan Rn-222 *kepada* Po-218.

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

(iii) Determine the number of alpha particles and beta particles produced in the decay of Rn-222 to Pb-210.
Tentukan bilangan zarah alfa dan zarah beta yang dihasilkan dalam reputan Rn-222 *kepada* Pb-210.

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

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(*e*) A lab assistant measures the number of particles emitted per minute from two different radioactive sources K and L. The measurements are repeated each hour for four hours and the results are shown in Table 12.2.

Seorang pembantu makmal telah mengukur bilangan zarah yang dipancarkan dalam masa per minit daripada dua sumber radioaktif K *dan* L *yang berbeza. Pengukuran ini diulang setiap satu jam dalam masa empat jam dan keputusan ditunjukkan seperti dalam Jadual* 12.2.

Time/hour *Masa/jam*	Number of particles emitted per minute *Bilangan zarah dipancarkan per minit*	
	Source K *Sumber* K	Source L *Sumber* L
0	160	1600
1	113	800
2	80	400
3	57	200
4	40	100

Table 12.2
Jadual 12.2

(i) Name the source that has the shortest half-life?
Namakan sumber yang mempunyai separuh hayat yang terpendek?

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

(ii) The experiment continues until the time is 6 hours.
Calculate the number of particles emitted per minute from source K.
Eksperimen ini diteruskan sehingga masa 6 *jam.*
Hitungkan bilangan zarah dipancarkan per minit daripada sumber K.

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

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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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 anda bagi* ***Bahagian* A** *pada ruang yang disediakan dalam kertas soalan ini.*

3. Answer **one** question from **Section B** and **one** question from **Section C.** Write your answers for **Section B** and **Section C** on the 'helaian tambahan' provided by the invigilators.

Jawab **satu** *soalan daripada* ***Bahagian* B** *dan* ***satu*** *soalan daripada* ***Bahagian* C**. *Tulis jawapan anda bagi* ***Bahagian* B** *dan bagi* ***Bahagian* C** *dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan.*

4. Show your working, it may help you to get marks.
Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.

5. 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 sesuatu jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

6. The diagrams in the questions are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak akan dilukis 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 part question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

9. 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 *minutes untuk* ***Bahagian* C.**

10. You may use a non-programmable scientific calculator.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

11. Detach **Section B** and **Section C** from this question paper. Tie the 'helaian tambahan' together with this question paper and hand in to the invigilator at the end of the examination.

Ceraikan ***Bahagian* B** *dan* ***Bahagian* C** *daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.*

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SULIT

NO. KAD PENGENALAN | | | | | | | | | | | | | |

ANGKA GILIRAN | | | | | | | | | |

Nama ..... Tingkatan .....

JABATAN PELAJARAN NEGERI SELANGOR
PERSIDANGAN KEBANGSAAN PENGETUA SEKOLAH MENENGAH

PROGRAM PENINGKATAN PRESTASI AKADEMIK (2) 4531/3

SIJIL PELAJARAN MALAYSIA 2010

PHYSICS

Kertas 3
Sept./Okt.
1½ jam

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan* **nombor kad pengenalan**, **angka giliran**, **nama** *dan* **tingkatan** *anda pada petak yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Untuk Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	16	
	2	12	
B	3	12	
	4	12	
Jumlah			

Kertas soalan ini mengandungi 15 halaman bercetak dan 1 halaman tidak bercetak.

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[Lihat halaman sebelah

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 period oscillation, T, of a spring and the mass, m, of the load, attached to the spring.
The arrangement of the apparatus is shown in Diagram 1.1.

Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara tempoh ayunan, T, bagi satu spring dengan jisim beban, m, yang disangkut pada spring tersebut.
Susunan radas bagi eksperimen ini ditunjukkan pada Rajah 1.1.

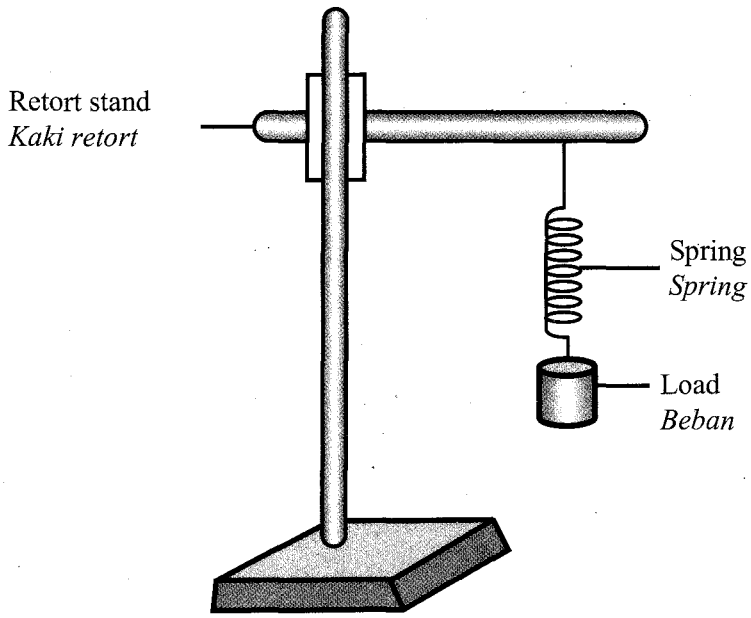

Diagram 1.1
Rajah 1.1

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The student starts the experiment with a load mass, m = 20·0 g. The load is displaced downwards to a fixed distance and released so that the spring oscillates. The time taken for 10 complete oscillations, t, is recorded. The experiment is repeated with load masses, m = 30·0 g, 40·0 g, 50·0 g and 60·0 g.

The corresponding readings of the stopwatch for 10 complete oscillations are shown in Diagram 1.2, 1.3, 1.4, 1.5 and 1.6.

Murid itu memulakan eksperimen dengan jisim beban, m = 20·0 g. Beban itu disesarkan ke bawah pada jarak yang ditetapkan dan dilepaskan supaya spring itu berayun. Masa yang diambil untuk 10 *ayunan lengkap, t, dicatat.*

Eksperimen diulangi dengan jisim beban, m = 30·0 g, 40·0 g, 50·0 g dan 60·0 g. *Bacaan jam randik yang sepadan untuk* 10 *ayunan lengkap ditunjukkan pada Rajah* 1.2, 1.3, 1.4, 1.5 *dan* 1.6.

