

TRIAL 3 SPM 2013
PHYSICS PAPER 1 FORM 5
1 HOUR 15 MINUTES
SMK MERBAU MIRI

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

Setiap soalan disertakan sama ada **tiga atau empat** pilihan. Pilih jawapan yang paling tepat untuk setiap soalan dan hitamkan pada ruangan yang betul pada kertas jawapan.

- 1 Which of the following shows the correct matching?
 Yang manakah antara berikut menunjukkan padanan yang betul?

	Quantity / Kuantiti	Unit / Unit
A	Acceleration / Pecutan	$m\ s^{-2}$
B	Force / Daya	$kg\ m^{-1}$
C	Current / Arus	volt
D	Pressure / Tekanan	Newton

- 2 Diagram 1 shows the reading of micrometer screw gauge.

Rajah 1 menunjukkan bacaan tolok skru mikrometer.

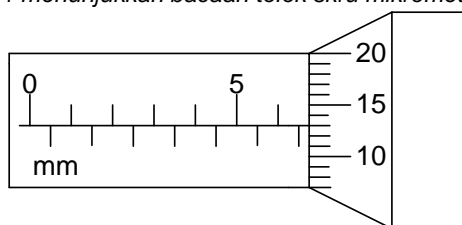
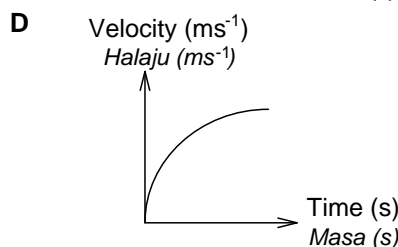
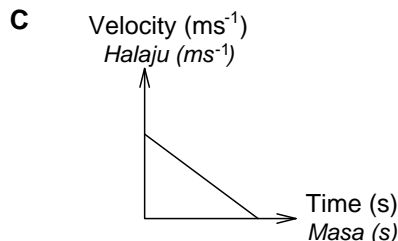
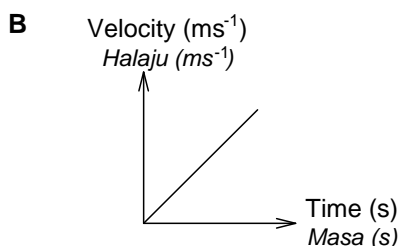
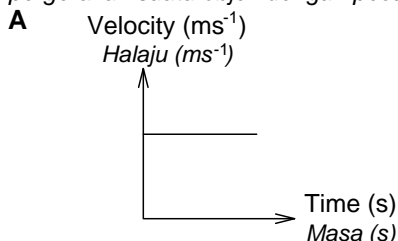


Diagram 1 / Rajah 1

The reading is
 Bacaan itu ialah

- A 6.13 mm C 7.13 mm
 B 6.63 mm D 7.63 mm
- 3 Which of the following shows the correct conversion?
 Yang manakah antara berikut menunjukkan pertukaran yang betul?
- A $32\ cm^3 = 3.2 \times 10^{-1}\ m^3$
 B $50\ m^3 = 5.0 \times 10^7\ cm^3$
 C $800\ km^3 = 8.0 \times 10^5\ m^3$
 D $380\ cm^3 = 3.80 \times 10^{-8}\ m^3$
- 4 Which of the following graphs shows the motion of an object with constant acceleration?
 Yang manakah antara graf berikut menunjukkan pergerakan suatu objek dengan pecutan malar?



- 5 The velocity of a cyclist increased uniformly from $3.5\ m\ s^{-1}$ to $4.0\ m\ s^{-1}$ in 5 seconds. Calculate the acceleration of the cyclist.

Halaju seorang pengayuh basikal bertambah secara seragam daripada $3.5\ m\ s^{-1}$ kepada $4.0\ m\ s^{-1}$ dalam 5 saat. Hitungkan pecutan pengayuh basikal itu.

- A $0.1\ ms^{-2}$ C $1.5\ ms^{-2}$
 B $0.25\ ms^{-2}$ D $37.5\ ms^{-2}$

- 6 Diagram 2 shows two spheres with different masses are dropped simultaneously from same height.

Rajah 2 menunjukkan dua sfera dengan jisim berlainan dijatuhkan serentak dari ketinggian sama.

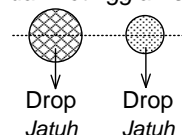


Diagram 2 / Rajah 2

Which quantity is same for both of the spheres?

Kuantiti manakah adalah sama bagi kedua-dua sfera itu?

- A Mass / Jisim C Force / Force
 B Momentum / Momentum D Acceleration / Pecutan

- 7 Diagram 3 shows two horizontal forces acting on a soft rubber ball.

Rajah 3 menunjukkan dua daya horizontal bertindak pada satu bola getah lembut.

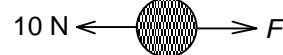


Diagram 3 / Rajah 3

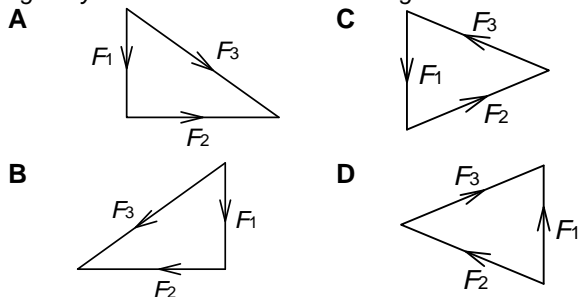
If the ball is in stationary state, the F will be

Jika bola itu dalam keadaan pegun, F itu mungkin ialah

- A 5 N C 15 N
 B 10 N D 20 N

- 8 Which of the following vector diagram shows three forces in the state of equilibrium?

Yang manakah antara rajah vektor berikut menunjukkan tiga daya dalam keadaan keseimbangan?



- 9 Diagram 4.1 shows a lorry and a car stop in front of traffic light.

Rajah 4.1 menunjukkan sebuah lori dan sebuah kereta yang berhenti di depan lampu trafik.

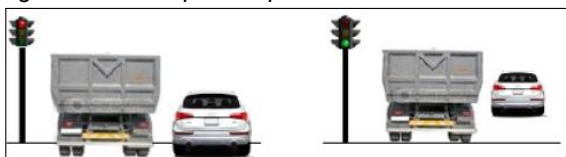


Diagram 4.1 / Rajah 4.1 Diagram 4.2 / Rajah 4.2

When the signal is green, the car moves faster than the lorry as shown in Diagram 4.2. This is because
Apabila isyarat ialah hijau, kereta itu bergerak lebih cepat daripada lori itu seperti ditunjukkan dalam Rajah 4.2. Ini adalah kerana

- A inertia of the lorry is bigger.
inersia lori itu adalah lebih besar.
B density of the lorry is bigger.
ketumpatan lori itu adalah lebih besar
C power of the car's engine is higher.
kuasa enjin kereta itu adalah lebih tinggi.
D size of the car is smaller.
saiz kereta itu adalah lebih kecil.

- 10 Diagram 5 shows a ball is thrown from high place onto hard road and bounces up.

Rajah 5 menunjukkan sebiji bola dijatuhkan dari tempat tinggi ke jalan keras dan melantun naik.

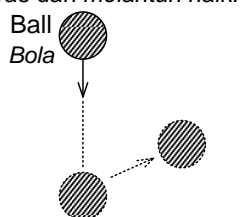


Diagram 5 / Rajah 5

The transformation of energy of the ball is

Perubahan tenaga bola itu adalah

- A Kinetic energy → gravitational potential energy
Tenaga kinetik → tenaga keupayaan graviti
B Elastic potential energy → kinetic energy → chemical potential energy
Tenaga keupayaan elastik → tenaga kinetik → tenaga keupayaan kimia
C Elastic potential energy → kinetic energy → gravitational potential energy
Tenaga keupayaan elastik → tenaga kinetik → tenaga keupayaan graviti
D Kinetic energy → elastic potential energy → kinetic energy + gravitational potential energy
Tenaga kinetik → tenaga keupayaan elastik → tenaga kinetik + tenaga keupayaan graviti

- 11 A motor of power 12 500W is used to lift object. Calculate the efficiency of the motor to lift a mass of 560 kg to a height of 20 m in 10 seconds.

Sebuah motor dengan kuasa 12 500 W digunakan untuk menaikkan objek. Hitungkan kecekapan motor untuk menaikkan suatu jisim 560 kg ke ketinggian 20 m dalam 10 saats.

- A 56.7 % C 89.6 %
B 86.9 % D 92.5 %

- 12 In Diagram 6, which points between A, B, C or D shows the elastic limit of a spring?

Dalam Rajah 6, titik yang manakah antara A, B, C or D menunjukkan had elastik bagi suatu spring?

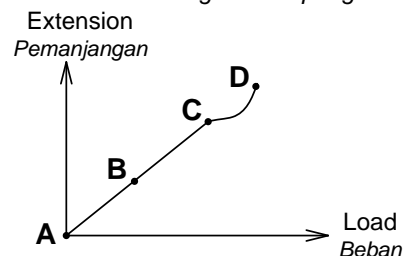


Diagram 6 / Rajah 6

- 13 Diagram 7 shows a bag commonly used by students.

Rajah 7 menunjukkan satu beg yang biasa digunakan oleh pelajar

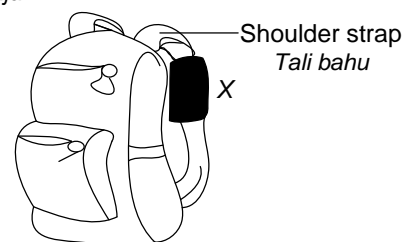


Diagram 7 / Rajah 7

Why is the shoulder strap at X wider?

Mengapakah tali bahu pada X lebar?

- A The large surface area decreases the pressure to the shoulder.
Luas permukaan yang besar mengurangkan tekanan ke atas bahu.
B The large surface area increases the pressure to the shoulder.
Luas permukaan yang besar menambahkan tekanan ke atas bahu.
C The large surface area increases the weight to the shoulder.
Luas permukaan yang besar mengurangkan berat ke atas bahu.
D The large surface area decreases the weight to the shoulder.
Luas permukaan yang besar menambahkan tekanan ke atas bahu.

- 14 Which of the following is used to measure the pressure of gas?

Yang manakah antara berikut digunakan untuk mengukur tekanan gas?

- A Mercury barometer C Bourdon gauge
Barometer merkuri Tolok bourdon
B Manometer D Venture tube
Manometer Tiub venturi

- 15 Diagram 8 shows a manometer being used to measure the pressure of gas X.

Rajah 8 menunjukkan satu manometer yang digunakan untuk mengukur tekanan suatu gas X.

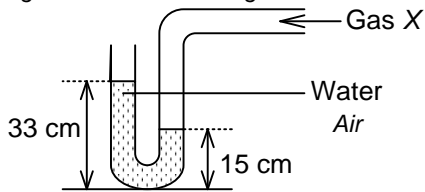


Diagram 8 / Rajah 8

How much greater is the pressure of gas X than the atmospheric pressure?

Berapa jauh lebih besarkah tekanan gas X berbanding dengan tekanan atmosfera?

- A 15 cm of water
15 cm air
B 18 cm of water
18 cm air
C 33 cm of water
33 cm air
D 48 cm of water
48 cm air

- 16 Diagram 9 shows three mercury barometer.

Rajah 9 menunjukkan tiga barometer merkuri.

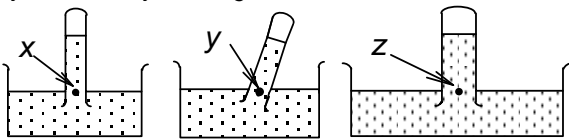


Diagram 9 / Rajah 9

Which of the following shows the correct comparison about the pressure, P at x , y and z ?

Yang manakah antara berikut menunjukkan perbandingan yang betul mengenai tekanan, P di x , y dan z ?

- A $P_x = P_y = P_z$
B $P_x = P_y > P_z$
C $P_x = P_y < P_z$
D $P_x < P_y < P_z$

- 17 Diagram 10 shows an aeroplane.

Rajah 10 menunjukkan sebuah kapal terbang.



Diagram 10 / Rajah 10

The flying of aeroplane can be explained by....

Penerbangan kapal terbang boleh diterangkan oleh....

- A Pascal's principle / Hukum Pascal
B Bernoulli's principle / Hukum Bernoulli
C Archimedes' principle / Hukum Archimedes

- 18 Diagram 11 shows the volume-temperature graph for a fixed mass of gas at a constant pressure.

Rajah 11 menunjukkan graf isipadu-suhu bagi suatu gas berjisim tetap pada tekanan tetap.

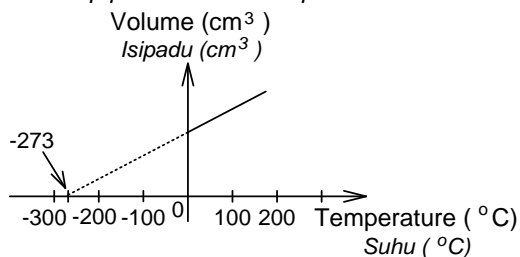


Diagram 11 / Rajah 11

Which statement is correct about the condition of the gas?

Pernyataan manakan betul mengenai keadaan gas itu?

- A The volume of gas is zero at 0°C .
Isipadu gas adalah sifar pada 0°C .
B The volume of gas is zero at -273°C .
Isipadu gas adalah sifar pada -273°C .
C The velocity of gas molecules is maximum at 0°C .
Halaju molekul gas adalah maksimum pada 0°C .
D The volume of gas is inversely proportional to the absolute temperature of gas.
Isipadu has adalah berkadar songsang dengan suhu mutlak gas.

- 19 Which of the following combinations is correct for a trapped gas in a container which is being heated?

Yang manakah antara gabungan berikut adalah betul untuk suatu gas yang terperangkap di dalam satu bekas di mana ia dipanaskan?

Number of air molecules Bilangan molekul udara	Kinetic energy of air molecules Tenaga kinetik molekul udara
A Increase Bertambah	Increase Bertambah
B Decrease Berkurang	Decrease Berkurang
C Unchange Tidak berubah	Increase Bertambah
D Unchange Tidak berubah	Decrease Berkurang

- 20 Diagram 12 shows three types of liquids, X, Y and Z which has same volume and same heat. They are being cooled down in the same cooling system.

Rajah 12 menunjukkan tiga jenis cecair, X, Y dan Z yang mempunyai isipadu dan haba yang sama. Mereka disejukkan di dalam sistem penyejukan yang sama.

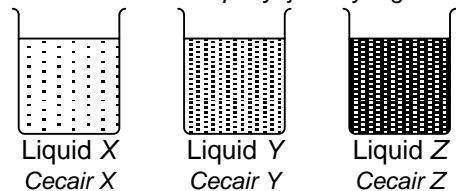


Diagram 12 / Rajah 12

The times taken for liquid X, Y and Z to solidify are 30 minutes, 90 minutes and 120 minutes respectively. Which statement is correct about their specific latent heat of fusion of liquid X, Y and Z?

Masa yang diambil untuk cecair X, Y dan Z untuk membeku ialah 30 minit, 90 minit dan 120 minit masing-masing. Pernyataan manakah adalah betul berkenaan dengan haba pendam pelakuran bagi cecair X, Y dan Z?

- A Liquid X has the lowest specific latent heat of fusion.
Cecair X mempunyai haba pendam tentu pelakuran yang paling rendah.
B Liquid X has the highest specific latent heat of fusion.
Cecair X mempunyai haba pendam tentu pelakuran yang paling tinggi.
C Liquid Z has a lower specific latent heat of fusion than liquid Y.
Cecair Z mempunyai haba pendam tentu pelakuran yang lebih rendah daripada Y.

- 21 Diagram 13 shows a process of change of state.
Rajah 13 menunjukkan satu proses perubahan keadaan.

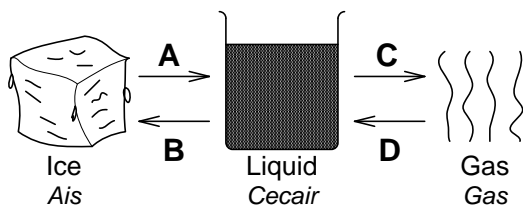


Diagram 13 / Rajah 13

In which process, **A**, **B**, **C** or **D**, is the latent heat of vaporization is released?

