JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN 4531/1
SIJIL PELAJARAN MALAYSIA 2010

PHYSICS
Kertas 1
Ogos/September
1 ¼ jam **Satu jam lima belas minit**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

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

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

Kertas soalan ini mengandungi 29 halaman bercetak dan 1 halaman tidak bercetak

The following information maybe useful. The symbols have their usual meaning.

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

1. $a = \frac{v - u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2} at^2$
4. Momentum = mv
5. $F = ma$
6. Kinetic energy / *Tenaga kinetik* = $\frac{1}{2} mv^2$
7. Gravitational potential energy / *Tenaga keupayaan graviti* = mgh
8. Elastic potential energy / *Tenaga keupayaan kenyal* = $\frac{1}{2}Fx$
9. $\rho = \frac{m}{V}$
10. Pressure / *Tekanan,* $p = h\rho g$
11. Pressure / *Tekanan,* $p = \frac{F}{A}$
12. Heat / *Haba,* $Q = mc\theta$
13. Heat / *Heat,* $Q = ml$
14. $\frac{pV}{T} =$ constant */ pemalar*
15. $E = mc^2$
16. $v = f\lambda$
17. Power, $P = \frac{\text{energy}}{\text{time}}$

    Kuasa, $P = \frac{tenaga}{masa}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

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

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

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

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

22. $Q = It$

23. $V = IR$

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

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

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

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

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

1 Which quantity is a vector quantity?
Kuantiti manakah ialah kuantiti vektor?

A Length
Panjang
B Volume
Isipadu
C Velocity
Halaju
D Density
Ketumpatan

2 Which of the following values is equal to 300 ms?
Antara nilai berikut,yang manakah sama dengan 300 ms?

A 3×10^{-5} s
B 3×10^{-4} s
C 3×10^{-3} s
D 3×10^{-1} s

3 Diagram 1 shows a graph relating two physical quantities, *P* and *K*.
Rajah 1 *menunjukkan satu graf yang menghubungkait dua kuantiti fizik, P dan K*.

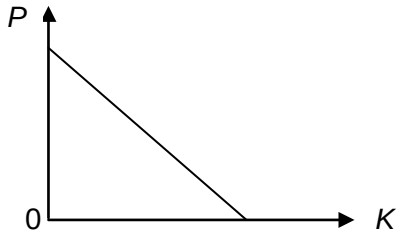


Diagram 1
Rajah 1

Which statement is correct?
Pernyataan manakah benar?

A *P* is the manipulated variable
P ialah pembolehubah dimanipulasi
B *K* is the constant variable
K ialah pembolehubah dimalarkan
C *P* decreases linearly with *K*
P berkurang secara linear dengan K
D *P* is directly proportional to *K*
P berkadar terus dengan K

4 Diagram 2 shows a boy that is running through three points P, Q and R with velocity 4 m s^{-1} , 3 m s^{-1} and 2 m s^{-1} respectively.
Rajah 2 *menunjukkan seorang budak lelaki sedang berlari melalui tiga titik* P, Q *dan* R *dengan halaju* 4 m s^{-1} , 3 m s^{-1} *and* 2 m s^{-1} *masing-masing.*

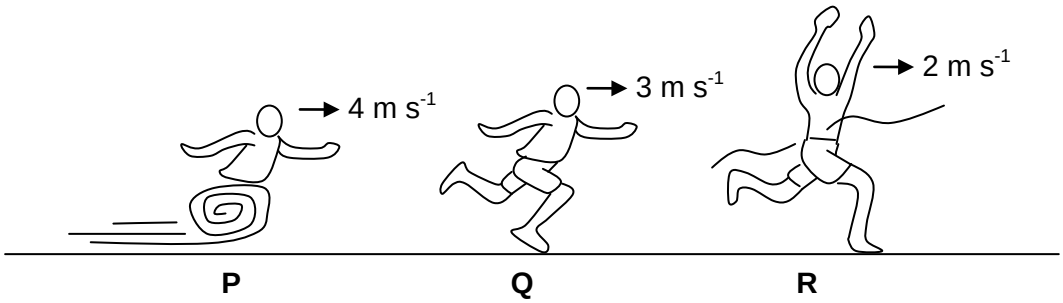


Diagram 2
Rajah 2

The boy is running with
Budak lelaki itu berlari dengan

A uniform velocity
halaju seragam
B uniform acceleration
pecutan seragam
C uniform deceleration
nyahpecutan seragam
D uniform momentum
momentum seragam

5 Diagram 3 shows four positions of a vaulter during a jump.
Rajah 3 *menunjukkan empat kedudukan bagi seorang atlet lompat bergalah yang sedang membuat lompatan.*