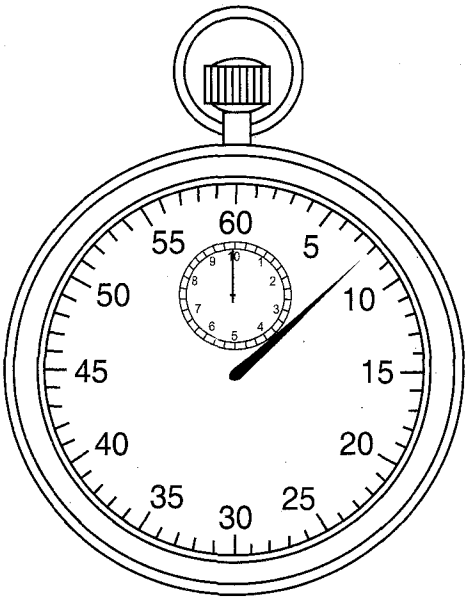

Diagram 1.2
Rajah 1.2

m = 20·0 g

t = _____

T = _____

T^2 = _____

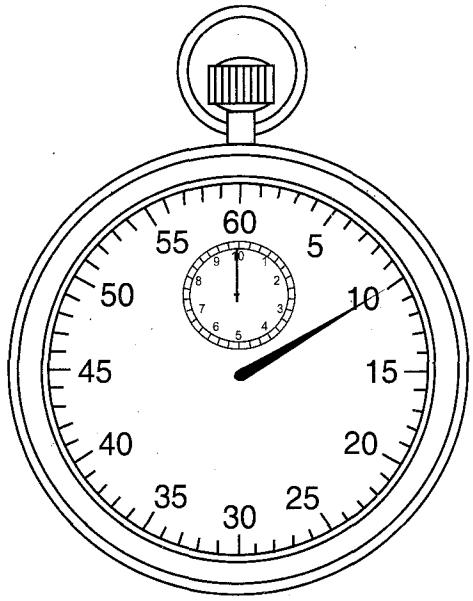

Diagram 1.3
Rajah 1.3

m = 30·0 g

t = _____

T = _____

T^2 = _____

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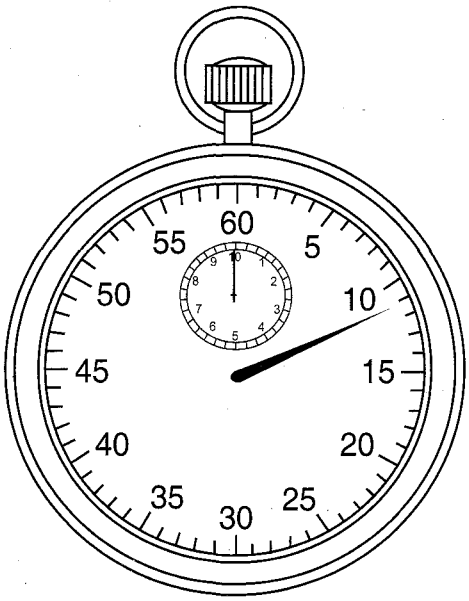

Diagram 1.4
Rajah 1.4

$m = 40{\cdot}0$ g

t = _____

T = _____

T^2 = _____

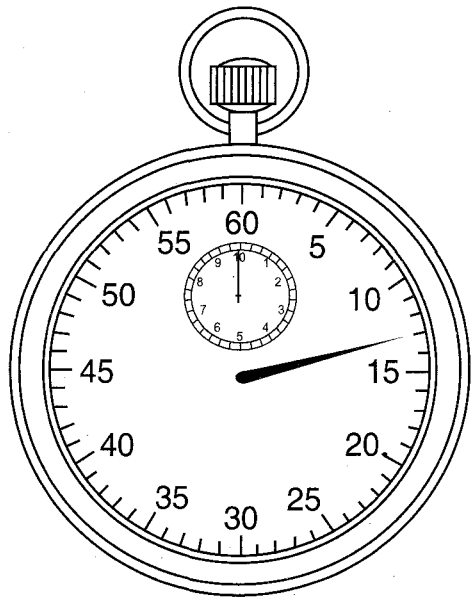

Diagram 1.5
Rajah 1.5

$m = 50{\cdot}0$ g

t = _____

T = _____

T^2 = _____

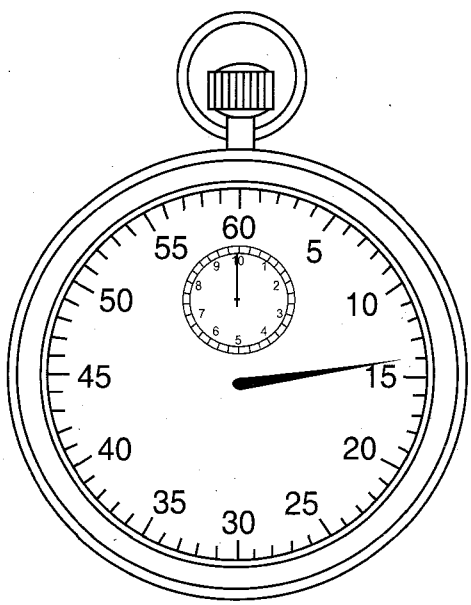

Diagram 1.6
Rajah 1.6

$m = 60{\cdot}0$ g

t = _____

T = _____

T^2 = _____

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For Examiner's Use

(*a*) For the experiment described, identify:
Bagi eksperimen yang diterangkan, kenal pasti:

(i) the manipulated variable
pembolehubah dimanipulasikan

1(*a*)(i) 1

_____

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

(ii) the responding variable
pembolehubah bergerak balas

1(*a*)(ii) 1

_____

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

(iii) the constant variable
pembolehubah dimalarkan

1(*a*)(iii) 1

_____

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

(*b*) For this part of the question, write your answers in the space provided in the corresponding diagrams.
Based on Diagram 1.2, 1.3, 1.4, 1.5 and 1.6:

Untuk bahagian soalan ini, tulis jawapan anda dalam ruang yang disediakan dalam rajah-rajah yang sepadan.
Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 *dan* 1.6:

(i) Record the readings, *t*, of the stopwatch.
Catat bacaan, t, bagi jam randik.

1(*b*)(i) 2

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

(ii) For each value of *t* in (*b*)(i), calculate the period of oscillation , *T*, of the spring using the following equation:
Bagi setiap nilai t di (*b*)(i)*, hitung tempoh ayunan, T, bagi spring menggunakan persamaan berikut*:

$$T = \frac{t}{10}$$

Record the value of *T*.
Catat nilai T.