Dalam proses yang manakah, **A**, **B**, **C** atau **D**, adalah pembebasan haba pendam pengewapan?

- 22 Water is always used as a cooling agent because of its

Air selalu digunakan sebagai agen penyejukan kerana

- A low density.
ketumpatannya yang rendah.
- B low freezing point.
takat bekunya yang rendah.
- C ability to wet the glass tube.
kebolehannya membasahi tiub kaca.
- D high specific heat capacity.
muatan haba tentunya yang tinggi.

- 23 Diagram 14 shows an object is placed in front of a concave mirror.

Rajah 14 menunjukkan satu objek diletakkan di hadapan satu cermin cekung.

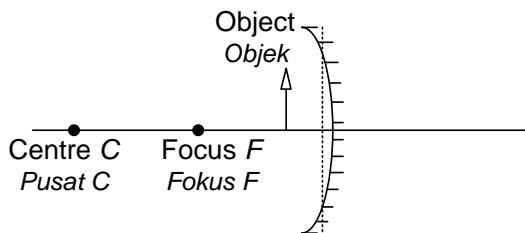


Diagram 14 / Rajah 14

What are the characteristics of the image formed?

Apakah ciri-ciri bagi imej yang terbentuk?

- A Real, inverted, magnified
Nyata, songsang, dibesarkan
- B Real, inverted, diminished
Nyata, songsang, dkecilkan
- C Virtual, upright, diminished
Maya, tegak, dibesarkan
- D Virtual, upright, magnified
Maya, tegak, dibesarkan

- 24 Which of the following phenomenon causes mirage?

Yang manakah antara fenomena berikut menyebabkan logam maya?

- A Refraction
Pembiasan
- B Reflection
Pantulan
- C Total internal reflection
Pantulan dalam penuh
- D Diffraction
Pembelauan

- 25 Diagram 15 shows the positions of a door, a man and a plane mirror.

Rajah 15 menunjukkan kedudukan satu pintu, seorang lelaki dan sebuah cermin satah.

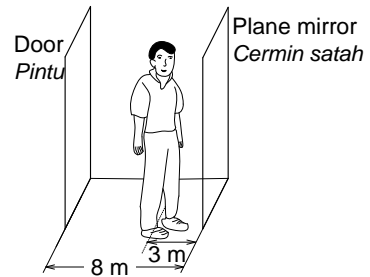


Diagram 15 / Rajah 15

What is the distance, in m, between the door and the image of the man?

Berapakah jarak, dalam m, di antara pintu dan imej lelaki itu?

- A 5 m
- B 8 m
- C 11 m
- D 14 m

- 26 Which of the following combinations is correct about the uses of mirror?

Yang manakah antara gabungan-gabungan berikut adalah betul mengenai kegunaan cermin?

	Rear view mirror of a car Cermin pandang belakang kereta	Mirror at road sharp corner Cermin di jalan selekoh tajam
A	Concave Cekung	Concave Cekung
B	Concave Cekung	Convex Cembung
C	Convex Cembung	Convex Cembung
D	Convex Cembung	Concave Cekung

- 27 Diagram 16 shows a ray of light travelling from glass to air at an angle of incidence of 40° .

Rajah 16 menunjukkan satu sinar cahaya yang merambat daripada kaca ke udara pada suatu sudut tuju 40° .

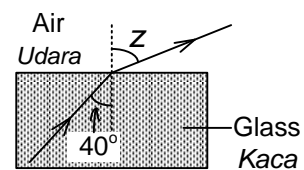


Diagram 16 / Rajah 16

Determine the value of z .

Tentukan nilai bagi z .

[Refractive index of glass = 1.5]

[Index pembiasan kaca = 1.5]

- A 74.6°
- B 60°
- C 25.4°
- D 20°

- 28 The focal length of a convex lens is 25 cm.

What is the power of the lens?

Panjang fokus bagi suatu kanta cembung ialah 25 cm. Berapakah kuasa bagi kanta itu?

- A + 0.4 D
- B - 0.4 D
- C + 4.0 D
- D 0.4 D

29 Which of the following quantities will **not** change when water waves propagates from deeper region to shallower region?

Yang manakah antara kuantiti-kuantiti berikut **tidak** akan berubah apabila gelombang air merambat dari kawasan dalam ke kawasan cetek?

- | | |
|------------------------------------|--------------------------|
| A Wave length
Panjang gelombang | C Direction
Arah |
| B Velocity
Halaju | D Frequency
Frekuensi |

30 Which of the following is linked to the pitch of the sound?

Yang manakah antara berikut dikaitkan dengan kelangsingan bunyi?

- A Speed of the sound
Kelajuan bunyi
- B Amplitude of the sound
Amplitud bunyi
- C Wavelength of the sound
Panjang gelombang bunyi
- D Frequency of the sound
Frekuensi bunyi

31 Diagram 17 shows a signal is transmitted from the radar to detect the position of an aeroplane.

Rajah 17 menunjukkan satu isyarat dipancarkan dari radar untuk mengesan kedudukan sebuah kapal terbang.

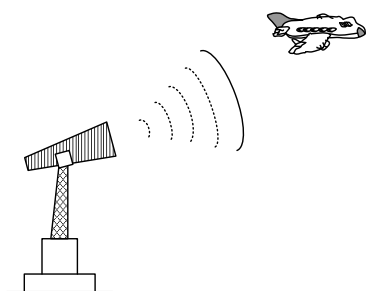


Diagram 17 / Rajah 17

Which of the following waves is the most suitable to be used?

Yang manakah antara gelombang berikut paling sesuai digunakan?

- | | |
|--------------------------------|---------------------------------|
| A X-ray
Sinar-X | C Ultra sound
Ultrasonik |
| B Microwave
Gelombang mikro | D Radio wave
Gelombang radio |

32 Diagram 18 shows the ripple tank experiment.

Rajah 18 menunjukkan eksperimen tangki riak.

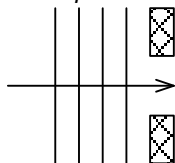
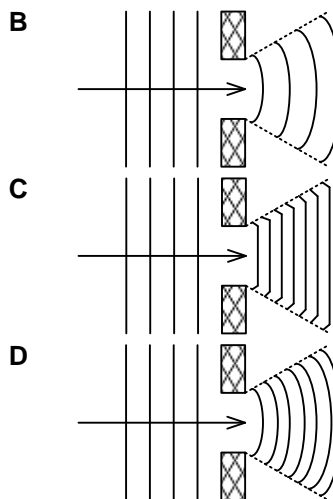
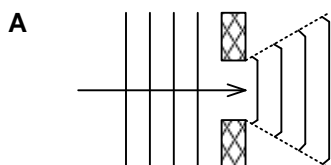


Diagram 18 / Rajah 18

Which diagram shows the wave pattern after passing through the barrier?

Yang manakah rajah menunjukkan corak gelombang selepas menerusi halangan?



33 Which statement is **correct** about the properties of sound waves?

Pernyataan manakah adalah **betul** mengenai ciri-ciri gelombang bunyi?

- A Sound waves are transverse waves.
Gelombang bunyi adalah gelombang melintang.
- B Sound waves can undergo polarization.
Gelombang bunyi boleh mengalami pengutuban.
- C Sound waves have the same speed with light.
Gelombang bunyi mempunyai kelajuan yang sama dengan gelombang cahaya.
- D Sound waves propagate the fastest through solid, followed through liquid and the slowest through air.
Gelombang bunyi merambat paling laju melalui pepejal, diikuti melalui cecair dan paling perlahan melalui udara.

34 Diagram 19 shows the fringes obtained when red light is used in a Young's double slit experiment.

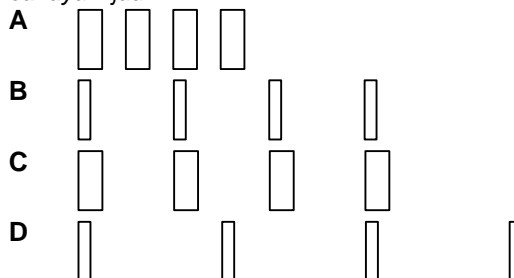
Rajah 19 menunjukkan pinggir-pinggir yang diperolehi apabila sinar merah digunakan dalam eksperimen dwicelah Young.



Diagram 19 / Rajah 19

Which of the following fringes are observed when the red light is replaced by green light?

Antara berikut, yang manakah merupakan pinggir-pinggir yang diperhatikan apabila sinar merah digantikan oleh cahaya hijau?



35 Which of the following has the highest resistance? Yang manakah antara berikut mempunyai rintangan tertinggi?

- | | |
|----------------------------|------------------------|
| A Constantan
Konstantan | C Copper
Kuprum |
| B Nichrome
Nikrom | D Tungsten
Tungsten |

- 36 The potential difference across a motor is 6.0 V and the current in it is 0.20 A. The energy used by the motor in 120 seconds is

Beza keupayaan merentasi suatu motor ialah 6.0 V dan arus dalamnya ialah 0.20 A. Tenaga yang digunakan oleh motor itu dalam 120 saat ialah

- A 24 J C 144 J
B 60 J D 3600 J

- 37 Four resistors of $4\ \Omega$ each are connected in circuit as shown in Diagram 20.

Empat perintang dengan $4\ \Omega$ setiap satu disambungkan pada suatu litar seperti ditunjukkan dalam Rajah 20.

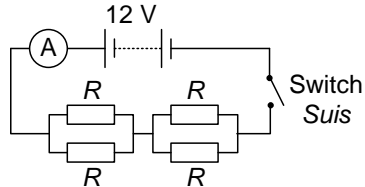


Diagram 20 / Rajah 20

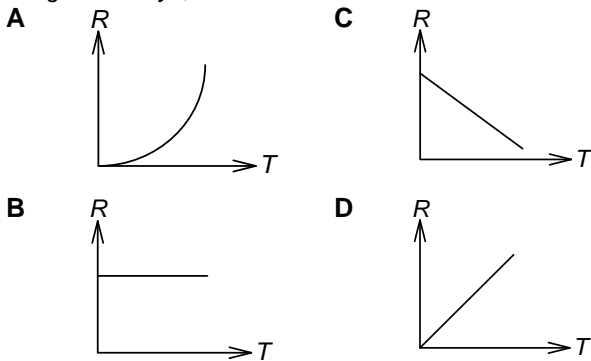
What is the reading of the ammeter when the switch is turned on?

Berapakah bacaan pada ammeter apabila suis itu dihidupkan?

- A 1.5 A C 3.0 A
B 2.0 A D 4.5 A

- 38 Which graphs shows correctly about the variation of resistance, R of a filament bulb with its temperature, T ?

Graf yang manakah menunjukkan dengan betul mengenai perubahan rintangan, R suatu mentol filamen dengan suhunya, T ?



- 39 Diagram 21 shows the Ohm's law circuit. Rajah 21 menunjukkan litar hukum Ohm.

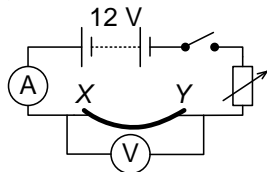


Diagram 21 / Rajah 21

What will happen to the reading of ammeter and voltmeter if a thinner constantan wire is used between XY?

Apakah yang akan berlaku kepada bacaan ammeter dan voltmeter jika satu dawai konstantan yang lebih nipis digunakan antara XY?

	Ammeter reading Bacaan ammeter	Voltmeter reading Bacaan voltmeter
A	Decrease / Berkurang	Decrease / Berkurang
B	Decrease / Berkurang	Increase / Bertambah
C	Increase / Bertambah	Decrease / Berkurang
D	Increase / Bertambah	Increase / Bertambah

- 40 Diagram 22 shows a candle flame is placed between two metal plates connecting to high voltage.

Rajah 22 menunjukkan satu nyalaan lilin yang diletakkan antara dua plat logam yang disambungkan kepada voltan tinggi.

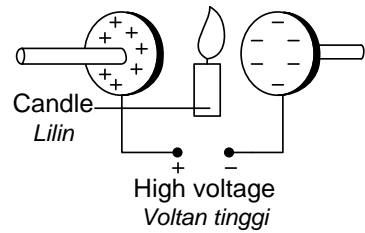


Diagram 22 / Rajah 22

What will be observed when the voltage is switched on?

Apakah yang akan berlaku apabila voltan itu dihidupkan?

- A The flame is seen flatten and spreads out more to the positive plate.
Nyalaan lilin kelihatan leper dan merebak lebih kepada plat positif.
B The flame is seen flatten and spreads out more to the negative plate.
Nyalaan lilin kelihatan leper dan merebak lebih kepada plat negatif.
C The flame is seen flatten and spreads out evenly to the positive and negative plate.
Nyalaan lilin kelihatan leper dan merebak seragam kepada plat positif dan plat negatif.
D The flame is seen flatten but does not spreads out to any plate.
Nyalaan lilin kelihatan leper tetapi tidak merebak kepada mana-mana plat.

- 41 Which of the following can reduce the eddy current in a transformer?

Yang manakah antara berikut boleh mengurangkan arus pusar di dalam satu transformer?

- A Using a laminated soft iron core
Menggunakan teras besi lembut yang berlaminata
B Using a thicker copper wire
Menggunakan dawai kuprum yang lebih tebal
C Using a stronger magnet
Menggunakan magnet yang lebih kuat
D Using a steel core
Menggunakan teras keluli

- 42 Why is electrical energy usually transmitted at high voltage?

Mengapakah tenaga elektrik biasanya dihantar pada voltan tinggi?

- A The current in the cable will be larger.
Arus di dalam kabel akan menjadi lebih besar.
B Power of the electrical energy will be large.
Kuasa tenaga elektrik menjadi besar.
C The transmission cable will be long lasting.
Kabel penghantaran akan menjadi lebih tahan lama.
D To reduce the resistance in the transmission cable.
Untuk mengurangkan rintangan di dalam kabel penghantaran.

43 What is the meaning of 240 V, 120 W labeled on a light bulb?

Apakah yang dimaksudkan dengan 240 V, 120 W pada suatu mentol cahaya?

A When a power of 120 watts is supplied to the bulb, it will release potential difference at 240 volts.

Apabila satu kuasa 120 watt dibekalkan kepada mentol, ia akan membebaskan beza keupayaan pada 240 volt.

B When a potential difference of 120 watts is supplied to the bulb, it will release power at 240 volts per second.

Apabila satu beza keupayaan 120 watt dibekalkan kepada mentol, ia akan membebaskan kuasa pada 240 volt per saat.

C When a potential difference of 240 volts is supplied to the bulb, it will release power at 120 joules per second.

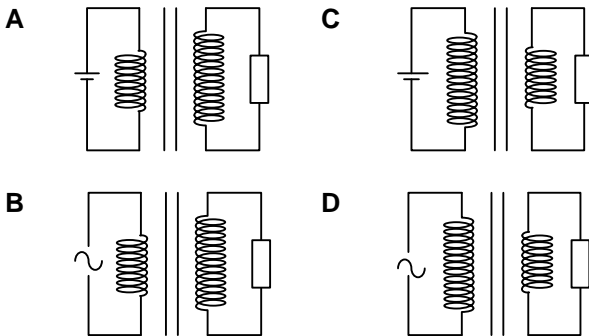
Apabila satu beza keupayaan 240 volt dibekalkan kepada mentol, ia akan membebaskan kuasa pada 120 joule per saat.

D When a potential difference of 240 volts is supplied to the bulb, it will release power at 120 watt per second.

Apabila satu beza keupayaan 240 volt dibekalkan kepada mentol, ia akan membebaskan kuasa pada 120 watt per saat.

44 Which diagram shows a step-up transformer?

Rajah yang manakah menunjukkan transformer injak naik?



45 Diagram 23 shows a transistor circuit with resistor R_A and R_B .

Rajah 23 menunjukkan satu litar transistor dengan perintang R_A dan R_B .

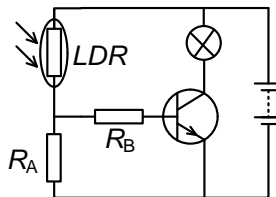


Diagram 23 / Rajah 23

State the function of R_A .

Nyatakan fungsi bagi R_A .

A To control the collector current.