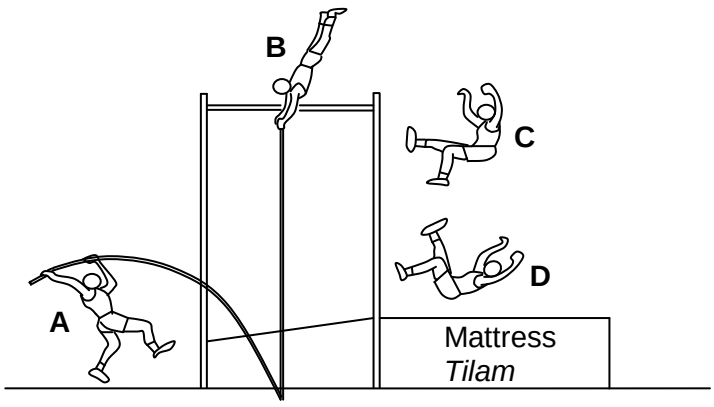


Diagram 3
Rajah 3

In which position is the kinetic energy of the vaulter becomes maximum?
Di kedudukan manakah tenaga kinetik atlet lompat bergalah itu adalah maksimum?

6 Diagram 4 shows a watermelon that is placed at A on a lorry. When the lorry starts to move, the watermelon rolls from position A to B. When the lorry suddenly stops, the watermelon rolls from position B to A.
Rajah 4 *menunjukkan sebiji tembikai yang diletakkan di kedudukan* A *di dalam sebuah lori. Apabila lori itu bergerak, tembikai itu bergolek dari kedudukan* A *ke* B. *Apabila lori itu berhenti dengan tiba-tiba, tembikai itu bergolek dari kedudukan* B *ke* A.

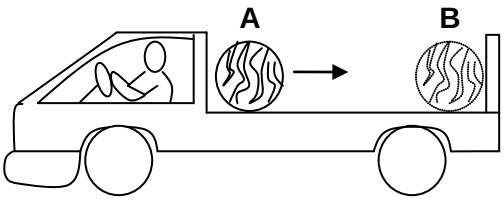


Diagram 4
Rajah 4

The movement of the watermelon is due to
Pergerakan buah tembikai itu adalah disebabkan oleh

A inertia
inersia
B friction
geseran
C impulse
impuls
D momentum
momentum

7 Which of the following safety features in a vehicle is not designed to protect the driver during collisions?
Antara ciri-ciri keselamatan kenderaan berikut, yang manakah tidak bertujuan untuk melindungi pemandu semasa pelanggaran?

A Reinforced passenger compartment
Ruang/Sangkar penumpang yang tegar
B Side bars in vehicle doors
Galang/Bar sisi dalam pintu kenderaan
C Shock absorbers
Penyerap hentakan
D Air bags
Beg udara

8 Diagram 5 shows a region X surrounding the Earth where a mass that is placed in this region will experience a force.
Rajah 5 *menunjukkan satu kawasan X mengelilingi Bumi di mana suatu jisim yang diletakkan di kawasan tersebut akan mengalami suatu daya.*

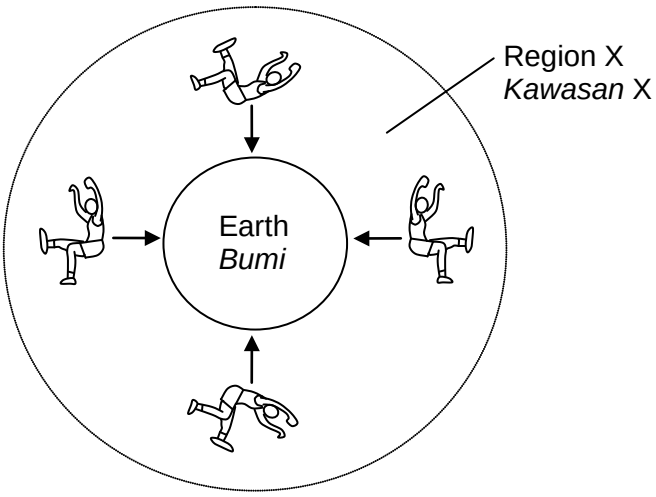


Diagram 5
Rajah 5

The region X is
Kawasan X *ialah*

A Electric field
Medan elektrik
B Magnetic field
Medan magnet
C Gravitational field
Medan graviti
D Electromagnetic field
Medan elelektromagnet

9 A force is applied to an object.
Which of the following cannot occur?
Daya dikenakan ke atas suatu objek.
Antara yang berikut, yang manakah tidak akan berlaku?