1(*b*)(ii) 1

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

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For Examiner's Use

(*a*) For the experiment described, identify:
Bagi eksperimen yang diterangkan, kenal pasti:

(i) the manipulated variable
pembolehubah dimanipulasikan

1(*a*)(i) 1

_____

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

(ii) the responding variable
pembolehubah bergerak balas

1(*a*)(ii) 1

_____

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

(iii) the constant variable
pembolehubah dimalarkan

1(*a*)(iii) 1

_____

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

(*b*) For this part of the question, write your answers in the space provided in the corresponding diagrams.
Based on Diagram 1.2, 1.3, 1.4, 1.5 and 1.6:

Untuk bahagian soalan ini, tulis jawapan anda dalam ruang yang disediakan dalam rajah-rajah yang sepadan.
Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 *dan* 1.6:

(i) Record the readings, *t*, of the stopwatch.
Catat bacaan, t, bagi jam randik.

1(*b*)(i) 2

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

(ii) For each value of *t* in (*b*)(i), calculate the period of oscillation , *T*, of the spring using the following equation:
Bagi setiap nilai t di (*b*)(i)*, hitung tempoh ayunan, T, bagi spring menggunakan persamaan berikut*:

$$T = \frac{t}{10}$$

Record the value of *T*.
Catat nilai T.

1(*b*)(ii) 1

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

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(iii) Calculate T^2 for each value of T in (*b*)(ii).
Record the value of T^2.
Hitung T^2 *untuk setiap nilai T di* (*b*)(ii).
Catat nilai T^2.

1(*b*)(iii) 2

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

(*c*) Tabulate your results for all values of *m*, *T* and T^2 in the space below.
Jadualkan keputusan anda bagi semua nilai m, T dan T^2 *dalam ruang di bawah.*

1(*c*) 2

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

(*d*) On the graph on page 7, plot a graph of T^2 against *m*.
Pada kertas graf di halaman 7, lukis graf T^2 *melawan m.*

1(*d*) 5

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

(*e*) Based on your graph in (*d*), state the relationship between T^2 and *m*.
Berdasarkan graf anda di (*d*), *nyatakan hubungan antara* T^2 *dengan m.*

1(*e*) 1

_____

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

Total A1 16

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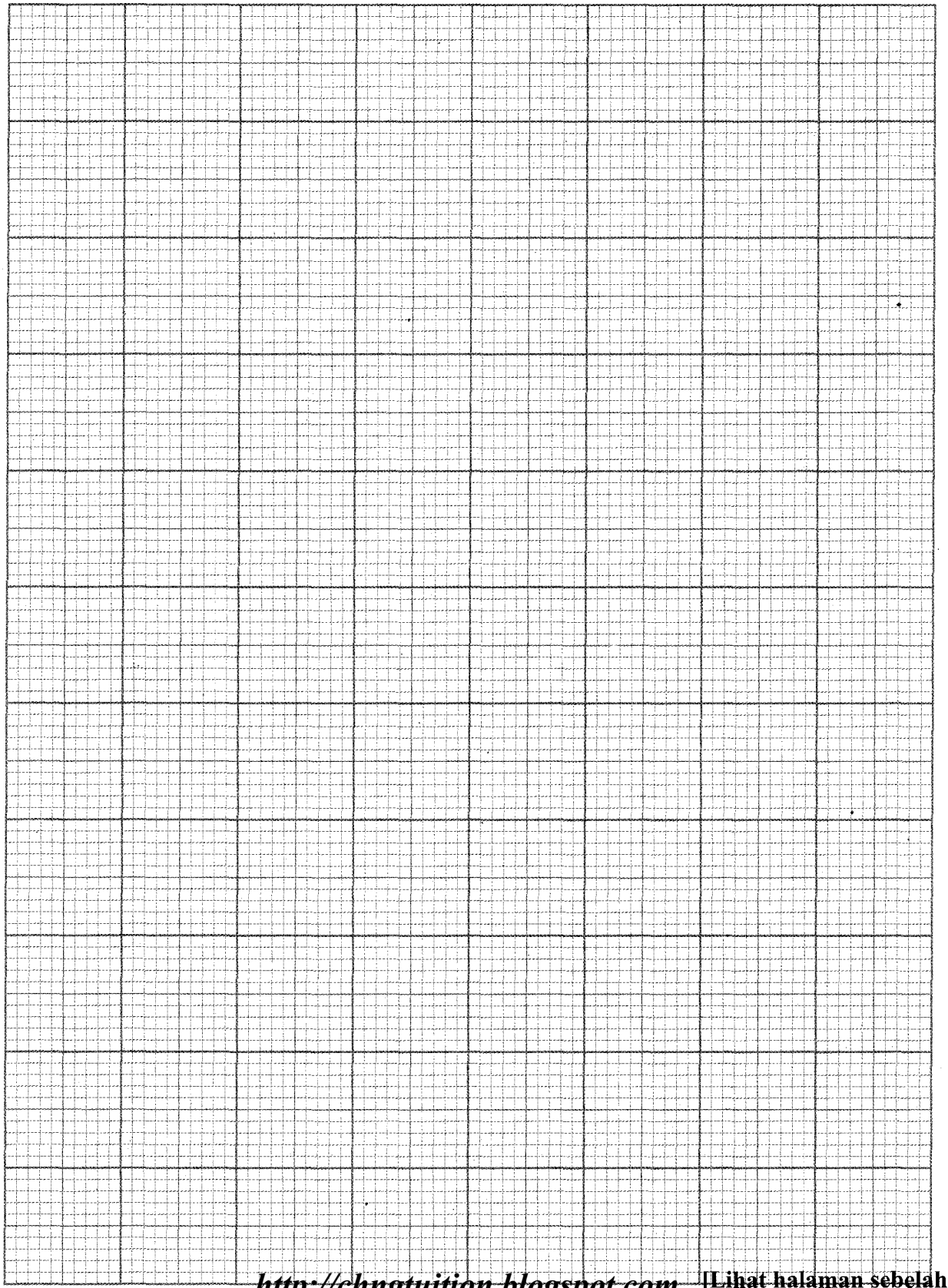
Graph T^2 against m
Graf T^2 *melawan* m



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2 A student carries out an experiment to investigate the relationship between the distance, a, between two loud speakers, and the distance, x, between two consecutive loud sounds. The sound is detected at distance of, D, 10·0 m from the two loud speakers. The results of this experiment are shown in the graph of x against $\frac{1}{a}$ in Diagram 2.1.

Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara jarak, a, di antara dua pembesar suara, dengan jarak, x, di antara dua bunyi kuat yang berturutan. Bunyi itu dikesan pada jarak, D, 10·0 m *daripada dua pembesar suara tersebut. Keputusan eksperimen ini ditunjukkan oleh graf x melawan* $\frac{1}{a}$ *pada Rajah* 2.1.

Graph x against $\frac{1}{a}$

Graf x melawan $\frac{1}{a}$

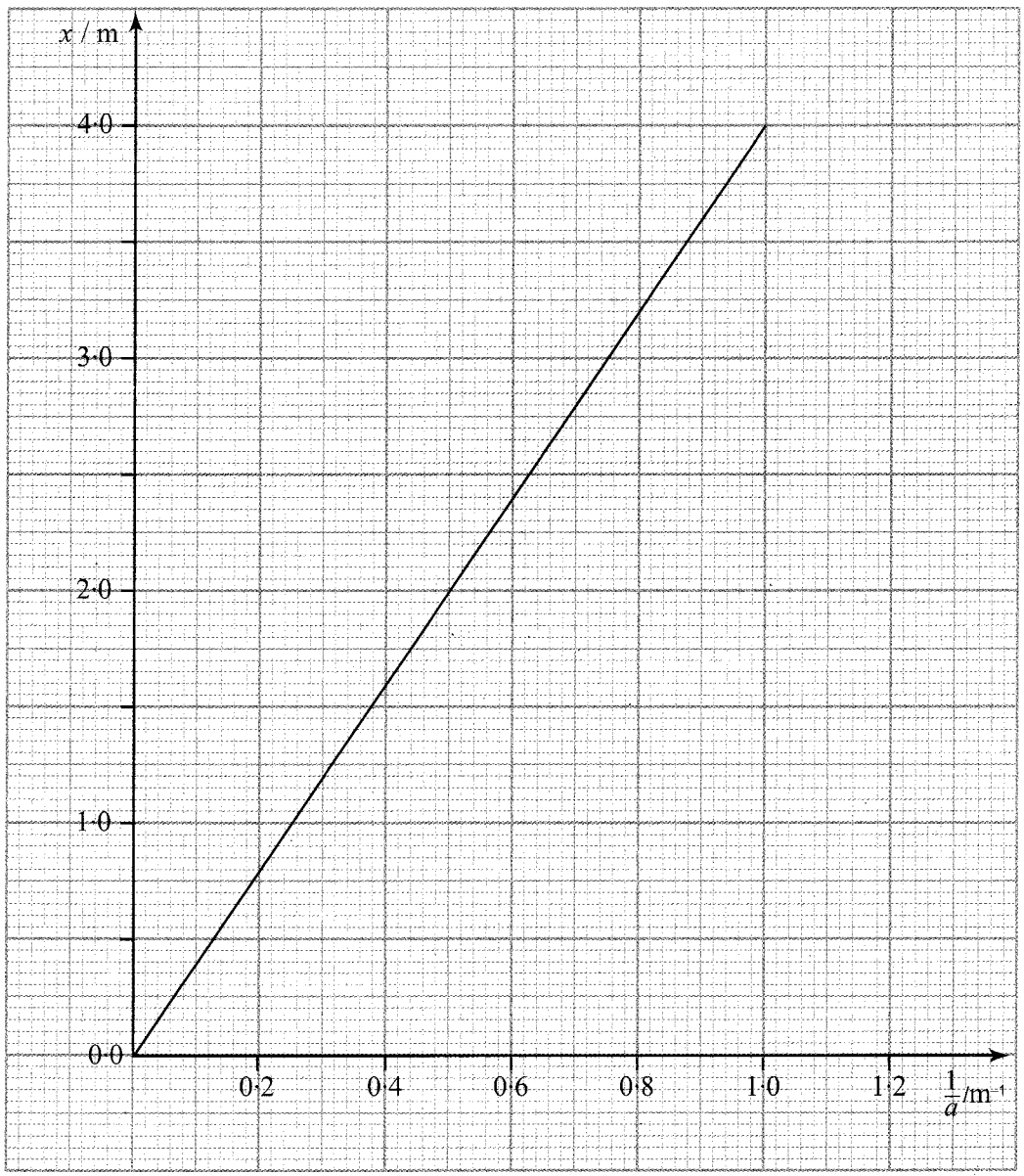

Diagram 2.1

Rajah 2.1

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For Examiner's Use

(*a*) Based on the graph in Diagram 2.1:
Berdasarkan graf pada Rajah 2.1:

(i) State the relationship between x and $\frac{1}{a}$.

Nyatakan hubungan antara x dengan $\frac{1}{a}$.

2(*a*)(i) 1

_____

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

(ii) Determine the value of a when $x = 2$ m.
Show on the graph, how you determine the value of a.
Tentukan nilai a apabila x = 2 m.
Tunjukkan pada graf itu, bagaimana anda menentukan nilai a.

2(*a*)(ii) 3

a = _____

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

(*b*) Calculate the gradient, m, of the graph.
Show on the graph how you determine m.
Hitung kecerunan, m, bagi graf itu.
Tunjukkan pada graf itu bagaimana anda menentukan m.

2(*b*) 3

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

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(*c*) Using the gradient, *m* and the Young's formula:
Menggunakan kecerunan, m dan formula Young's:

$$\lambda = \frac{ax}{D}$$

calculate the wavelength of the sound waves, λ.
hitungkan panjang gelombang bunyi, λ.

2(*c*)
4

[4 *marks*]
[4 *markah*]

(*d*) State **one** precaution that should be taken to improve the result of this experiment.
Nyatakan **satu** *langkah berjaga-jaga yang boleh diambil untuk meningkatkan keputusan eksperimen ini.*

2(*d*)
1

_____

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

Total A2
12

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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 shows a boy accidentally spilt a few drops of hot noodle soup onto his hand and felt slight pain. Later on, he accidentally spilt the whole bowl of hot noodle soup onto himself and felt extreme pain as shown in Diagram 3.2.

Rajah 3.1 *menunjukkan mee sup panas terpercik ke atas tangan seorang budak lelaki secara tidak sengaja dan dia merasai sedikit kesakitan. Tidak lama kemudian, sekali lagi secara tidak sengaja dia menumpahkan keseluruhan mee sup yang panas itu ke atas dirinya dan merasai kesakitan yang amat sangat seperti ditunjukkan dalam Rajah* 3.2.