Untuk mengawal arus pengumpul.

B Act as voltage divider.

Bertindak sebagai pembahagi voltan.

C To control the base current.

Untuk mengawal arus tapak.

D To control the emitter current.

Untuk mengawal arus pemancar.

46 Table 1 shows the resistance of four wires with the same thickness at room temperature.

Jadual 1 menunjukkan rintangan bagi empat dawai dengan ketebalan yang sama pada suhu bilik.

Wire Dawai	Resistance (Ω) Rintangan (Ω)
A	0.10
B	1.00
C	1.50
D	2.00

Table 1 / Jadual 1

Which wire, A, B, C or D, is used in a bulb as the filament to increase the efficiency of the bulb?

Antara dawai, A, B, C atau D, yang manakah digunakan dalam suatu mentol sebagai filamen untuk meningkatkan kecekapan mentol itu?

47 The doping process of pure semiconductor with trivalent element will

Proses pendopan semikonduktor dengan unsur trivalent akan

A cause the semiconductor to be negatively charged.

menyebabkan semikonduktor itu bercas negatif.

B produce p-type semiconductor.

menghasilkan semikonduktor jenis-p.

C cause the resistance of the semiconductor to decrease.

menyebabkan rintangan semikonduktor menjadi kurang.

D produce majority charged carrier which are electrons.

menghasilkan pembawa cas majoriti iaitu elektron.

48 An atom has the half life of 2 days with its initial count rate of 6400 counts per second.

How many counts per second are left after 10 days?

Suatu atom mempunyai separuh hayat 2 hari dengan kadar bilang awal 6400 bilang per saat.

Berapakah bilang per saat yang tinggal selepas 10 hari?

A 200

C 400

B 320

D 420

49 The process of splitting of a heavy nucleus into two lighter nuclei and releases large energy is known as

Proses membedil suatu nukleus yang berat kepada dua nuclei yang lebih ringan dan membebaskan tenaga besar dikenali sebagai

A Nuclear fusion

Pelakuran nukleus

C Chain reaction

Tindak balas berantai

B Nuclear fission

Pembelahan nukleus

50 The mass defect in a nuclear reaction is 4×10^{-6} kg.

What is the energy released when the speed of light is $3.0 \times 10^8 \text{ ms}^{-1}$?

Cacat jisim dalam satu tindak balas nuclear ialah 4×10^{-6} kg. Berapakah tenaga yang dibebaskan apabila kelajuan cahaya ialah $3.0 \times 10^8 \text{ ms}^{-1}$?

A 3.6×10^{12} J

C 4.5×10^{-12} J

B 1.2×10^{14} J

D 1.2×10^{15} J

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

TRIAL SPM YEAR 2013
PHYSICS PAPER 2 FORM 5
2 HOURS 30 MINUTES
SMK MERBAU MIRI SARAWAK

Information for candidates / Maklumat untuk calon-calon:

- This question paper consists of **three** sections: **Section A**, **Section B** and **Section C**.
*Kertas soalan ini mengandungi 3 bahagian: **Bahagian A**, **Bahagian B** dan **Bahagian C**.*
- Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in this question paper.
*Jawab semua soalan di **Bahagian A**. Tulis jawapan anda untuk **Bahagian A** pada ruangan yang disediakan di dalam kertas soalan ini.*
- Answer **one** question from **Section B** and **one** question from **Section C**. Write your answers for **Section B** and **Section C** on the papers provided by the invigilator.
*Jawab **satu** soalan daripada **Bahagian B** dan **satu** soalan daripada **Bahagian C**. Tulis jawapan anda untuk **Bahagian B** dan **Bahagian C** pada kertas yang disediakan oleh pengawas.*

Section A / Bahagian A
[60 marks / 60 markah]

*Answer all the questions in this section. The time suggested to answer this section is 90 minutes.
Jawab semua soalan untuk bahagian ini. Masa dicadangkan untuk menjawab bahagian ini adalah 90 minit*

- 1 Diagram 1.1 and Diagram 1.2 show two scales of instrument A and instrument B.
Rajah 1.1 dan 1.2 menunjukkan dua skala bagi pengukur A dan pengukur B.

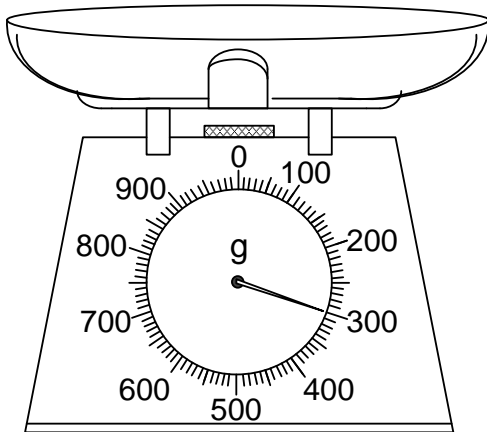


Diagram 1.1: Instrument A
Rajah 1.1: Pengukur A

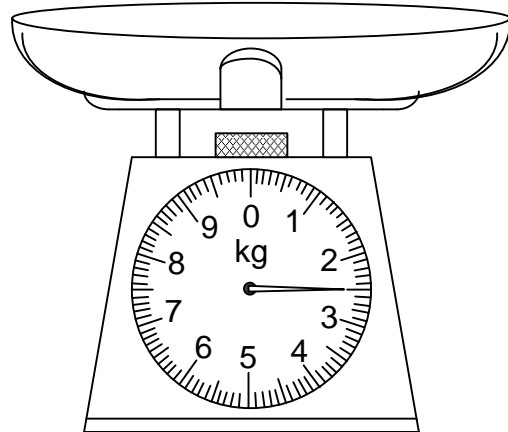


Diagram 1.1: Instrument B
Rajah 1.1: Pengukur B

- (a) Name the physical quantity can be measured by the instrument? [1 mark / markah]
Namakan kuantiti fizik yang boleh diukur oleh alat itu?
-
- (b) Between instrument A and instrument B:
Antara pengukur A dan pengukur B:
- (i) Which one is more sensitive? [1 mark / markah]
Yang manakah lebih sensitif?
-
- (ii) Give **one** reason for answer in 1(b)(i). [1 mark / markah]
*Beri **satu** sebab bagi jawapan di 1(b)(i).*
-
- (c) Give **one** method to increase the accuracy of readings. [1 mark / markah]
*Beri **satu** kaedah untuk meningkatkan kejituan bagi bacaan.*
-

- 2 Diagram 2 shows a displacement-time graph for transverse waves.
Rajah 2 menunjukkan graf sesaran-masa bagi gelombang melintang.

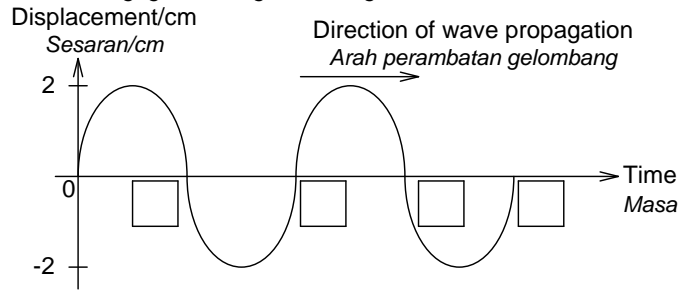


Diagram 2 / Rajah 2

- (a) The transverse wave has a period of 2 seconds.
Gelombang melintang tersebut mempunyai tempoh 2 saat.
- (i) What is meant by *period*? [1 mark / markah]
Apakah maksud *period*?
-
- (ii) Complete the Diagram 2 by filling in the empty boxes for the time taken by the waves. [2 marks / markah]
Lengkapkan Rajah 2 dengan mengisi kotak kosong bagi masa yang diambil oleh gelombang tersebut.
- (b) What will happen to the frequency of the wave when the period of the wave increases? [1 mark / markah]
Apakah yang akan berlaku kepada frekuensi gelombang apabila tempoh gelombang itu bertambah?
-
- (d) What is transferred by the wave? [1 mark / markah]
Apakah yang dipindahkan oleh gelombang tersebut?
-

- 3 Diagram 3.1 shows a metal block hanging in air from a spring balance.
Diagram 3.2 shows a metal block being immersed in water from a spring balance.
Rajah 3.1 menunjukkan satu blok logam tergantung dalam udara dari sebuah neraca spring.
Rajah 3.2 menunjukkan satu blok logam ditenggelamkan ke dalam air dari sebuah neraca spring.

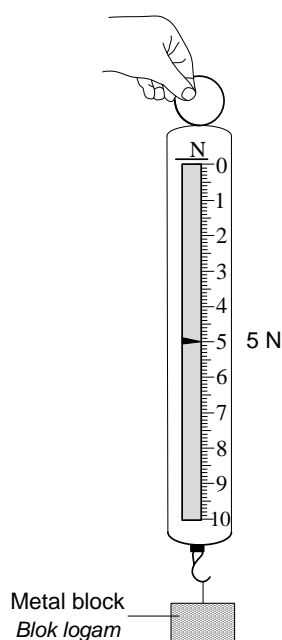


Diagram 3.1 / Rajah 3.1

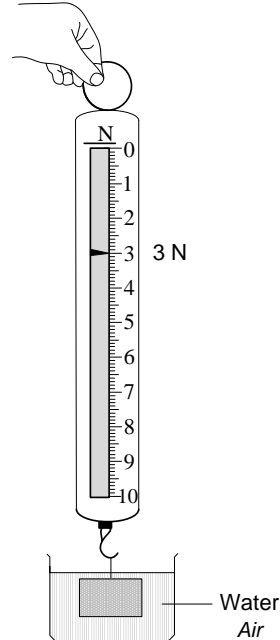


Diagram 3.2 / Rajah 3.2

A principle states that;

When a body is immersed wholly or partially in a fluid, the buoyant force acting on the body is equal to the weight of the fluid it displaces.

Satu prinsip menyatakan bahawa;

Bila suatu objek yang direndamkan sepenuhnya atau sebahagiannya di dalam bendalir, daya tujah yang bertindak ke atas objek itu adalah sama dengan berat bendalir yang tersesar.

- (a) Name the principle above. [1 mark / markah]
Namakan prinsip di atas.
-

(b) Based on Diagram 3.1 and Diagram 3.2:

Berdasarkan pada Rajah 3.1 dan Rajah 3.2:

(i) What is the apparent loss in weight for the metal block? [1 mark / markah]

Berapakah kehilangan berat ketara blok logam itu?

(ii) Explain why the spring balance shows a smaller reading? [1 mark / markah]

Terangkan mengapa neraca spring itu menunjukkan bacaan yang lebih kecil?

(iii) Calculate the volume of the metal block. Given the density of water is 1000 kgm^{-3} . [2 marks / markah]

Hitungkan isipadu blok logam itu. Diberi ketumpatan air ialah 100 kgm^{-3} .

(c) The water in Diagram 3.2 is replaced by oil. State what will happen to the reading of spring balance?

Air di dalam Rajah 3.2 digantikan oleh minyak. Nyatakan apa yang akan berlaku kepada bacaan neraca spring?

[1 mark / markah]

4 Diagram 4.1 shows the structure of a simple cathode ray oscilloscope (CRO).

Rajah 4.1 menunjukkan struktur bagi satu osiloskop sinar katod ringkas (OSK).

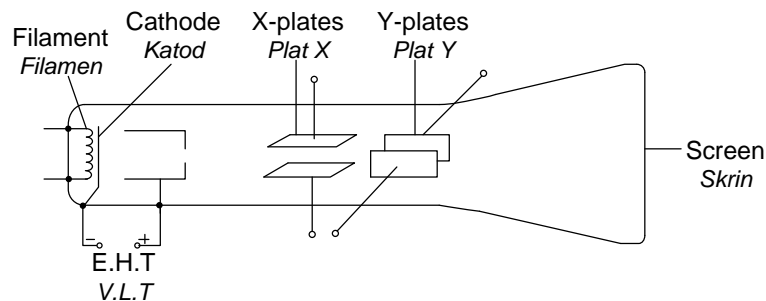


Diagram 4.1 / Rajah 4.1

(a) (i) Name the physics process happen at cathode. [1 mark / markah]

Namakan proses fizik yang berlaku di cathode.

(ii) Explain what happens to the electrons at surface of cathode when the cathode is heated? [1 mark / markah]

Terangkan apa yang akan berlaku kepada elektron-elektron pada permukaan katod apabila katod itu dipanaskan?

(iii) What will happen if a thicker cathode is used in CRO? [1 mark / markah]

Apakah yang akan berlaku jika cathode yang lebih tebal digunakan dalam CRO?

(b) A student uses a CRO to study the output voltage of an electric dynamo. The waveform of output voltage is shown in Diagram 4.2. The Y-gain control is set at 3 V/division.

Seorang pelajar menggunakan satu OSK untuk mengkaji voltan output bagi suatu dinamo elektrik. Bentuk gelombang voltan output ditunjukkan dalam Rajah 4.2. Gandaan Y dilaraskan pada 3 V/ bahagian

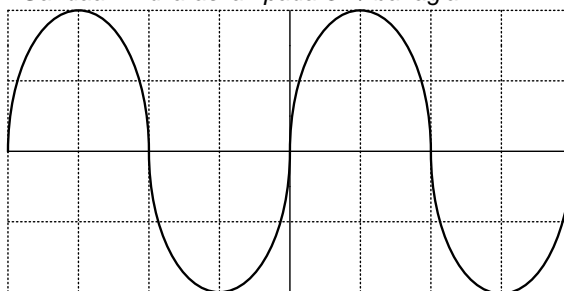


Diagram 4.2 / Rajah 4.2

(i) Calculate the output voltage produced by the electric dynamo. [2 marks / markah]
Hitungkan voltan output yang dihasilkan oleh dinamo elektrik itu.

(ii) On Diagram 4.3, draw a new trace to show the waveform of output voltage if the time-base of the CRO is turned off. [2 marks / markah]
Pada Rajah 4.3, lukis satu surihan yang baru untuk menunjukkan bentuk gelombang voltan output jika dasar-masa OSK itu dimatikan.

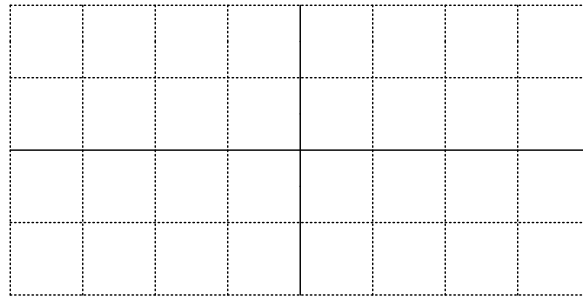


Diagram 4.3 / Rajah 4.3

5 Diagram 5.1 shows three identical cradle springs with two cradle springs supporting babies, P and Q, of mass 5 kg and 8 kg respectively. [2 marks / markah]
Rajah 5.1 menunjukkan tiga spring buaian serupa dengan dua spring buaian menampung bayi, P dan Q berjisim 5 kg dan 8 kg masing-masing.

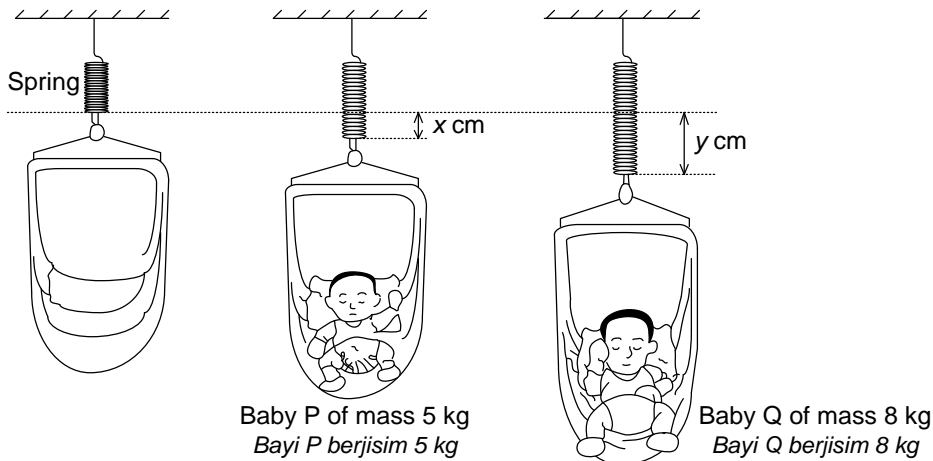


Diagram 5.1 / Rajah 5.1

(a) What is meant by mass? [1 mark / markah]
Apakah yang dimaksudkan dengan jisim?

(b) Observe the Diagram 5.1: [1 mark / markah]
Perhatikan Rajah 5.1:

(i) Compare the mass of baby P and baby Q. [1 mark / markah]
Bandingkan jisim bayi P dan bayi Q.

(ii) Compare the spring constant of the spring. [1 mark / markah]
Bandingkan pemalar spring bagi spring.

(iii) Compare the extension of springs, x and y. [1 mark / markah]
Bandingkan pemanjangan spring, x dan y.

(c) (i) Relate the mass of the baby with the extension of the spring. [1 mark / markah]
Hubungkan jisim bayi dengan pemanjangan spring.

(ii) State the physics law involved. [1 mark / markah]
Nyatakan hukum fizik yang terlibat.

- (d) A spring with spring constant, k , of 10 Nm^{-1} is used to hang an object of mass 5 kg. Calculate the extension of the spring.
 Satu spring dengan pemalar spring, k , dengan 10 Nm^{-1} digunakan untuk menggantung satu objek berjisim 5 kg. Hitungkan pemanjangan spring itu.

[2 marks / markah]

- 6 Diagram 6.1 and Diagram 6.2 show movements of identical bar magnet into the solenoid with the same force as to produce current. Both solenoids are made of same wires which are connected to a zero-centered galvanometer.
 Rajah 6.1 dan Rajah 6.2 menunjukkan pergerakan magnet bar serupa ke dalam solenoid dengan daya sama untuk menghasilkan arus. Kedua-dua solenoid diperbuat daripada wayar sama yang disambungkan ke satu galvanometer sifar-tengah.

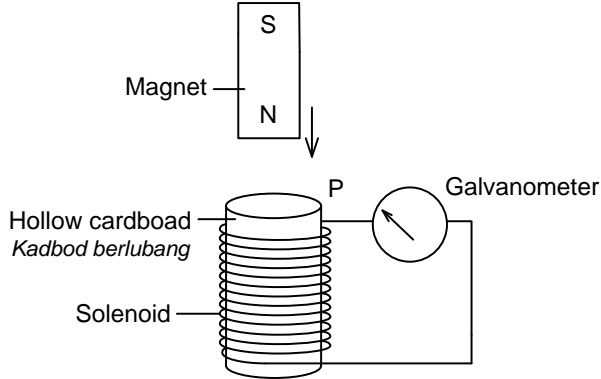


Diagram 6.1 / Rajah 6.1

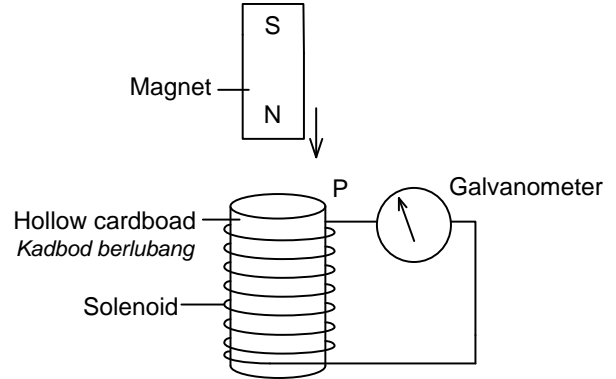


Diagram 6.2 / Rajah 6.2

- (a) Underline the correct answer in the bracket to complete the sentence below. [1 mark / markah]
 Gariskan jawapan yang betul dalam kurungan untuk melengkapkan ayat berikut.

The method of producing current without electrical supply is called (electromagnet, electromagnetic induction).

Kaedah menghasilkan arus tanpa bekalan elektrik dipanggil (elektromagnet, aruhan elektromagnetik).

- (b) On Diagram 6.1 and Diagram 6.2:
 Pada Rajah 6.1 dan Rajah 6.2:

- (i) State the polarity of region P. [1 mark / markah]
 Nyatakan kekutuban kawasan P.

- (ii) Name the law used to determine the polarity in 6(b)(i). [1 mark / markah]
 Namakan hukum yang digunakan untuk menentukan kekutuban dalam 6(b)(i).

- (c) Based on Diagram 6.1 and Diagram 6.2, compare:
 Berdasarkan pada Rajah 6.1 dan Rajah 6.2, compare:

- (i) The number of turns of coils [1 mark / markah]
 Bilangan lilitan gegelung

- (ii) Deflection of the pointer of the galvanometer [1 mark / markah]
 Pesongan jarum galvanometer

- (d) State the relationship between the number of turns of coils and
 Nyatakan hubungan antara bilangan lilitan gegelung dan

- (i) deflection of the pointer of the galvanometer [1 mark / markah]
 pesongan jarum galvanometer

- (ii) magnitude of induced current [1 mark / markah]
 magnitude arus aruhan

- (e) State what will happen to the deflection of galvanometer if a soft magnet is used? [1 mark / markah]
 Nyatakan apakah yang akan berlaku kepada pesongan galvanometer jika magnet yang lebih lembut digunakan?

7 Diagram 7.1 shows a detector used to measure the radioactivity count of a substance which has long half-life. The readings are taken for four different situations.

Rajah 7.1 menunjukkan satu pengesan yang digunakan untuk mengukur keradioaktifan bahan yang separuh hayatnya panjang. Bacaan-bacaan diambil untuk empat situasi berlainan.

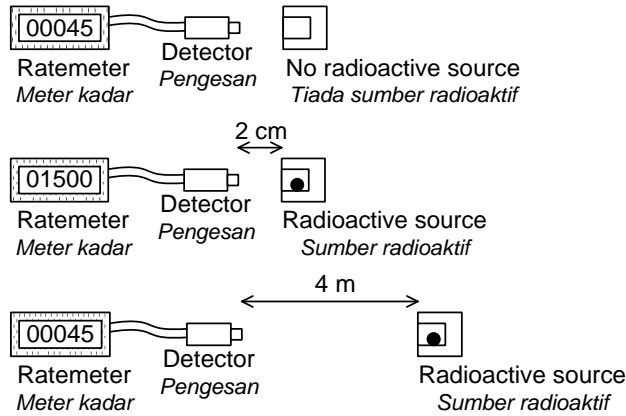


Diagram 7.1 / Rajah 7.1

- (a) (i) Name the radiation being emitted by the radioactive source. [1 mark / markah]
 Namakan sinaran yang dibebaskan oleh bahan radioaktif.
- (ii) What is the nature of this radiation in 7(a)(i)? [1 mark / markah]
 Apakah sifat semulajadi sinaran ini dalam 7(a)(i)?
- (iii) Explain why the ratemeter shows a reading even no radioactive source is used? [1 mark / markah]
 Terangkan mengapa kadar meter menunjukkan bacaan walaupun tiada bahan radioaktif digunakan?

(b) The same radioactive in 7(a)(i) is placed between two magnets bar as shown in Diagram 7.2
 Radioaktif yang sama dalam 7(a)(i) diletakkan antara dua bar magnet seperti ditunjukkan dalam Rajah 7.2.

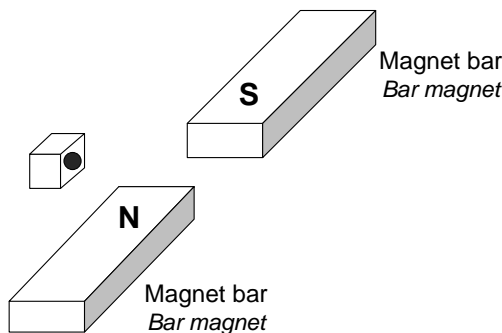


Diagram 7.2 / Rajah 7.2

On Diagram 7.2, draw the path of radiation when passing through the magnet bars. [1 mark / markah]
 Pada Rajah 7.2, lukiskan laluan sinar apabila bergerak menerusi bar magnet.

(c) A fruit factory uses a method of irradiation using radioisotopes when producing fruit canes. Some characteristics of radioisotopes need to be considered in order to irradiate the fruit safely. Sebuah kilang buah-buahan menggunakan satu kaedah penyinaran menggunakan radioisotop apabila menghasilkan tin buah-buahan. Beberapa sifat radioisotop perlu diambil kira demi menyinarakan buah-buahan tersebut dengan selamat.

State the suitable property for the following characteristics and give one reason for the choice. Nyatakan sifat-sifat yang sesuai untuk ciri-ciri berikut dan berikan satu sebab untuk pilihan itu.

(i) Type of radiation for fruit irradiation [1 mark / markah]
 Jenis sinaran untuk penyinaran buah-buahan

Reason [1 mark / markah]
 Sebab

- (ii) Half-life of the radiation source [1 mark / markah]
Separuh hayat bahan sinaran

Reason [1 mark / markah]
Sebab

- (iii) Physical state of the radiation source [1 mark / markah]
Keadaan fizikal bahan sinaran

Reason [1 mark / markah]
Sebab

- 8 Diagram 8.1 and Diagram 8.2 show two arrangements of apparatus to determine the specific heat capacity of aluminium block.

Rajah 8.1 dan Rajah 8.2 menunjukkan dua susunan radas untuk menentukan muatan haba tentu suatu blok aluminium.

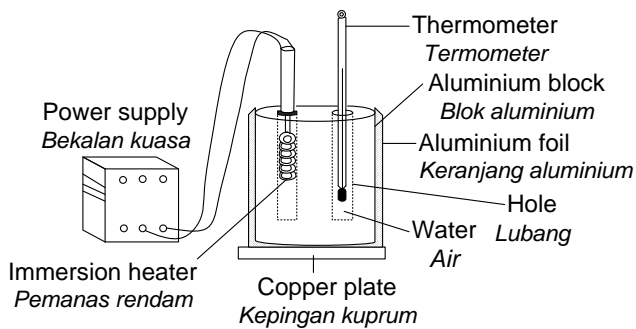


Diagram 8.1 / Rajah 8.1

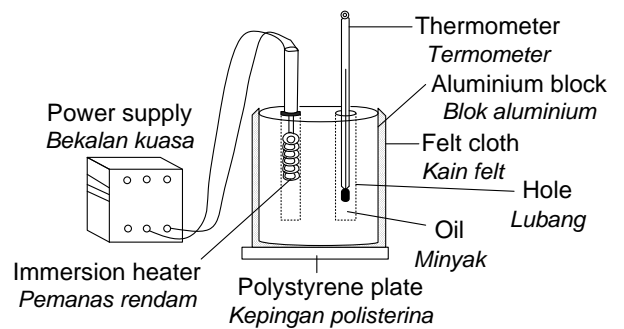


Diagram 8.2 / Rajah 8.2

- (a) What is meant by specific heat capacity? [1 mark / markah]
Apakah yang dimaksudkan dengan muatan haba tentu?

- (b) Based on Diagram 8.1 and Diagram 8.2, state the suitable characteristics of the arrangement of apparatus to determine the specific heat capacity of aluminium block. Give reason for the suitability of the characteristics.

Berdasarkan pada Rajah 8.1 and Rajah 8.2, nyatakan kesesuaian ciri-ciri bagi susunan radas untuk menentukan muatan haba tentu suatu blok aluminium. Beri sebab untuk kesesuaian ciri-ciri tersebut.

- (i) Type of plate to be used as the base [1 mark / markah]
Jenis kepingan yang digunakan sebagai tapak

Reason [1 mark / markah]
Sebab

- (ii) Type of liquid poured into the hole [1 mark / markah]
Jenis cecair yang dituang ke dalam lubang

Reason [1 mark / markah]
Sebab

- (iii) Material used to wrap the aluminium block [1 mark / markah]
Bahan yang digunakan untuk membalut blok aluminium

Reason [1 mark / markah]
Sebab

- (c) The aluminium block in both diagrams have 1 kg mass and is heated using electric heater of power 200 W within 4 minutes. The increasing temperature in Diagram 8.1 is 30°C whereas in Diagram 8.2 is 50°C.

Blok aluminium dalam kedua-dua rajah mempunyai jisim 1 kg dan dipanaskan menggunakan pemanas elektrik dengan kuasa 200 W selama 4 minit. Penambahan suhu dalam Rajah 8.1 ialah 30°C manakala dalam Rajah 8.2 ialah 50°C.

Calculate the specific heat capacity of the aluminium block in:

Hitungkan muatan haba tentu bagi blok aluminium dalam:

- (i) Diagram 8.1
Rajah 8.1

[2 marks / markah]

- (ii) Diagram 8.2
Rajah 8.2

[2 marks / markah]

- (d) Which apparatus between Diagram 8.1 or Diagram 8.2 will give more accurate result if the specific heat capacity of aluminium block is $900 \text{ J kg}^{-1}\text{°C}^{-1}$?

Radas yang manakah antara Rajah 8.1 atau Rajah 8.2 akan memberi keputusan yang lebih jitu jika muatan haba tentu bagi blok aluminium ialah $900 \text{ J kg}^{-1}\text{°C}^{-1}$?

[1 mark / markah]

.....

Section B / Bahagian B
[20 marks / 20 markah]

Answer any **one** question from this section. The time suggested to answer this section is 30 minutes.
 Jawab mana-mana **satu** soalan daripada bahagian ini. Masa dicadangkan untuk menjawab bahagian ini adalah 30 minit.

- 9 Diagram 9.1 and Diagram 9.2 show the water spurt out from two identical containers, P and Q.
 Rajah 9.1 dan Rajah 9.2 menunjukkan pancutan air daripada dua bekas serupa P dan Q.

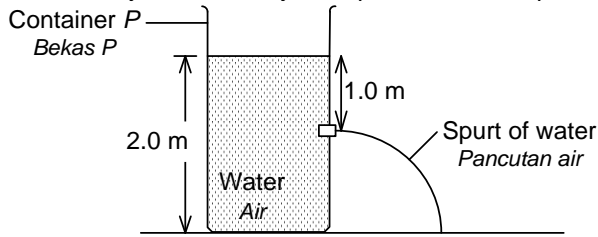


Diagram 9.1 / Rajah 9.1

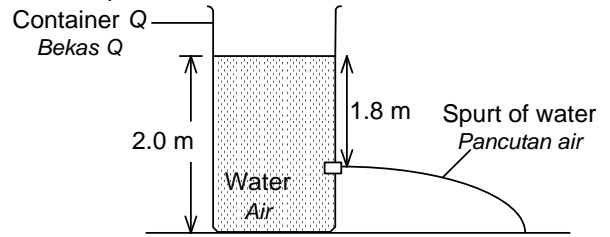


Diagram 9.2 / Rajah 9.2

The density of the water in container P and container Q are equal.
 Ketumpatan air di dalam bekas P dan bekas Q adalah sama.

- (a) What is the meaning of density? [1 mark / markah]
 Apakah yang dimaksudkan dengan ketumpatan?
- (b) Using the Diagram 9.1 and Diagram 9.2, compare the type of liquid filled in the container, the depth of the holes and the distance of spurt of water. Relate the depth of the hole to the distance of spurt of water to deduce a physics concept. State that physics concept. [5 marks / markah]
 Menggunakan Rajah 9.1 and Rajah 9.2, bandingkan jenis cecair yang diisi ke dalam bekas, kedalaman lubang dan jarak pancutan air. Hubungkan kedalaman lubang kepada jarak pancutan air untuk mendeduksikan satu konsep fizik. Nyatakan fizik konsep tersebut.
- (c) Diagram 9.3 shows a Bunsen burner. [4 marks / markah]
 Rajah 9.3 menunjukkan sebuah penunu Bunsen.

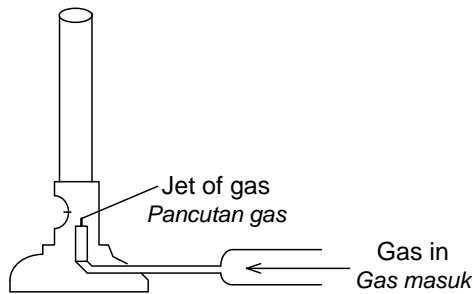


Diagram 9.3 / Rajah 9.3

Explain how the Bunsen burner can produce a blue flame. [4 marks / markah]
 Terangkan bagaimana penunu Bunsen boleh menghasilkan satu nyalaan api berwarna biru.