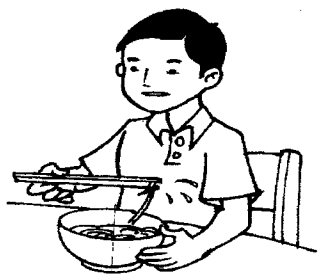

Diagram 3.1
Rajah 3.1

Diagram 3.2
Rajah 3.2

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

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

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

(*b*) State **one** hypothesis that could be investigated.
Nyatakan **satu** *hipotesis yang boleh disiasat.*

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

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(*c*) With the use of apparatus such as power supply, beaker, immersion heater and other apparatus, describe an experiment to investigate the hypothesis stated in **3**(*b*).
In your description, state clearly the following:

Dengan menggunakan radas seperti bekalan kuasa, bikar, pemanas rendam dan lain-lain radas, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di **3**(*b*).
Dalam penerangan anda, jelaskan 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 used in the experiment.

Describe how to control the manipulated variable and how to measure the responding variable.

Prosedur yang digunakan dalam eksperimen.

Terangkan bagaimana mengawal pembolehubah dimanipulasikan dan bagaimana mengukur pembolehubah bergerak balas.

(vi) The way to tabulate the data.
Cara untuk menjadualkan data.

(vii) The way to analyse the data.
Cara untuk menganalisis data.

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

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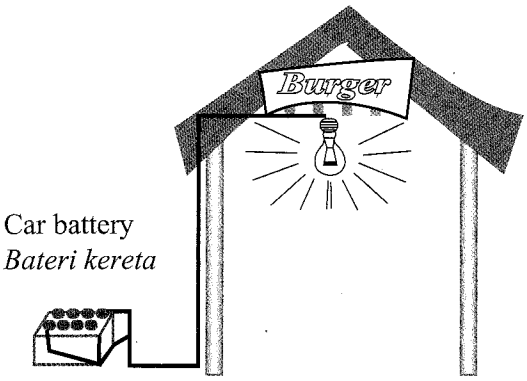
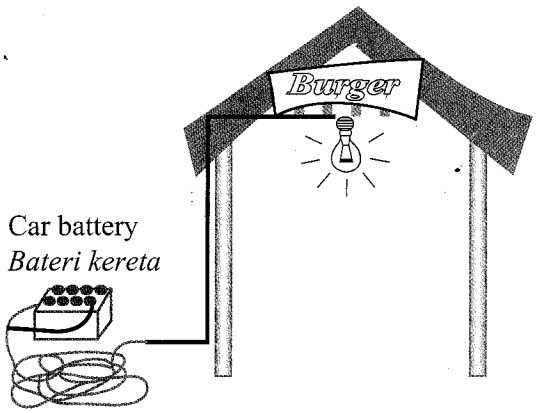
4 Diagram 4.1 and Diagram 4.2 show two night market stalls. Both stalls installed two identical bulbs which is connected to two identical 12 V car batteries with different length of connecting wires. Both bulbs light up with different brightness.

Rajah 4.1 *dan Rajah* 4.2 *menunjukkan dua gerai pasar malam. Kedua-dua gerai memasang dua mentol yang serupa dan disambungkan kepada dua bateri kereta* 12 V *yang serupa dengan panjang dawai penyambung yang berbeza. Kedua-dua mentol menyala dengan kecerahan yang berbeza.*



Connecting wire
Wayar penyambung

Diagram 4.1
Rajah 4.1



Connecting wire
Wayar penyambung

Diagram 4.2
Rajah 4.2

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

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

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

(*b*) State **one** hypothesis that could be investigated.
Nyatakan **satu** *hipotesis yang boleh disiasat.*

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

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(*c*) With the use of apparatus such as dry cells, constantan wire, and other apparatus, describe an experiment to investigate the hypothesis stated in **4**(*b*).
In your description, state clearly the following:
Dengan menggunakan radas seperti sel kering, wayar constantan dan lain-lain radas, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di **4**(*b*).
Dalam penerangan anda, jelaskan 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 used in the experiment.

Describe how to control the manipulated variable and how to measure the responding variable.

Prosedur yang digunakan dalam eksperimen.

Terangkan bagaimana mengawal pembolehubah dimanipulasikan dan bagaimana mengukur pembolehubah bergerak balas.

(vi) The way to tabulate the data.
Cara untuk menjadualkan data.

(vii) The way to analyse the data.
Cara untuk menganalisis data.

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

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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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 this question paper.

   Jawab **semua** *soalan dalam* ***Bahagian*** **A**. *Tulis jawapan anda bagi* ***Bahagian*** **A** *pada ruang yang disediakan dalam kertas soalan ini.*

3. Answer any **one** question from **Section B.** Write your answers for **Section B** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.

   Jawab mana-mana **satu** *soalan daripada* ***Bahagian*** **B**. *Tulis jawapan anda bagi* ***Bahagian*** **B** *pada helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, 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 akan dilukis mengikut skala kecuali dinyatakan.

6. The marks allocated for each question or sub-part 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 dinasihati supaya mengambil masa 60 *minit untuk menjawab soalan dalam* ***Bahagian*** **A** *dan* 30 *minit untuk* ***Bahagian*** **B**.

10. Detach **Section B** from this question paper. Tie the 'helaian tambahan' together with this question paper and hand in to the invigilator at the end of the examination.

    Ceraikan ***Bahagian*** **B** *daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.*

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PROGRAM PENINGKATAN PRESTASI AKADEMIK **4531/1**

SIJIL PELAJARAN MALAYSIA 2010

Fizik
Kertas 1

SKEMA JAWAPAN
PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010

FIZIK

Kertas 1

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan Pemarkahan ini mengandungi **2** halaman bercetak

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SKEMA JAWAPAN
FIZIK KERTAS 1
PEPERIKSAAN PERCUBAAN SETARA SPM 2010

No.	Answer	No.	Answer	No.	Answer	No.	Answer	No.	Answer
1	A	**11**	C	**21**	C	**31**	B	**41**	A
2	C	**12**	B	**22**	A	**32**	B	**42**	A
3	C	**13**	C	**23**	C	**33**	B	**43**	B
4	D	**14**	B	**24**	D	**34**	A	**44**	A
5	C	**15**	A	**25**	B	**35**	D	**45**	B
6	C	**16**	B	**26**	C	**36**	D	**46**	B
7	D	**17**	C	**27**	D	**37**	A	**47**	A
8	C	**18**	C	**28**	A	**38**	C	**48**	C
9	A	**19**	C	**29**	A	**39**	B	**49**	C
10	C	**20**	B	**30**	A	**40**	D	**50**	B