- (d) Diagram 9.4 shows a submarine. [10 marks / markah]
 Rajah 9.4 menunjukkan sebuah kapal selam.



Diagram 9.4 / Rajah 9.4

Using appropriate physics concept, explain the suitable characteristics of the submarine that can work efficiently and safe. Your explanation should include the following characteristics:

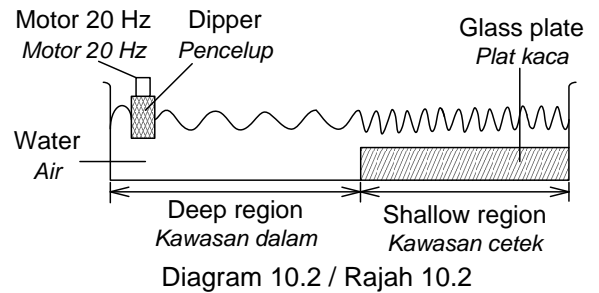
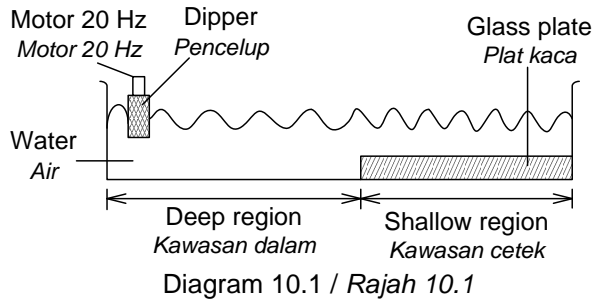
Menggunakan konsep fizik yang sesuai, terangkan kesesuaian ciri-ciri kapal selam yang boleh berfungsi dengan cekap dan selamat. Penerangan anda perlu merangkumi ciri-ciri berikut:

- (i) Shape of submarine / Bentuk kapal selam
- (ii) Strength of material for the body of submarine / Kekuatan bahan untuk badan kapal selam
- (iii) Rusting rate of the material used / Kadar pengurangan bagi bahan yang digunakan
- (iv) Component for submarine to submerge or float / Komponen untuk kapal selam menyelam dan terapung
- (v) Type of power source used / Jenis sumber tenaga yang digunakan

[10 marks / markah]

- 10 (a) Diagram 10.1 and Diagram 10.2 shows the vibrations of wooden dippers by motor of same frequency. The waves travel from deep region to shallow region.

Rajah 10.1 dan Rajah 10.2 menunjukkan getaran pencelup kayu oleh motor yang mempunyai frekuensi yang sama. Gelombang-gelombang itu bergerak dari kawasan dalam ke kawasan cetek.



- (i) What is the meaning of wavelength? [1 mark / markah]
Apakah yang dimaksudkan dengan panjang gelombang?

- (ii) Based on the Diagram 10.1 and Diagram 10.2, compare the frequency of motor used, the wavelength of wave at deep region with shallow region, the depth of shallow region and the wavelength of wave at shallow region. Hence, deduce the wavelength of wave to the depth of water.

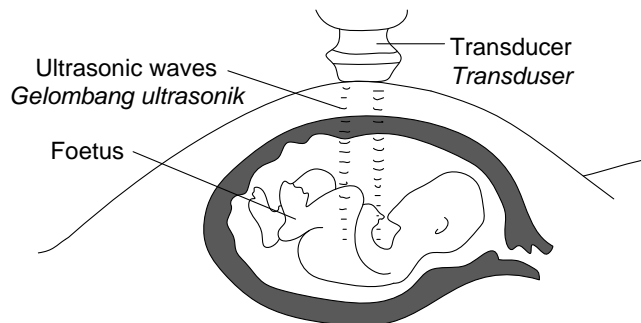
Berdasarkan pada Rajah 10.1 dan Rajah 10.2, bandingkan frekuensi motor yang digunakan, panjang gelombang di kawasan dalam dengan kawasan cetek, kedalaman di kawasan cetek dan panjang gelombang bagi gelombang di kawasan cetek. Kemudian, deduksikan panjang gelombang bagi gelombang dengan kedalaman air.

[5 marks / markah]

- (b) Explain how the sound wave can be used to detect the depth of sea. [4 marks / markah]
Terangkan bagaimana gelombang bunyi boleh digunakan untuk mengesan kedalaman laut.

- (c) Diagram 10.3 shows the use of a type of wave to obtain an image of a foetus. A transducer transmits the waves into the womb. The transducer is moved on a layer of gel applied on the skin of the mother. The rebounding echoes of the waves are detected to form a picture of the foetus on a computer monitor.

Rajah 10.3 menunjukkan penggunaan suatu jenis gelombang untuk memperolehi imej bagi fetus. Sebuah transduser memancar gelombang itu ke dalam rahim. Transduser itu digerakkan di atas satu lapisan gel yang disapu pada kulit ibu. Gema bagi gelombang yang melantun balik dikesan untuk membentuk gambar fetus itu pada paparan komputer.



Using appropriate physics concepts, explain how a clearer image of the foetus can be obtained.

Your answer should include the following aspects:

Dengan menggunakan konsep fizik yang sesuai, terangkan bagaimana satu imej yang lebih jelas bagi fetus itu dapat diperolehi.

Jawapan anda harus meliputi aspek berikut:

- The type of wave used / Jenis gelombang yang digunakan
- The frequency of the wave / Frekuensi bagi gelombang
- The amplitude of the wave / Amplitud bagi gelombang
- The use of the layer of gel / Penggunaan lapisan gel
- The energy of the wave / Tenaga bagi gelombang

[10 marks / markah]

Section C / Bahagian C
[20 marks / 20 markah]

Answer **any one** question from this section. The time suggested to answer this section is 30 minutes.
 Jawab mana-mana **satu** soalan daripada bahagian ini. Masa dicadangkan untuk menjawab bahagian ini adalah 30 minit.

- 11 Diagram 11.1 shows two convex lenses, *P* and *Q*, used in an astronomical telescope. The focal length of *P* is 40 cm and for *Q* is 10 cm.

Rajah 11.1 menunjukkan dua kanta cembung, *P* dan *Q*, yang digunakan dalam teleskop astronomi. Panjang fokus bagi *P* ialah 40 cm dan untuk *Q* ialah 10 cm.

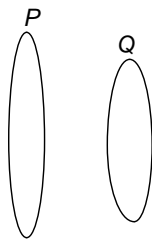


Diagram 11.1 / Rajah 11.1

- (a) What is the meaning of *focal length* of lens? [1 mark / markah]
 Apakah maksud panjang fokus suatu kanta?
- (b) By using apparatus such as ray box, metre rule, lens holder, screen and others, explain how the focal length of lens *P* can be estimated. [4 marks / markah]
 Dengan menggunakan radas seperti kotak sinar, pembaris meter, pemegang kanta, skrin dan lain-lain, terangkan bagaimana panjang fokus bagi kanta *P* dapat dianggarkan.
- (c) Diagram 11.2 shows an arrangement of lenses to construct a simple astronomical telescope using lens *P* and lens *Q*.

Rajah 11.2 menunjukkan satu susunan kanta-kanta untuk membina satu teleskop astronomi yang ringkas dengan menggunakan kanta *P* dan kanta *Q*.

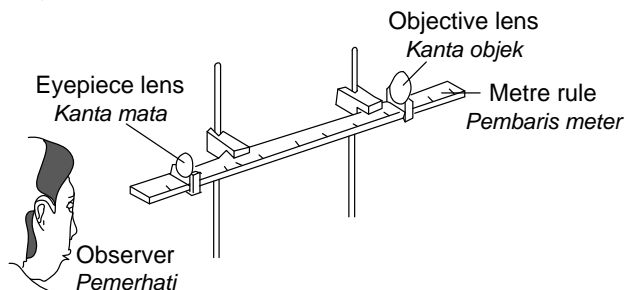


Diagram 11.2 / Rajah 11.2

You are asked to investigate the arrangement and characteristics of the lenses used to construct the simple astronomical telescope as shown in Table 11.1.

Anda diminta untuk menyiasat susunan dan ciri-ciri bagi kanta-kanta yang digunakan untuk membina teleskop astronomi yang ringkas seperti ditunjukkan dalam Rajah 11.3.

Telescope Teleskop	Focal length of objective lens, f / cm Panjang fokus kanta objek, f / cm	Magnification of image Pembesaran imej	Distance between lenses, D /cm Jarak antara kanta, D /cm	Diameter of lenses, d / cm Diameter kanta-kanta, d / cm
<i>J</i>	40.0	4.00	50.0	Large / Besar
<i>K</i>	40.0	0.25	60.0	Small / Kecil
<i>L</i>	10.0	4.00	50.0	Large / Besar
<i>M</i>	10.0	0.25	60.0	Small / Kecil

Table 11.1 / Jadual 11.1

Explain the suitability of the arrangement and each characteristic of the lenses and determine the telescope which can produce the brightest and sharp image at normal adjustment.

Terangkan kesesuaian susunan dan ciri setiap kanta-kanta dan tentukan teleskop yang boleh menghasilkan imej paling cerah dan tajam pada pelarasan normal. [10 marks / markah]

A camera has a convex lens of focal length 5 cm is used to capture an object of 30 cm from the camera which has 5 cm in height.

Satu kamera mempunyai satu kanta cembung dengan panjang fokus 5 cm digunakan untuk menangkap satu objek 30 cm dari kamera yang mempunyai ketinggian 5 cm.

- (i) Determine the image distance from the camera. [2 marks / markah]
 Tentukan jarak imej dari kamera itu.
- (ii) Calculate the height of image produced in the camera. [2 marks / markah]
 Hitungkan ketinggian imej yang dihasilkan di dalam kamera.
- (iii) State one characteristic of image formed in the camera. [1 marks / markah]
 Nyatakan satu ciri bagi imej yang terbentuk di dalam kamera.

- 12 Diagram 12.1 shows a typical circuit on a household electrical appliance that using a fuse.
Rajah 12.1 menunjukkan satu litar tipikal pada satu alatan elektrik rumah yang menggunakan satu fuis.

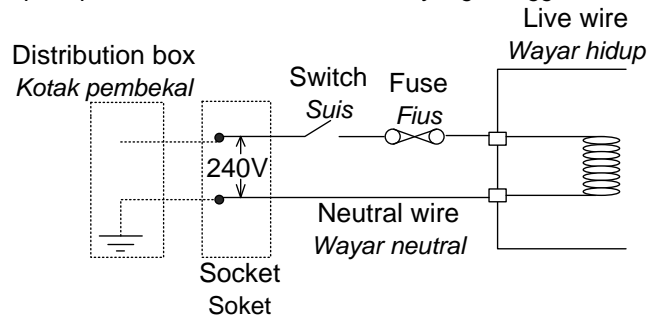


Diagram 12.1 / Rajah 12.1

- (a) What is a fuse?
Apakah itu fuis? [1 mark / markah]
- (b) Explain the advantages of parallel circuit in a house wiring system.
Terangkan kepentingan litar selari dalam satu sistem wayar rumah. [4 marks / markah]
- (c) An immersion heater its specifications of '240V, 500 W' is used to boil water. The efficiency of that immersion heater is 85%.
Satu pemanas rendam dengan spesifikasinya '240 V, 500 W' digunakan untuk mendidih air. Kecekapan pemanas rendam itu ialah 85%.
- (i) Explain the meaning of '240 V, 500 W'?
Terangkan maksud bagi '240 V, 500 W'? [1 mark / markah]
- (ii) Calculate the electric current that passes through the immersion heater.
Hitungkan arus elektrik yang menerusi pemanas rendam itu. [2 marks / markah]
- (iii) Calculate the output power of the immersion heater.
Hitungkan kuasa output bagi pemanas rendam itu. [2 marks / markah]
- (d) Fuse takes some time to blow. A fast blowing fuse is required to protect circuit which has overloaded high current. When a fuse blows, sparking may occur and produces high temperature. Therefore, the fuse wire has to be placed in a cartridge as to prevent its sparks from damaging the circuit.
Fuis mengambil beberapa masa untuk terbakar. Fuis yang cepat terbakar diperlukan untuk melindungi litar yang telah termuat arus yang berlebihan. Apabila satu fuis terbakar, bunga api mungkin berlaku dan menghasilkan suhu yang tinggi. Oleh itu, fuis perlu diletak dalam bekas demi mengelakkan bunga apinya daripada merosakkan litar.

Table 12.1 shows the specifications of four fuses that can be used to protect circuit.
Jadual 12.1 menunjukkan spesifikasi bagi empat jenis fuis yang boleh digunakan untuk melindungi litar.

Fuse Fuis	Thickness of fuse wire Ketebalan wayar fuis	Cartridge Bekas	Current rating Kadar arus	Melting point of fuse Takat lebur fuis
P	Thick / Tebal	Rubber / Getah	9 A	Low / Rendah
Q	Thin / Nipis	Rubber / Getah	13 A	High / Tinggi
R	Thick / Tebal	Plastic / Plastik	13 A	High / Tinggi
S	Thin / Nipis	Plastic / Plastik	9 A	Low / Rendah

Table 12.1 / Jadual 12.1

Study the specifications of all five fuses based on the following aspects:
Kaji spesifikasi kesemua empat fuis berdasarkan aspek-aspek berikut:

- The thickness of fuse wire / Ketebalan wayar fuis
- The cartridge / Bekas
- The current rating / Kadar arus
- The melting point / Takat lebur fuis

Explain the suitability of the aspects and hence, determine the most suitable fuse to protect a circuit of '240 V, 2000 W'. Justify your choice.

Terangkan kesesuaian aspek-aspek dan kemudian tentukan fuis yang paling sesuai untuk melindungi satu litar dengan '240 V, 2000 W'.

[10 marks / markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

FINAL TERM EXAM YEAR 2013 (TRIAL SPM 2013)
PHYSICS PAPER 3 FORM 5
1 HOUR 30 MINUTES
SMK MERBAU MIRI SARAWAK

Information for candidates:

- This question paper consists of two sections: **Section A** and **Section B**.
*Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.*
- 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 untuk **Bahagian A** dalam ruangan yang disediakan dalam kertas soalan ini.*
- Answer any **one** question from **Section B**. Write your answers for **Section B** on the papers provided by the invigilator.
*Jawab mana-mana **satu** soalan dari **Bahagian B**. Tulis jawapan anda untuk **Bahagian B** pada kertas yang disediakan oleh pengawas.*

Section A / Bahagian A
[28 marks / 28 markah]

Answer all the questions. The time suggested to answer this section is 60 minutes.

Jawab semua soalan. Masa dicadangkan untuk menjawab bahagian ini adalah 60 minit.

- 1 A student carries out an experiment to study the relationship between the angle of incidence, i , and the angle of refraction, r , when a light ray passes from air to a semicircular glass block. The apparatus for this experiment is shown in Diagram 1.1.

Seorang pelajar menjalankan satu eksperimen untuk menyiasat hubungan antara sudut tuju, i , dan sudut pembiasan, r , apabila satu sinar cahaya bergerak dari udara ke dalam satu blok kaca semibulatan. Radas untuk eksperimen ini ditunjukkan dalam Rajah 1.1.

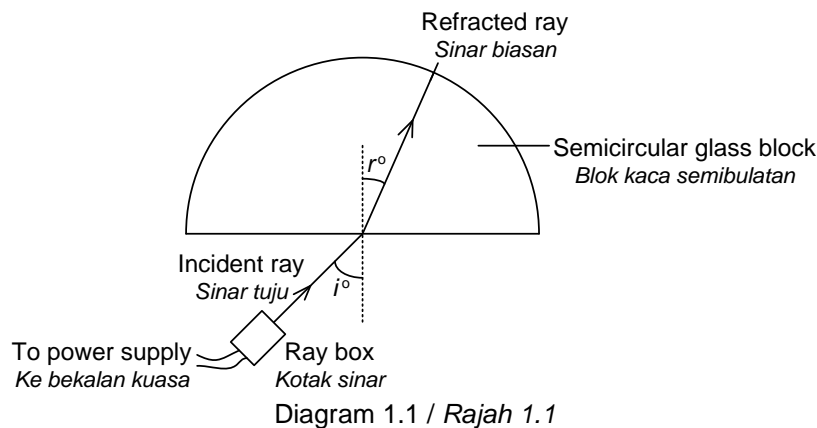


Diagram 1.1 / Rajah 1.1

The ray box is adjusted so that a ray of light enters the semicircular glass block at an angle of incidence, $i = 15^\circ$. The angle of refraction, r , is measured with a protractor. The experiment is repeated with angles of incidence, $i = 30^\circ$, 45° , 60° and 75° . The corresponding measurements made by the protractor are shown in Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6.