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PROGRAM PENINGKATAN PRESTASI AKADEMIK **4531/2**

SIJIL PELAJARAN MALAYSIA 2010

Fizik

Kertas 2

SKEMA JAWAPAN
PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010

FIZIK

Kertas 2

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan Pemarkahan ini mengandungi **7** halaman bercetak

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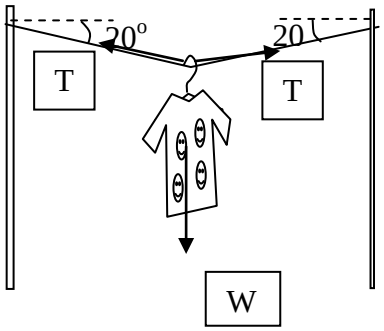
Physics Paper 2
Trial Examination JPS 2010
Marking Scheme

Question Number	Marking Scheme	Marks
1. (a)	Transverse wave	1
(b)	Reflection	1
(c)	Amplitude - reduce	1
	Frequency- unchanged	1
	Total	4
2. (a)	Kg m s^{-2}	1
(b)(i) (ii)	 Note: also accept if only one T is labelled	1 1
(c)	1. 2 T sin 20^0= 8 N 2. T = 8/ 2 sin 20^0 = 11.7 N (answer with correct unit)	1 1
	Total	5
3 (a)	Nuclear fission	1
(b)	2	1
(c)i	$3.985 \times 10^{-25} - 3.982 \times 10^{-25}$	1
	0.003×10^{-25} kg.	1
(c)ii	0.003×10^{-25} kg × $(3 \times 10^8)^2$	1
	2.7×10^{-11} J	1
	Total	6

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4 (a)i	Temperature is degree of hotness or coldness	1
ii	80 ^{0}C	1
(b)	Solid +Liquid	1
(c)	60 second	1
(d)	1st : 0.05 kg 2nd : 0.05 x 1720 x (80-30) 3rd : 4300 J (with correct unit)	1 1 1
	Total	7
5. (a)	To measure the pressure.	1
(b) (i)	h_1 is higher than h_2	1
(ii)	difference in height of the water in the manometer in Diagram 5.1 is higher than Diagram 5.2	1
(iii)	Pressure	1
(iv)	The greater the depth of thistle funnel, the greater the difference in height of the water in manometer / when h increases, the difference in height of the water in manometer also increase.	1
(v)	As depth of liquid increases, the pressure also increases.	1
(c)	1. The difference in height of the water in manometer will increase 2. When the density increases, the pressure also increases.	1 1
	Total	8
6. (a) (i)	Diagram 6.2 is more than Diagram 6.1	1
(ii)	The degree of deflection of the ammeter pointer in Diagram 6.2 is greater	1
(iii)	Current flow in diagram 6.2 is greater	1
(iv)	The final position of the copper rod in Diagram 6.2 is further from the original position.	1
(b)	Force / magnetic force	1
(c)	The amount of current flow increase, the force increases	1
(d)	Fleming's left-hand rules / Right-hand Slap Rule	1
(e)	Magnetic field strength	1

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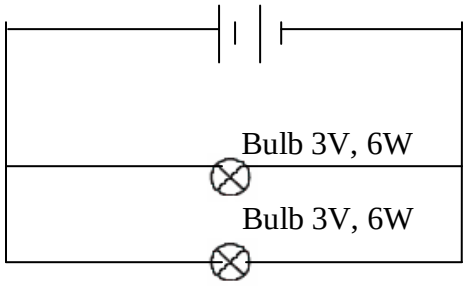
	Total	8
7. (a) (i)	Series	1
(b)	1. Ammeter reading increase. 2. Effective resistance is smaller	1 1
(c)(i)	$\frac{V^2}{R} = \frac{9}{6} = 1.5\ \Omega$ // atau guna V=IR	1
(ii)	1. Total resistance = 3 Ω 2. Current flow = $\frac{3V}{3\ \Omega}$ 3. I = 1A	1 1 1
(iii)	Brightness of bulbs in Diagram 7.2 is greater than Diagram 7.3	1
(iv)	1. Bulbs are connected in parallel. 2. Circuit is complete, function able, batteries are labelled as 3V or draw two batteries in series 	1 1
	Total	10
8. (a)	n-p-n	1
(b)	to limit the base current	1
(c)	Increases	1
(d)	1. street lamp does not light up 2. voltage across V_{BE} decreases 3. base current decrease, transistor is off	1 1 1
(e) (i)	$\frac{50}{1050} \times 6 = 0.2857$ V	1
(ii)	$\frac{100}{1100} \times 6 = 0.5454$ V	1
(ii)	$\frac{200}{} \times 6 = 1.000$ V	1

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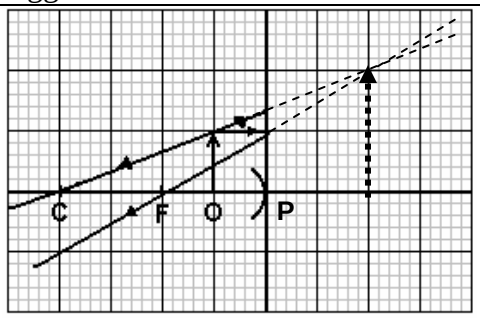
(f)	1200 * show method for either one of it. 200 Ω V_{BE} is greater than 0.7 V and transistor can function.	 1 1 1
	Total	12

Section B

Answer for No 9						
QUESTION			ANSWER SCHEME		MARKS	
9	(a)	(i)	Real image is an image which can be formed / projected on a screen.		1	1
		(ii)	object distance in 9.1 is shorter than 9.2		1	5
			Size of image formed in 9.1 is bigger than in 9.2		1	
			Image distance in 9.1 is smaller /shorter		1	
			The shorter the object distance, the bigger the size of the image formed		1	
			When the object distance is shorter, the magnification scale is bigger.		1	
	(b)		 1. Object is placed between F and P 2. Parallel light ray from top of object to mirror and reflected to F 3. Light ray from top to mirror and reflected back to C 4. Extrapolation of both rays and its intersection behind the mirror and an upright image is drawn.			4
	(c)	(i)	Use higher power bulb	Higher intensity of light / more light produced.	1+1	Any 5 sets of correct answers 10
		(ii)	The filament of the bulb is at the focus point of the concave mirror	The light ray focuses to one point. // Parallel ray can be obtain after reflection by concave mirror.	1+1	
		(iii)	More curvature	More light to be reflected (upwards) // less light towards other direction other than upwards.	1+1	
		(iv)	lens between f and 2f	To produce real and enlarge / bigger images.	1+1	
		(v)	Increase the distance / further away the screen	Larger image produced.	1+1	
					Total	20