Kotak sinar itu dilaraskan supaya satu sinar cahaya bergerak ke dalam blok kaca semibulatan pada suatu sudut tuju, $i = 15^\circ$. Sudut pembiasan, r , diukur dengan satu protractor. Eksperimen ini diulangi dengan sudut-sudut tuju, $i = 30^\circ$, 45° , 60° dan 75° . Pengukuran yang sepadan oleh protractor itu ditunjukkan dalam Rajah-rajah 1.2, 1.3, 1.4, 1.5 dan 1.6.

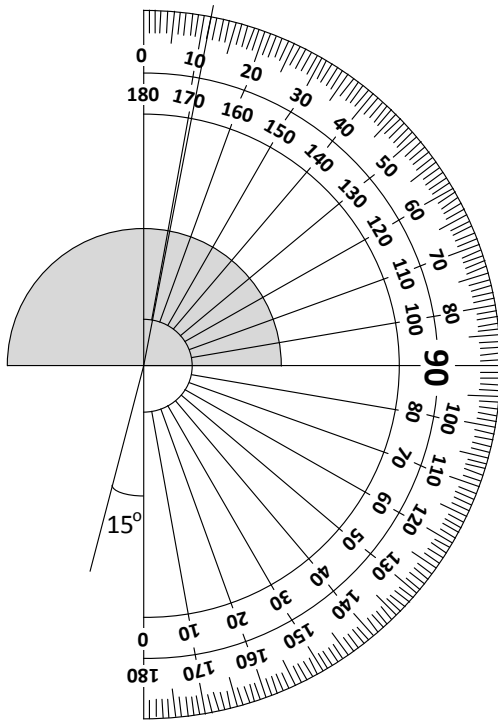


Diagram 1.2: $i = 15^\circ$
 Rajah 1.2: $i = 15^\circ$

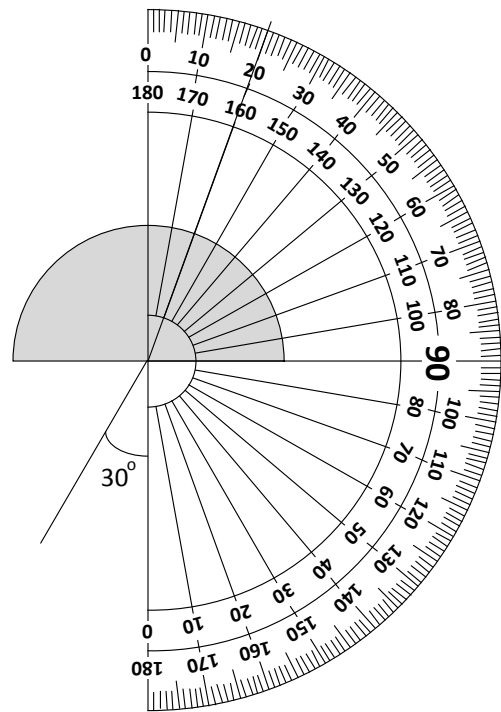


Diagram 1.3: $i = 30^\circ$
 Rajah 1.3: $i = 30^\circ$

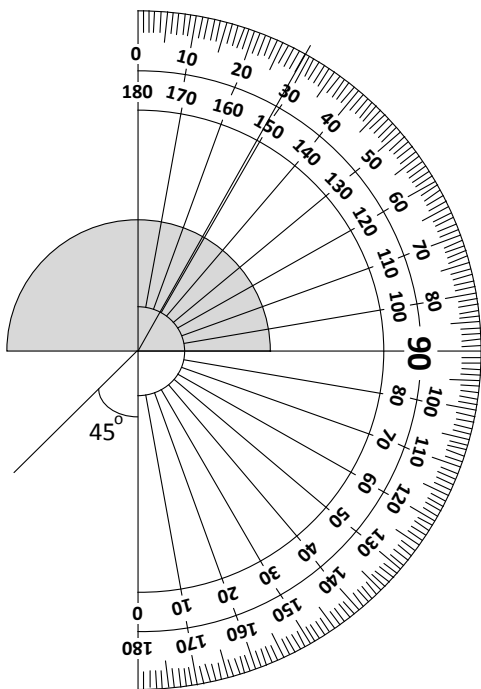


Diagram 1.4: $i = 45^\circ$
 Rajah 1.4: $i = 45^\circ$

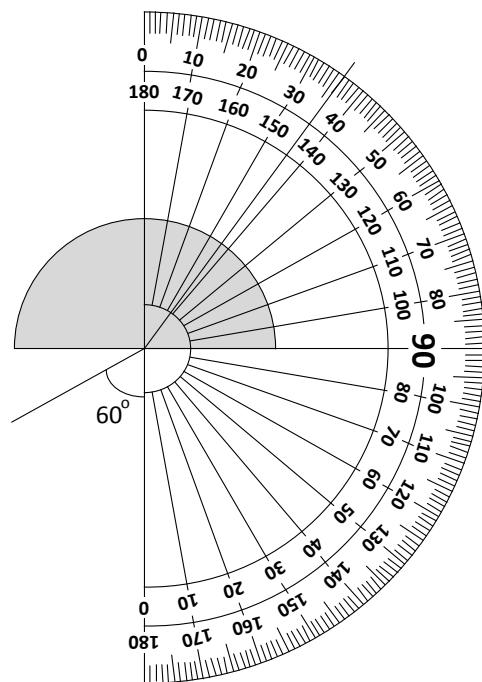


Diagram 1.5: $i = 60^\circ$
 Rajah 1.5: $i = 60^\circ$

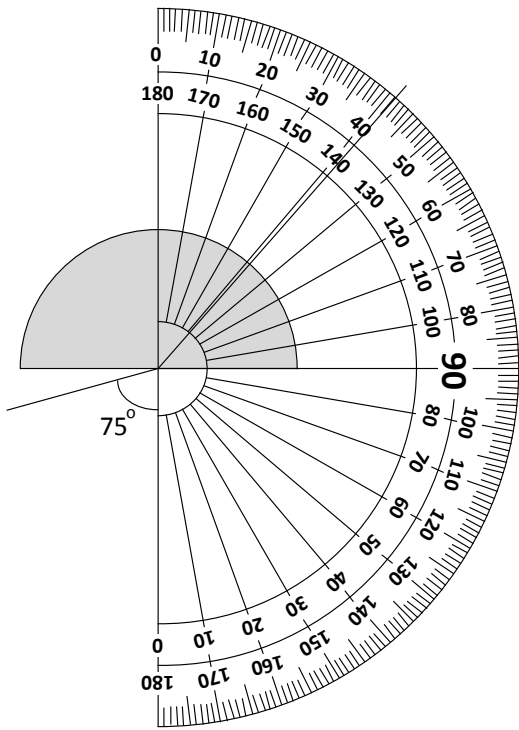


Diagram 1.6: $i = 75^\circ$

Rajah 1.6: $i = 75^\circ$

(a) For the experiment described, identify:
Untuk eksperimen yang digambarkan, tentukan:

(i) The manipulated variable [1 mark / markah]
Pembolehubah dimanipulasikan

(ii) The responding variable [1 mark / markah]
Pembolehubah bergerak balas

(iii) The constant variable [1 mark / markah]
Pembolehubah dimalarkan

(b) For this part of the question, write your answers in the spaces provided below.
Untuk bahagian soalan ini, tuliskan jawapan-jawapan anda di ruangan yang disediakan di bawah.

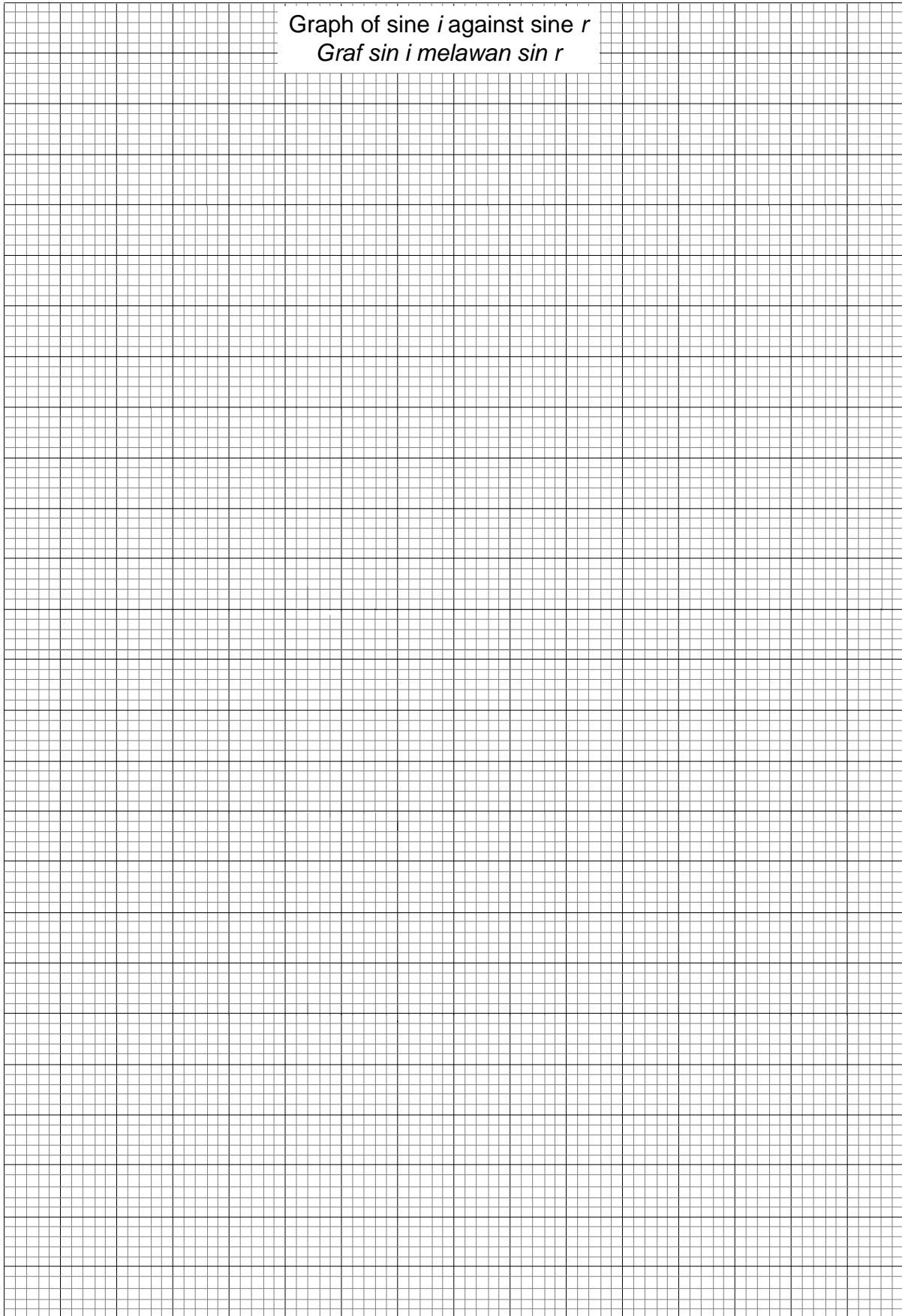
Based on Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6, record the refracted angles, r , from the protractor for each incident angles, i . Tabulate your results for all values of i , r , sine i and sine r in the space below.

Berdasarkan pada Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6, catatkan sudut-sudut pembiasan, r , daripada protractor untuk setiap sudut tuju, i . Jadualkan keputusan-keputusan anda untuk semua nilai-nilai i , r , $\sin i$ dan $\sin r$ pada ruangan di bawah.

[5 marks / markah]

- (c) On the graph paper provided below, plot a graph of sine i against sine r .
Pada kertas graf yang disediakan di bawah, plot satu graf bagi sin i melawan sin r .

[6 marks / markah]



- (d) Based on your graph in 1(c), state the relationship between sine i and sine r .
Berdasarkan pada graf anda di 1(c), nyatakan hubungan antara sin i dan sin r .

[1 mark / markah]

- (e) State one precaution needed to be taken to improve the result of this experiment.
Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk memperbaiki keputusan eksperimen ini.

[1 mark / markah]

- 2 A student carries out an experiment to investigate the relationship between the object distance, u , and linear magnification, M , of the image formed by a convex lens. The results of this experiment are shown in a graph of u against $\frac{1}{M}$ in Diagram 2.1.

Seorang pelajar menjalankan satu eksperimen untuk menyoiasat hubungan antara jarak objek, u , dan pembesaran linear, M , bagi imej yang terbentuk oleh satu kanta cembung. Keputusan eksperimen ini ditunjukkan dalam graf u melawan $\frac{1}{M}$ dalam Rajah 2.1.

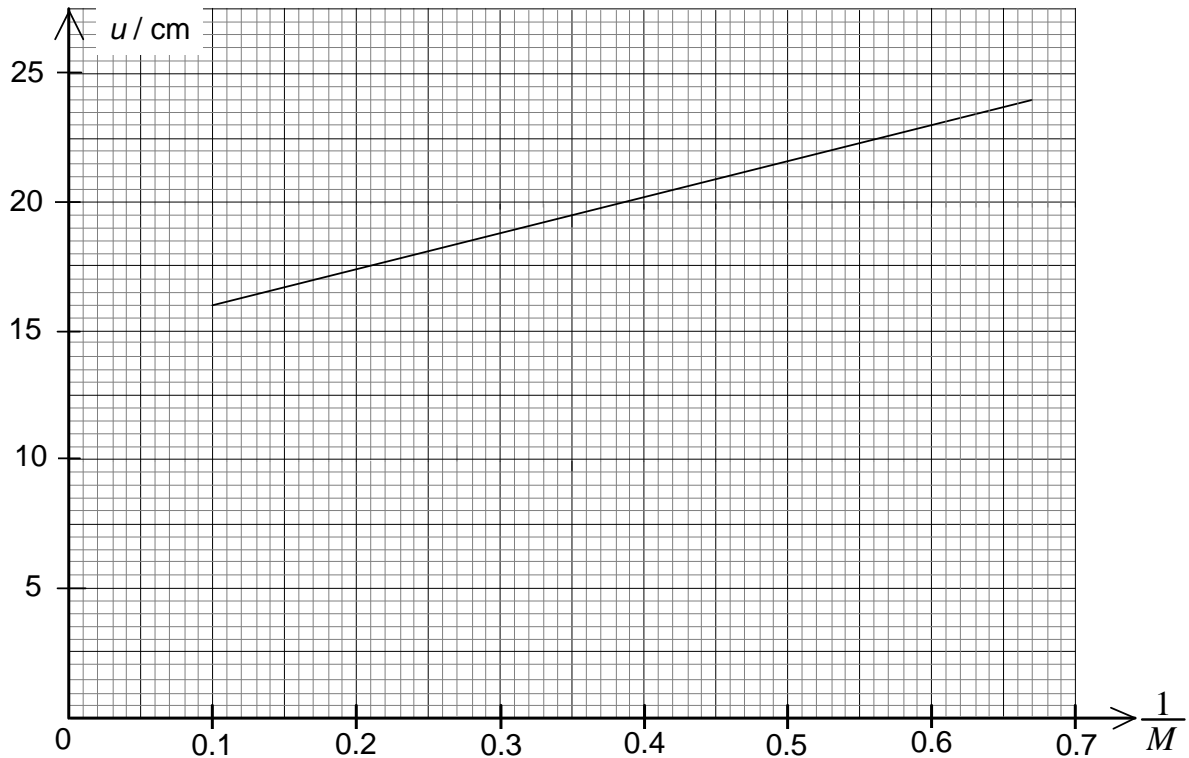


Diagram 2.1 / Rajah 2.1

- (a) Based on the graph in Diagram 2.1:
Berdasarkan pada graf dalam Rajah 2.1:
- (i) State the relationship between u and $\frac{1}{M}$ / Nyatakan hubungan antara u dan $\frac{1}{M}$. [1 mark / markah]
- (ii) Determine the value of u when $M = 2.5$. Show on the graph how you determine the value of u .
Tentukan nilai bagi u apabila $M = 2.5$. Tunjukkan pada graf bagaimana anda menentukan nilai u . [3 marks / markah]
- $u = \dots\dots\dots$
- (b) The relationship between u and $\frac{1}{M}$ is given by the formula $u = f\left(\frac{1}{M}\right) + f$, where f is the focal length of the lens.
Hubungan antara u dan $\frac{1}{M}$ diberikan oleh formula $u = f\left(\frac{1}{M}\right) + f$, di mana f ialah panjang fokus bagi kanta.
- (i) Determine the value of f from the u -intercept. Show on the graph how you determine the value of f .
Tentukan nilai bagi f daripada pintasan- u . Tunjukkan pada graf bagaimana anda menentukan nilai bagi f . [2 marks / markah]
- $f = \dots\dots\dots$
- (ii) Calculate the gradient, f , of the graph. Show on the graph how you calculate the gradient.
Hitung kecerunan, f , bagi graf itu. Tunjukkan pada graf bagaimana anda menghitung kecerunan itu. [3 marks / markah]
- $f = \dots\dots\dots$
- (iii) From your answers in 2(b)(i) and 2(b)(ii), calculate the average value of the focal length, f , of the lens.
Daripada jawapan anda di 2(b)(i) dan 2(b)(ii), hitung nilai purata bagi panjang fokus, f , bagi kanta itu. [2 marks / markah]
- (c) State one precaution that should be taken to improve the accuracy of the result in this experiment.
Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk memperbaiki kejituan keputusan dalam eksperimen ini. [1 mark / markah]

SECTION B / BAHAGIAN B

[12 marks / 12 markah]

Answer any **one** question.
Jawab mana-mana **satu** soalan.

- 3 Diagram 3.1 shows a scuba diving in a sea notices that the water pressure acted on his eardrums is greater when he dives at greater depth.

Rajah 3.1 menunjukkan seorang penyelam scuba menyelam di dalam laut mendapati tekanan yang bertindak ke atas gendang telinganya semakin besar apabila dia menyelam pada kedalaman yang lebih besar.

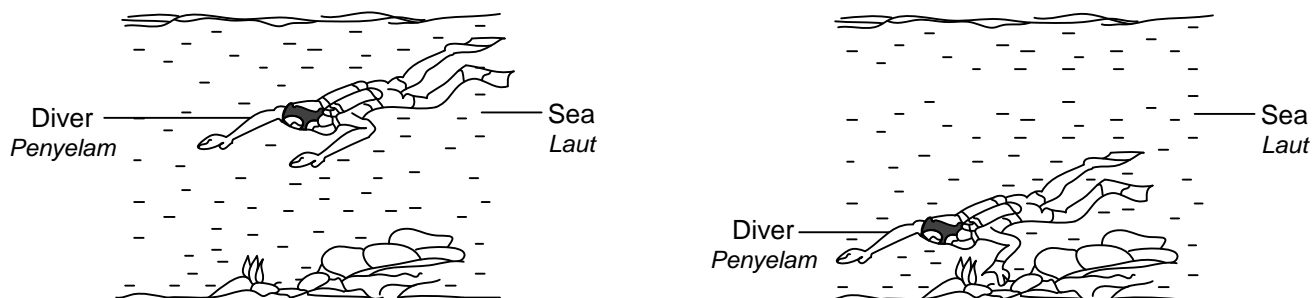
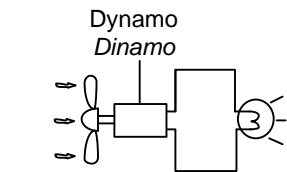


Diagram 3.1 / Rajah 3.1

Based on your knowledge of the buoyant force and observation above:
Berdasarkan pada pengetahuan anda tentang daya apungan dan pemerhatian atas:

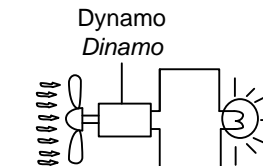
- (a) State **one** suitable inference. [1 mark / markah]
Nyatakan satu inferens yang sesuai.
- (b) State **one** suitable hypothesis. [1 mark / markah]
Nyatakan satu hipotesis yang sesuai.
- (c) With the use of apparatus such as thistle funnel, a manometer and other apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b).
In your description, state clearly the following:
Dengan menggunakan radas seperti corong tisel, satu manometer dan lain-lain radas, huraikan satu rangka eksperimen untuk menyiasat hipotesis yang dinyatakan di 3(b).
Dalam huraian anda, nyatakan dengan jelas perkara berikut:
- (i) Aim of the experiment
Tujuan eksperimen ini
 - (ii) Variables in the experiment
Pembolehubah-pembolehubah di dalam eksperimen
 - (iii) List of apparatus and materials
Senarai radas dan bahan-bahan
 - (iv) Arrangement of the apparatus and materials
Susunan radas dan bahan-bahan
 - (v) The procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable
Prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasikan dan kaedah mengukur pembolehubah bergerak balas
 - (vi) The way you would tabulate the data
Cara bagaimana anda menjadual data
 - (vii) The way you would analyse the data [10 marks / markah]
Cara bagaimana anda menganalisis data

- 4 Diagram 4.1 shows a gentle breeze blowing the blades of dynamo. The bulb lights up dimly. Diagram 4.2 shows a strong breeze blowing the same dynamo blades. The bulb lights up brightly. *Rajah 4.1 menunjukkan angin perlahan meniup bilah kipas sebuah dinamo. Mentol menyala dengan malap. Rajah 4.2 menunjukkan angin kuat meniup bilah kipas dinamo yang sama. Mentol menyala dengan terang.*



Gentle breeze
Angin perlahan

Diagram 4.1 / Rajah 4.1



Strong wind
Angin kuat

Diagram 4.2 / Rajah 4.2

Based on the above observation and the concept of induced current:

Berdasarkan pada pemerhatian atas dan konsep arus aruhan:

- (a) State **one** suitable inference. [1 mark / markah]
Nyatakan satu inferens yang sesuai.
- (b) State **one** suitable hypothesis. [1 mark / markah]
Nyatakan satu hipotesis yang sesuai.
- (c) With the use of apparatus such as magnet bar, solenoid, metre rule and others, describe an experiment framework to investigate the hypothesis stated in 4(b).
In your description, state clearly the following:
*Dengan menggunakan radas seperti bar magnet, solenoid, pembaris meter dan bahan-bahan lain, huraikan satu rangka eksperimen untuk menyasat hipotesis yang dinyatakan di 4(b).
Dalam huraian anda, nyatakan dengan jelas perkara berikut:*
- (i) Aim of the experiment
Tujuan eksperimen ini
- (ii) Variables in the experiment
Pembolehubah-pembolehubah di dalam eksperimen
- (iii) List of apparatus and materials
Senarai radas dan bahan-bahan
- (iv) Arrangement of the apparatus and materials
Susunan radas dan bahan-bahan
- (v) The procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable
Prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasikan dan kaedah mengukur pembolehubah bergerak balas
- (vi) The way you would tabulate the data
Cara bagaimana anda menjadual data
- (vii) The way you would analyse the data [10 marks / markah]
Cara bagaimana anda menganalisis data

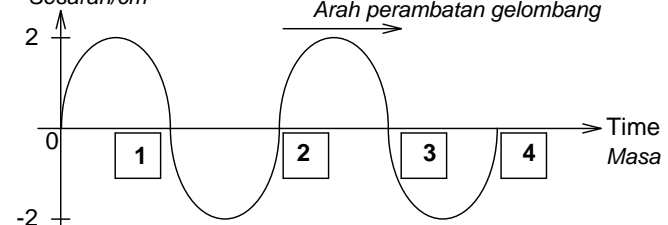
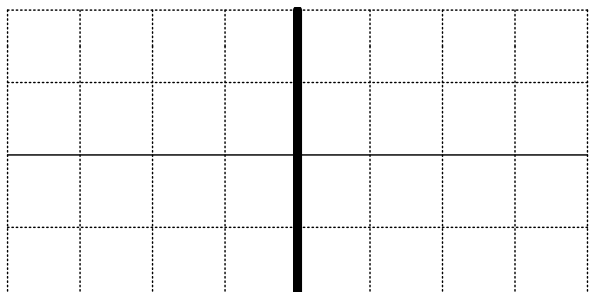
END OF QUESTION PAPER
KERTAS SOALAN TAMAT

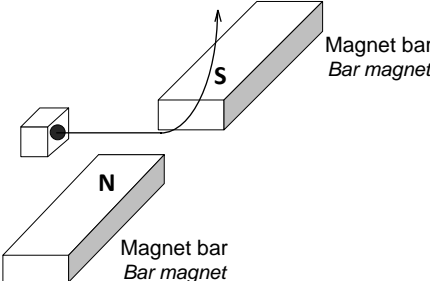
**ANSWER SCHEME
TRIAL SPM 2013
PHYSICS PAPER 1 FORM 5
1 HOUR 15 MINUTES
SMK MERBAU MIRI SARAWAK**

1	A
2	B
3	B
4	B
5	A
6	D
7	B
8	C
9	A
10	D
11	C
12	C
13	A
14	C
15	B
16	A
17	B
18	B
19	C
20	A
21	C
22	D
23	D
24	C
25	C
26	C
27	A
28	C
29	D
30	D
31	B
32	A
33	D
34	A
35	B
36	C
37	C
38	A
39	C
40	B
41	A
42	B
43	C
44	B
45	B
46	D
47	B
48	A
49	B
50	A

MARKING SCHEME
TRIAL SPM YEAR 2013
PHYSICS PAPER 2 FORM 5
2 HOURS 30 MINUTES
SMK MERBAU MIRI SARAWAK

Section A / Bahagian A

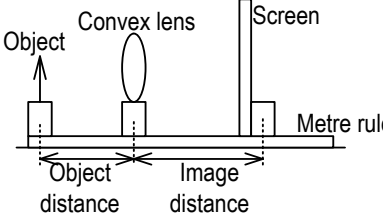
1	(a)	Mass [1 mark]
	(b)	(i) Instrument A [1 mark]
		(ii) Has smaller scale division up to 10 g compared to instrument B with scale division of 100 g [1 mark] //Has smaller scale division
	(c)	Use a device which has smaller scale division than instrument A [1 mark]
2	(a)	(i) Time taken to make a complete oscillation [1 mark]
		(ii) <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> Displacement/cm Sesaran/cm </div> <div style="margin-right: 20px;"> Direction of wave propagation Arah perambatan gelombang </div> </div>  <p style="margin-left: 20px;">2marks- all correct 1mark-3 correct or less</p>
	(b)	Frequency decreases [1 mark]
	(d)	Energy [1 mark] //kinetic energy
3	(a)	Archimedes' principle [1 mark]
	(b)	(i) Apparent loss in weight = 2 N [1 mark]
		(ii) Due to the buoyant force from water acting on the block [1 mark] //the water float up the block
		(iii) From density = mass/volume $1000 = 0.2\text{kg}/\text{volume}$ where the buoyant force = weight of water displaced = 2 N ←1 mark $\text{Volume} = 2 \times 10^{-4} \text{ m}^3$ ← 1 mark
	(c)	Reading of spring balance increases [1 mark]
4	(a)	(i) Thermionic emission [1 mark]
		(ii) Electrons gain kinetic energy to release [1 mark]
		(iii) Rate of electron release reduced [1 mark]
		(i) Output voltage = scale x peak grid $= 3 \text{ V/division} \times 2 \text{ grids}$ ←1mark $= 6 \text{ V}$ ←1mark Straight to answer[2 marks]
		(ii) <div style="text-align: center;">  </div> <p style="margin-left: 20px;">1 mark [correct shape] 1 mark [correct length]</p>
5	(a)	Quantity of matter contained by the object [1 mark]
	(b)	(i) Mass of baby P is less than the mass of baby Q [1 mark]
		(ii) Both the springs have the same spring constant [1 mark]
		(iii) Extension of springs x is less than y [1 mark]
	(c)	(i) The mass of the baby is directly proportional to the extension of the spring [1 mark]
		(ii) Hooke's law [1 mark]
	(d)	From $F = kx$ $5 \times 10 = (10)x$ ←1mark $x = 5 \text{ m}$ ←1mark

6	(a)	The method of producing current without electrical supply is called (electromagnet, <u>electromagnetic induction</u>). [1 mark]
	(b)	(i) North pole [1 mark]
		(ii) Lenz's law [1 mark] Reject wrong spelling of len's law!!
	(c)	(i) The number of turns of coils in Diagram 6.1 is more than in Diagram 6.2 [1 mark]
		(ii) Deflection of the pointer of the galvanometer in Diagram 6.1 is more than in Diagram 6.2 [1 mark] .
	(d)	(i) Directly proportional [1 mark]
		(ii) Directly proportional [1 mark]
	(e)	Deflection of galvanometer will increase [1 mark]
7	(a)	(i) Alpha [1 mark]
		(ii) Helium particle [1 mark]
		(iii) Due to the background radiation [1 mark]
	(b)	 [1 mark]
	(c)	(i) Type of radiation for fruit irradiation <u>Gamma</u> [1 mark] Reason <u>Has high penetrating power to sterilize the food</u> [1 mark]
		(ii) Half-life of the radiation source <u>Long half-life</u> [1 mark] Reason <u>Can be used for longer time with the least of refillment cost</u> [1 mark]
		(iii) Physical state of the radiation source <u>Solid</u> [1 mark] Reason <u>Easy to handle</u> [1 mark]
8	(a)	Is the amount of heat energy required to raise the temperature of 1 kg object by 1°C with change in physical state [1 mark]
	(b)	(i) Type of plate to be used as the base <u>Polystyrene plate</u> [1 mark] Reason <u>Reduce the heat loss to the surrounding from the conduction</u> [1 mark]
		(ii) Type of liquid poured into the hole <u>Oil</u> [1 mark] Reason <u>Oil can conduct heat faster to the thermometer</u> [1 mark]
		(iii) Material used to wrap the aluminium block <u>Felt cloth</u> [1 mark] Reason <u>good insulator of heat</u> [1 mark]
	(c)	(i) From heat, $H = mc\theta$ and power = Heat/time So, $Pt = mc\theta$ $(200)(4 \times 60) = (1)(c)(30)$ ←1 mark $c = 1600 \text{ Jkg}^{-1}\text{°C}^{-1}$ ←1 mark
		(ii) From heat, $H = mc\theta$ and power = Heat/time So, $Pt = mc\theta$ $(200)(4 \times 60) = (1)(c)(50)$ ←1 mark $c = 960 \text{ Jkg}^{-1}\text{°C}^{-1}$ ←1 mark
	(d)	Diagram 8.2 [1 mark]