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Answer for No 10						
QUESTION			ANSWER SCHEME		MARKS	
10	(a)	(i)	Current produced when the magnetic flux is cut by a conductor.		1	1
	(b)	(i)	No. of turns of the solenoid in Diagram 10.2 is greater.		1	
		(ii)	the deflection of the galvanometer pointer in Diagram 10.2 is bigger / larger.		1	
		(iii)	the rate of cutting of the magnetic flux in Diagram 10.2 is greater.		1	
		(iv)	Magnitude of induced current in Diagram10.2 is greater.		1	4
	(c)	(i)	No of turn increases, rate of cutting of magnetic flux increases.		1	
		(ii)	Rate of cutting increases, magnitude of induced current increases.		1	2
			Faraday's Law		1	1
	(d)	(i)	The greater the transmission voltage, the smaller the current in the power lines.		1	
			Power loss during transmission due to resistance will be smaller. / $P=I^2R$		1	2
		(ii)	1. - soft iron core - laminated soft iron core	2. - easily magnetised or demagnetised - to reduce the effect of eddy current	2	
			3. copper wire & large diameter	4. reduce heat loss due to resistance	2	
			5. N_p : N_s 240 : 20 24 : 2 12 : 1	6. to reduce output voltage	2	
			7. Wind the secondary coil on top of the primary coil	8. to reduce the leakage of magnetic flux	2	
			9. 2/4 diodes	10. to produce full-wave rectification	2	10
					Total	20

Section C

Answer for No 11						
QUESTION			ANSWER SCHEME		MARKS	
11	(a)		Upwards force cause by weight of fluid displaced by an object when the object is immerse in the fluid.		1	1
	(b)		Valve release air from ballast tank.		1	
			Sea water flooded ballast tank		1	
			The weight of water displaced is smaller.		1	
			Buoyant force < Weight of the submarine		1	4
	(c)		Characteristics	Reasons		
			The volume of ballast tank is higher	To produce bigger buoyant force / easy to rise up / can carry greater weight inside	2	
			More number of air tanks cylinder carried	Can stay longer time under the water / Can rise and submerge	2	10

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				many times / more air supply for respiration of crews		
			Can withstand higher maximum water pressure	Safe when the submarine submerge very deep in the sea / The body will not break due to high water pressure	2	
			The suitable shape of submarine is aerodynamic	Less water resistance in the motion / can move faster	2	
			Submarine X because X has large volume of ballast tank, large number of air tanks, can withstand higher pressure and aerodynamic.		1 1	
	(d)	(i)	$V = 0.2 \times 0.8$		1	
			$= 0.16\ m^3$		1	
		(ii)	$B = V\rho g = 0.16 \times 1000 \times 10$		1	
			$= 1600N$		1	
		(iii)	mass = 1600 ÷ 10 = 160 kg		1	5
					Total	20

Answer for No 12						
QUESTION			ANSWER SCHEME		MARKS	
12	(a)		Unstable isotopes which decay and emit radioactive particles / ray		1	1
	(b)		Radioisotope is injected into the pipe		1	
			G-M tube as detector is used to find the leakage		1	
			Reading on detector increases when near a leakage		1	3
	(c)		1. type of ray is gamma	2. high penetration power can penetrate through the thick layer of soil	2	
			3. short half life	4. Decay faster and detection can be done faster	2	
			5. in liquid state	6. Easy to flow/ to mix with water / easy to diffuse.	2	
			I choose radioisotope T because the type ray is gamma, has short half life and it is in liquid state.		2	8
	(d)	(i)	136		1	
		(ii)	$^{222}_{86}Rn \rightarrow {}^{218}_{84}Po + {}^{4}_{2}He$ 1. correct elements in equation 2. All nuclide notations are correct		2	
		(iii)	$^{222}_{86}Rn \rightarrow {}^{210}_{82}Pb + 3({}^{4}_{2}He) + 2({}^{0}_{-1}e)$ 1. 3 alpha 2. 2 beta		2	5
	(e)	(i)	Source L		1	
		(ii)	$160 \xrightarrow{2\text{ hours}} 80 \xrightarrow{2\text{ hours}} 40 \xrightarrow{2\text{ hours}} 20$ 1. show method to determine answer 2. Correct answer 20 min^{-1}		2	3
					Total	20

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PROGRAM PENINGKATAN PRESTASI AKADEMIK **4531/3**

SIJIL PELAJARAN MALAYSIA 2010

Fizik
Kertas 3

SKEMA JAWAPAN
PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010

FIZIK

Kertas 3

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan Pemarkahan ini mengandungi **5** halaman bercetak

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Peperiksaan Percubaan Spm 2010
Skema jawapan Fizik 3

<table>
<tr><th>No</th><th>Answer</th><th>Mark</th></tr>
<tr><td>1a i)</td><td>- Mass of load/m/weight/w</td><td>1</td></tr>
<tr><td>ii)</td><td>- Oscillation period/T/time taken for 10 oscillation/t</td><td>1</td></tr>
<tr><td>iii)</td><td>- Spring constant/k/10 oscillation/number of oscillation</td><td>1</td></tr>
<tr><td>1b i)</td><td>m = 20 g, t = 8.0 s
m = 30 g, t = 10.0 s
m = 40 g, t = 11.0 s
m = 50 g, t = 13.0 s
m = 60 g, t = 14.0 s
Note : 5 values correct – 2 marks
3 – 4 corrects – 1 mark
less than 3 – 0 mark</td><td>2</td></tr>
<tr><td>ii)</td><td>T = 0.8 s
T = 1.0 s
T = 1.1 s
T = 1.3 s
T = 1.4 s
Note : accept ecf in (b)(i)
5 values correct to 2 decimal point – 1 mark</td><td>1</td></tr>
<tr><td>iii)</td><td>$T^2 = 0.64\ s^2$
$T^2 = 1.00\ s^2$
$T^2 = 1.21\ s^2$
$T^2 = 1.69\ s^2$
$T^2 = 1.96\ s^2$
Note : accept ecf in (b)(ii)
5 values correct – 1 mark
5 values correct to 4 decimal point – 1 mark</td><td>2</td></tr>
<tr><td>1c</td><td>- m, T and T^2 shown in the table
- state all units of m, T and T^2 correctly
<table>
<tr><th>m / g</th><th>T / s</th><th>T^2 / s^2</th></tr>
<tr><td>20</td><td>0.8.</td><td>0.64</td></tr>
<tr><td>30</td><td>1.0</td><td>1.00</td></tr>
<tr><td>40</td><td>1.1</td><td>1.21</td></tr>
<tr><td>50</td><td>1.3</td><td>1.69</td></tr>
<tr><td>60</td><td>1.4</td><td>1.96</td></tr>
</table></td><td>1
1</td></tr>
<tr><td>1d</td><td>Draw a complete graph of T^2 against m
Tick √ based on the following aspects:
1. Show T^2 on the y – axis and m on the x – axis
2. State the units of the variables correctly
3. Both axes are marked with uniform scale
4. All five points are plotted correctly
3 – 4 points plotted correctly, give √
5. Best fit line is drawn
6. Show the minimum size of graph (5 x 4)</td><td>