Section B / Bahagian B

9	(a)	Is the mass per unit volume [1 mark]													
	(b)	Compare the type of liquid filled in the container → Both diagrams are filled with water [1 mark] Compare the depth of the holes → Diagram 9.2 > Diagram 9.1 [1 mark] Compare the distance of spurt of water → Diagram 9.2 > Diagram 9.1 [1 mark] The depth of the hole is directly proportional to the distance of spurt of water [1 mark] Physics concept is pressure [1 mark]													
	(c)	1 st : To produce blue flame, the hole must be opened to let in the oxygen from the surrounding 2 nd : The flow of air inside is now at high speed will cause low pressure of air according to Bernoulli's principle 3 rd : Low pressure of air cause small flame 4 th : The flame is blue due to complete combustion [4 marks]													
	(d)	<table border="1"> <thead> <tr> <th>Characteristics</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>Shape of submarine is streamline</td> <td>Reduce water friction while moving</td> </tr> <tr> <td>High strength material</td> <td>Withstand high water pressure while submerging</td> </tr> <tr> <td>Low rusting rate material</td> <td>Long lasting without rust</td> </tr> <tr> <td>Installed with ballast tank</td> <td>Can be filled with water if submerge and water can be pressure out if float</td> </tr> <tr> <td>Use nuclear power</td> <td>The power is efficient and save cost</td> </tr> </tbody> </table>	Characteristics	Reason	Shape of submarine is streamline	Reduce water friction while moving	High strength material	Withstand high water pressure while submerging	Low rusting rate material	Long lasting without rust	Installed with ballast tank	Can be filled with water if submerge and water can be pressure out if float	Use nuclear power	The power is efficient and save cost	[2 marks] [2 marks] [2 marks] [2 marks]
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10	(a)	(i)	Is the distance between two adjacent crests or two adjacent troughs [1 mark]												
		(ii)	Compare the frequency of motor used → same frequency for both diagrams [1 mark] Compare the wavelength of wave at deep with shallow region → longer wavelength at deep region [1m] Compare the depth of shallow region → Diagram 10.2 < Diagram 10.1 [1 mark] Compare the wavelength of wave at shallow region → shorter wavelength at shallower region [1 mark] The wavelength of wave become shorter when the depth of water decreases [1 mark]												
	(b)	A transmitter of frequency f which produces wave is sent to the seabed ←[1mark] The reflected wave is detected by the detector which is connected to CRO ←[1mark] From the CRO, the time between the sending and reflected signal is count ←[1mark] The depth of sea = velocity of sound x sending time. ←[1mark] Velocity of sound = v Sending time = echo time ÷ 2													
	(c)	<table border="1"> <thead> <tr> <th>Characteristics</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>Use mechanical wave</td> <td>Because the ultrasound needs medium to travel</td> </tr> <tr> <td>Use high frequency of sound</td> <td>The signal is clear and thus produce clear image scanned</td> </tr> <tr> <td>Use low amplitude of wave</td> <td>Does not hurt the feotus</td> </tr> <tr> <td>Apply gel to the area of scan</td> <td>Motion of transducer is soft</td> </tr> <tr> <td>Use high energy of wave</td> <td>Clearer wave signal</td> </tr> </tbody> </table>	Characteristics	Reason	Use mechanical wave	Because the ultrasound needs medium to travel	Use high frequency of sound	The signal is clear and thus produce clear image scanned	Use low amplitude of wave	Does not hurt the feotus	Apply gel to the area of scan	Motion of transducer is soft	Use high energy of wave	Clearer wave signal	[2 marks] [2 mark] [2 marks] [2 marks] [2 marks]
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Use high energy of wave	Clearer wave signal														

Section C

11	(a)	Is the distance between the centre of lens with principal F [1 mark]																
	(b)	Carry out the experiment below:																
		 <p align="center">← 1 mark</p> <p>Object distance, u is fixed ← 1 mark</p> <p>The screen is adjusted until sharp image is seen. The image distance is measured as v ← 1 mark</p> <p>The focal length, f, of lens P can be estimated from the formula of lens, $1/f = 1/u + 1/v$ ← 1 mark</p>																
	(c)	<table border="1" data-bbox="204 560 1173 846"> <thead> <tr> <th>Characteristics</th> <th>Reason</th> <th></th> </tr> </thead> <tbody> <tr> <td>Use longer focal length for objective lens</td> <td>To view distant object</td> <td>[2 marks]</td> </tr> <tr> <td>Big magnification of image</td> <td>Image is big and clear to be seen</td> <td>[2 marks]</td> </tr> <tr> <td>Distance between two lenses are sum of two focal lengths</td> <td>At normal adjustment</td> <td>[2 marks]</td> </tr> <tr> <td>Diameter of lens must be big</td> <td>More refraction of light and thus the image is clear to be seen</td> <td>[2 marks]</td> </tr> </tbody> </table> <p>So, telescope J is chosen ← [1 mark]</p> <p>Because it focal length is big, has big magnification of image, distance between two lenses are sum of two focal lengths of lenses used and the diameter of lens is large ← [1 mark]</p>		Characteristics	Reason		Use longer focal length for objective lens	To view distant object	[2 marks]	Big magnification of image	Image is big and clear to be seen	[2 marks]	Distance between two lenses are sum of two focal lengths	At normal adjustment	[2 marks]	Diameter of lens must be big	More refraction of light and thus the image is clear to be seen	[2 marks]
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	(d)	(i)	<p>Given $u = 30$, $f = 5$ Image distance, $v = ?$ From $1/f = 1/u + 1/v$ So, $1/5 = 1/30 + 1/v$ ← [1 mark] Get the $v = 6$ cm ← [1 mark]</p>															
		(ii)	<p>From image magnification, $m = v/u = \text{image height} / \text{object height}$ So, $6/30 = \text{image height}/5$ ← [1 mark] Image height = 1 cm ← [1 mark]</p>															
		(iii)	<p>Real // diminished // inverted [1 mark]</p>															
12	(a)	A device to surge the power down by burning itself once the current overloaded to the circuit [1 mark]																
	(b)	<p>Share the same power supply ← [1 mark] Produce smaller effective resistance ← [1 mark] Produce higher current flow ← [1 mark] Once one component is burnt, the rests of component can still function normally ← [1 mark]</p>																
	(c)	(i)	<p>A device which is plugged to the voltage of 12 volts and give out the electrical energy of 500 J in one second [1 mark]</p>															
		(ii)	<p>From Power, $P = IV$ $500 = I(240)$ ← [1 mark] $I = 2.08$ A ← [1 mark]</p>															
		(iii)	<p>Given input power = 500 W Given the efficiency of that immersion heater is 85%. So, the output power of the immersion heater = $(85/100) \times 500$ W = 425 W</p>															
	(d)	<table border="1" data-bbox="204 1736 1077 2022"> <thead> <tr> <th>Characteristics</th> <th>Reason</th> <th></th> </tr> </thead> <tbody> <tr> <td>Use thin fuse wire</td> <td>Can be burnt easily to cut off the circuit once current overloaded</td> <td>[2 marks]</td> </tr> <tr> <td>Use plastic cartridge</td> <td>Can be heated easily</td> <td>[2 marks]</td> </tr> <tr> <td>From $P = IV$ $2000 = I(240)$ $I = 8.33$ A So, use 9 A fuse</td> <td>Just supply enough current to the circuit without overloaded</td> <td>[2 marks]</td> </tr> <tr> <td>Melting point of fuse is low</td> <td>Can be burnt easily at low temperature</td> <td>[2 marks]</td> </tr> </tbody> </table> <p>So, fuse S is chosen [1 mark] Because its fuse wire is thin, use plastic cartridge, fuse is 9A and has low melting point [1 mark]</p>		Characteristics	Reason		Use thin fuse wire	Can be burnt easily to cut off the circuit once current overloaded	[2 marks]	Use plastic cartridge	Can be heated easily	[2 marks]	From $P = IV$ $2000 = I(240)$ $I = 8.33$ A So, use 9 A fuse	Just supply enough current to the circuit without overloaded	[2 marks]	Melting point of fuse is low	Can be burnt easily at low temperature	[2 marks]
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END OF QUESTION PAPER

MARKING SCHEME
FINAL TERM EXAM YEAR 2013 (TRIAL SPM)
PHYSICS PAPER 3 FORM 5
1 HOUR 30 MINUTES
SMK MERBAU MIRI SARAWAK

Section A
[28 marks]

- 1 (a) (i) Angle of incident [1 mark]
(ii) Angle of refraction [1 mark]
(iii) Refractive index of glass block [1 mark]

(b)

$i / ^\circ$	$r / ^\circ$	$\sin i$	$\sin r$
15	11	0.2588	0.1908
30	20	0.5000	0.3420
45	29	0.7071	0.4848
60	36	0.8660	0.5878
75	41	0.9659	0.6561

← ✓

✓ ✓ ✓ ✓
 At least At least At least At least
 4 correct 4 correct 4 correct 4 correct

✓ ✓
 Consistent Consistent
 decimal decimal

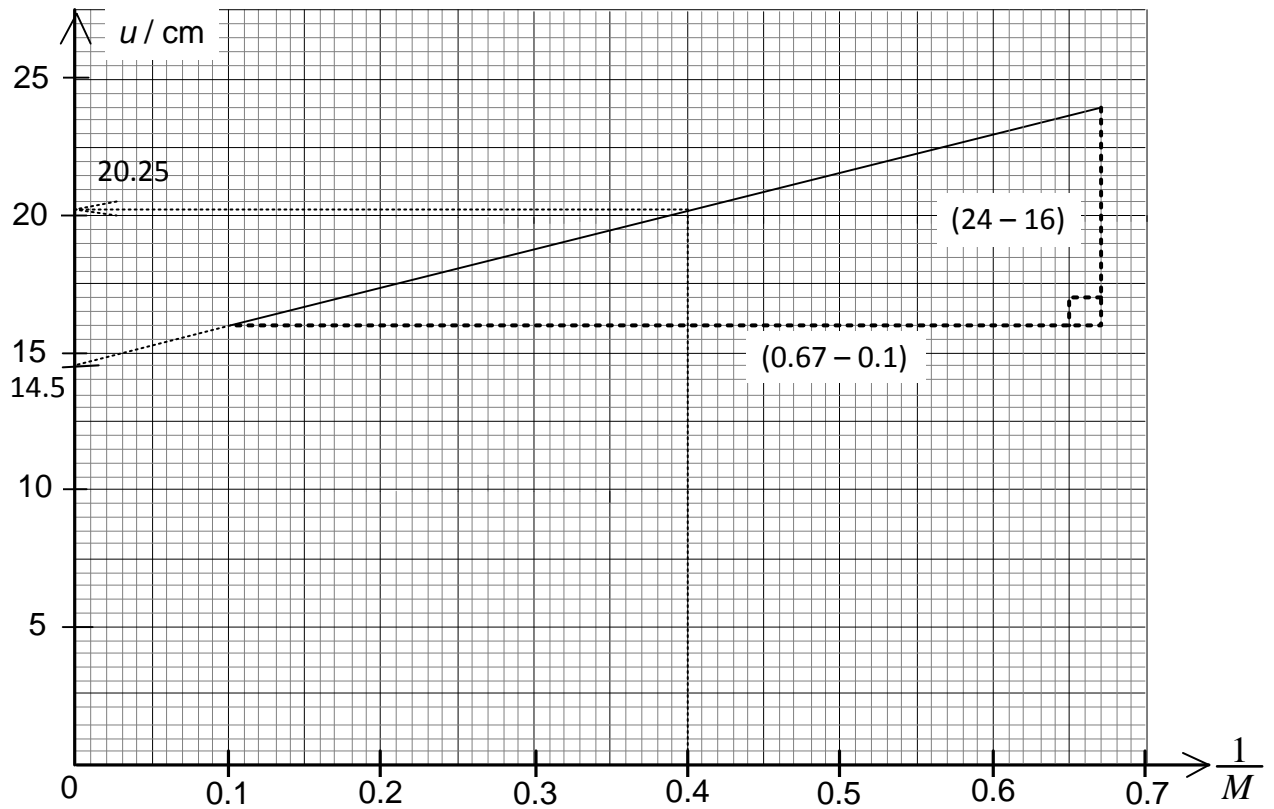
Marking criteria	Skor
7 ticks	5 marks
6 ticks	4 marks
4 – 5 ticks	3 marks
2 – 3 ticks	2 marks
1 tick	1 mark
0 tick	0 mark

- (c) ✓ correct y-axis label (sine i)
✓ correct x-axis label (sine r)
✓ correct x-axis scale
✓ correct y-axis scale
✓ at least 4 points are plotted correctly
✓ line of best fit

Marking criteria	Skor
6 ticks	6 marks
5 ticks	5 marks
4 ticks	4 marks
3 ticks	3 marks
2 ticks	2 marks
1 tick	1 mark
0 tick	0 mark

- (d) Sine i is directly proportional to sine r [1 mark]
- (e) Avoid parallax error when reading the scale of protractor when taking the reading of incident angle and reflected angle [1 mark]

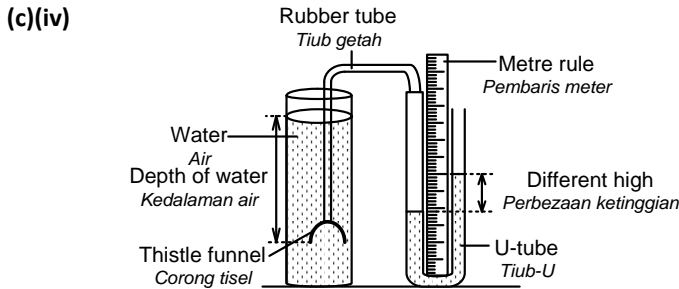
2



- (a) (i) u increases linearly to the $\frac{1}{M}$ [1 mark]
(ii) When $M = 2.5$, $1/M = 1/2.5$
 $= 0.4$ ← 1 mark
Show on the graph ← 1 mark
 $u = \underline{20.25 \text{ cm}}$ ← 1 mark
- (b) (i) Show on the graph by extrapolation of line ← 1 mark
 $f = \underline{14.5 \text{ cm}}$ ← 1 mark
(ii) Show on the graph ← 1 mark
Gradient, $f = (24 - 16)/(0.67 - 0.1)$ ← 1 mark
 $= 14.04 \text{ cm}$
 $f = \underline{14.04 \text{ cm}}$ ← 1 mark
(iii) Average value of the focal length, $f = (14.5 + 14.04)/2$
 $= 14.27 \text{ cm}$
- (c) Carry out the experiment in darker room [1 mark]

SECTION B

- 3 (a) The water pressure is influenced by the depth of water
 (b) When the depth of water increases, its water pressure increases also
 (c)(i) To find the relationship between the depth with the water pressure
 (c)(ii) Manipulated Variable: depth of water
 Responding Variable: water pressure
 Constant Variable: density of water
 (c)(iii) Apparatus: Metre rule, manometer, water, rubber tube, measuring cylinder, thistle funnel, rubber sheet
 Materials: water



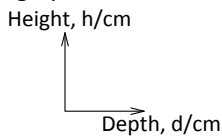
Operational Definitions:

- The depth of water is measured using metre rule
 - The water pressure is measured from difference height between the column of water in manometer measured using metre rule
- (c)(v) -The experiment is started by lowering the thistle funnel into the water to depth, $x = 2$ cm. The reading of difference in height of water column, h , of the manometer is recorded.
 -The procedure is repeated with the depths of 4 cm, 6 cm, 8 cm, 10 cm and 12 cm and the respective reading of the manometer are read respectively from metre rule.

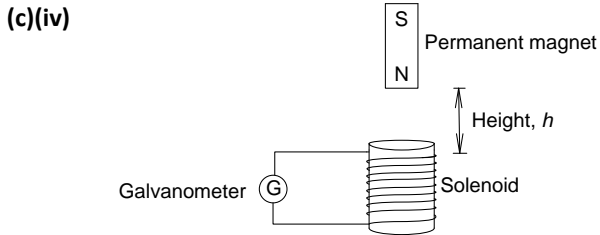
(c)(vi)

Depth x/cm	Difference in height of column, h/cm
2	
4	
6	
8	
10	
12	

(c)(vii) A graph of difference in height of water column against the depth is plotted.



- 4 (a) The amount of induced current depends on the number of turns of coils of wires on soft iron core
 (b) The higher number of turns of coils of wires used, the more the induced current being produced.
 (c)(i) To investigate the relationship between the numbers of turns of coils with the amount of induced current
 (c)(ii) Manipulated Variable: number of turns of coils
 Responding Variable: amount of induced current
 Constant Variable: height of magnet bar being dropped
 (c)(iii) Apparatus: galvanometer, magnet bar, metre rule
 Materials: coils of wires



Operational definition:

- The speed of magnet bar being dropped into the solenoid can be fixed by releasing the magnet from the same height.
 - The amount of induced current is measured using galvanometer.
- (c)(v)
- The above apparatus setup is prepared. The speed of magnet is kept constant by releasing it from the same height, h .
 - The experiment is started with the number of turns of coils, $N = 10$. The maximum amount of induced current, I , being measured by the galvanometer is recorded.
 - The above step is repeated with the number of turns of coils, $N = 20, 30, 40$ and 50 and respective galvanometer readings are recorded.

(c)(vi)

Number of turns of coils, N	Induced current, I/A
10	
20	
30	
40	
50	

- (c)(vii) A graph of induced current, I/A against the number of turns of coils, N is plotted.