√
√
√
√√

√
√</td></tr>
</table>

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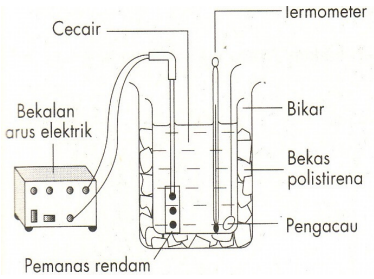
<table>
<tr><td></td><td>Score
<table><tr><th>Number of √</th><th>Score</th></tr><tr><td>7</td><td>5</td></tr><tr><td>5 – 6</td><td>4</td></tr><tr><td>3 – 4</td><td>3</td></tr><tr><td>2</td><td>2</td></tr><tr><td>1</td><td>1</td></tr></table></td><td>5</td></tr>
<tr><td>1e</td><td>Directly proportional</td><td>1</td></tr>
<tr><td>2a i)</td><td>Directly proportional</td><td>1</td></tr>
<tr><td>ii)</td><td>x = 2 (on graph)
1/a = 0.5
a = 2 m with unit</td><td>1
1
1</td></tr>
<tr><td>2b</td><td>Show the triangle (min: 4 x 4)
$m = \frac{4 - 0}{1 - 0}$
m= 4 m^2 with unit</td><td>1
1

1</td></tr>
<tr><td>2c</td><td>gradient = 10 λ (substitute)
4 = 10 λ
Λ = 0.4 m with unit</td><td>1
1
1</td></tr>
<tr><td>2d</td><td>a) Repeat experiment and take the average reading/
b) The position of the eyes must be perpendicular to the reading</td><td>1</td></tr>
<tr><td>3</td><td></td><td></td></tr>
<tr><td>a</td><td>The heat/ time taken of the water depends on its mass/volume</td><td>1</td></tr>
<tr><td>b</td><td>The greater the mass/volume, the time taken increase</td><td>1</td></tr>
<tr><td>c i)</td><td>Aim of the experiment
To investigate the relationship between the time taken and mass/volume</td><td>1</td></tr>
<tr><td>ii)</td><td>Variables in the experiment
Manipulated variable : mass/volume
Responding variable : Time taken
Constant variable : Initial temperature/specific heat capacity/ changes in temperature</td><td>
1
1</td></tr>
<tr><td>iii)</td><td>List of apparatus and material
Power supply, thermometer, beaker, immersion heater, stirrer</td><td>1</td></tr>
<tr><td>iv)</td><td>Arrangement of apparatus
 
</td><td>1</td></tr>
</table>

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<table>
<tr><td>v)</td><td>Controlling the manipulated variables
The 20 g of water is filled in the beaker.
The initial temperature, Θ_0, of water is recorded.
The heater is switched on until the water boiled.

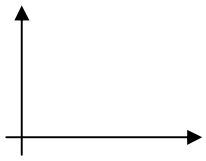
Controlling the responding variables
The time taken for the water is observed and recorded/
The heat is calculated.

Repeat the experiment with four different values of mass.
Repeat with masses of boiling water 40 g, 60 g, 80 g and 100 g.</td><td>1

1

1</td></tr>
<tr><td>vi)</td><td>How you tabulate the data.

<table><tr><th>Mass</th><th>Time taken</th></tr><tr><td>20</td><td></td></tr><tr><td>40</td><td></td></tr><tr><td>60</td><td></td></tr><tr><td>80</td><td></td></tr><tr><td>100</td><td></td></tr></table></td><td>1</td></tr>
<tr><td>vii)</td><td>How you analyse the data.

time taken
 
</td><td>1</td></tr>
<tr><td>4a</td><td>The length of wire affects the resistance/current</td><td>1</td></tr>
<tr><td>B</td><td>The shorter the wire, the higher the current/the resistance is decrease</td><td>1</td></tr>
<tr><td>c i)</td><td>Aim of the experiment
To investigate the relationship between the length of wire and current/resistance</td><td>1</td></tr>
<tr><td>ii)</td><td>Variables in the experiment
Manipulated variable : length
Responding variable : Current/Resistance
Constant variable : Potential difference/Temperature/Diameter</td><td>
1
1</td></tr>
<tr><td>iii)</td><td>List of apparatus and material
Ammeter, voltmeter, dry cells, constantan wires, ruler</td><td>1</td></tr>
</table>

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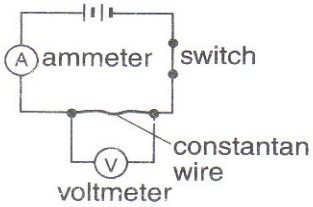
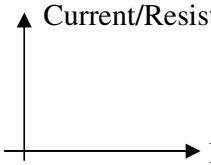
<table>
<tr><td>iv)</td><td>Arrangement of apparatus
 
</td><td>1</td></tr>
<tr><td>v)</td><td>Controlling the manipulated variables
The length of wire is measured at 10 cm.

Controlling the responding variables
The current is observed and recorded using the ammeter/
The resistance is calculated.

Repeat the experiment with four different values of length.
Repeat with different lengths of 20 cm, 30 cm, 40 cm and 50 cm.</td><td>1

1

1</td></tr>
<tr><td>vi)</td><td>How you tabulate the data.
<table><tr><th>Length</th><th>Current/resistance</th></tr><tr><td>10.0</td><td></td></tr><tr><td>20.0</td><td></td></tr><tr><td>30.0</td><td></td></tr><tr><td>40.0</td><td></td></tr><tr><td>50.0</td><td></td></tr></table></td><td>1</td></tr>
<tr><td>vii)</td><td>How you analyse the data.
 
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