A The object speeds up
Jasad semakin laju
B The shape of the object changes
Bentuk jasad berubah
C The mass of the object decreases
Jisim jasad berkurang
D The object changes its direction of motion
Arah gerakan jasad berubah

10 Diagram 6 shows a squid that executes an emergency escape by ejecting a black fluid towards its enermy.
Rajah 6 *menunjukkan seekor sotong yang melarikan diri dalam keadaan cemas dengan memancutkan cecair hitam ke arah musuhnya.*

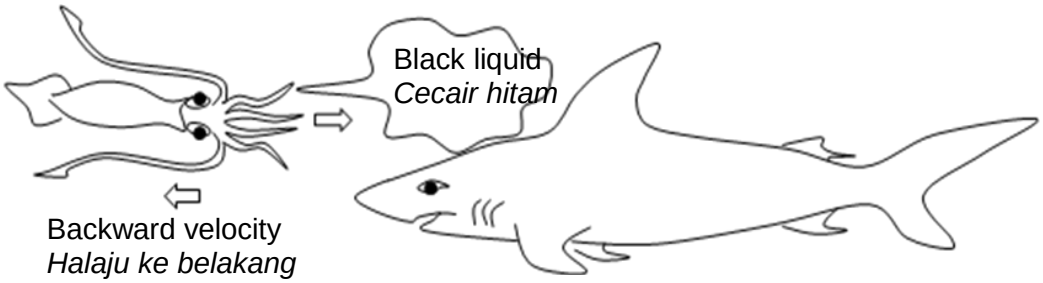


Diagram 6
Rajah 6

Which of the following principle explained the emergency escape of the squid ?
Antara prinsip yang berikut, yang manakah menerangkan situasi sotong itu ?

A Principle of Superposition
Prinsip Superposisi
B Principle of Conservation of Momentum
Prinsip Keabadian Momentum
C Principle of Conservation of Energy
Prinsip Keabadian Tenaga

11 Diagram 7 shows a catapult that is aim to a chicken.
Rajah 7 *menunjukkan satu lastik yang ditujukan ke arah seekor ayam.*

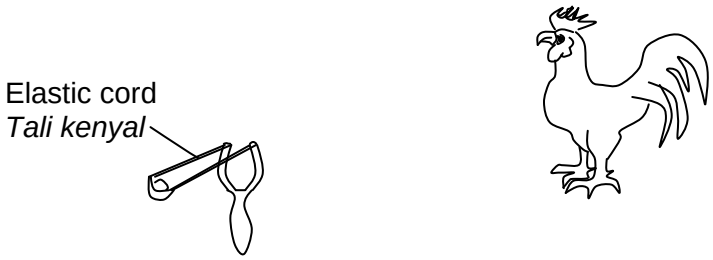


Diagram 7
Rajah 7

A 5 N force is applied to the catapult to produce an extension of 10 cm in the elastic cord, calculate the elastic potential energy stored in the elastic cord.
Satu daya 5 N *dikenakan ke atas lastik itu untuk menghasilkan pemanjangan 10 cm pada tali kenyal, hitungkan tenaga keupayaan kenyal yang tersimpan di dalam tali kenyal itu.*

A 0.010 J
B 0.015 J
C 0.020 J
D 0.025 J

12 Diagram 8 shows a student throws an egg towards a piece of cloth that is supported by two of his friends.
Rajah 8 *menunjukkan seorang pelajar sedang melontar telur ke arah sehelai kain yang dipegang oleh dua orang rakannya.*

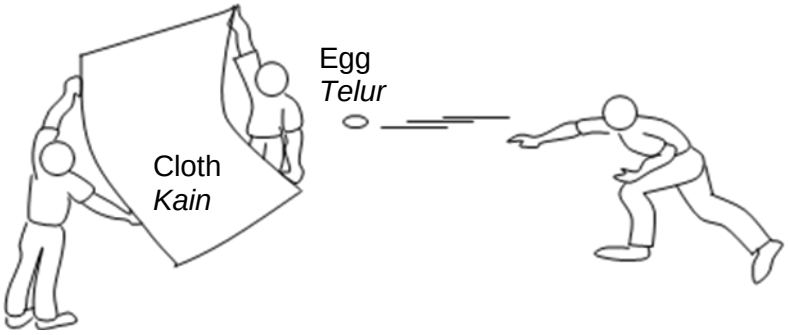


Diagram 8
Rajah 8

Which of the following explained why the egg doesn't break?
Antara yang berikut, yang manakah menerangkan mengapa telur itu tidak pecah?

A Both the cloth and the egg shell are made of soft material
Kedua-dua kain dan kulit telur dibuat dari bahan yang lembut
B The egg has negligible momentum
Telur itu mempunyai momentum yang boleh diabaikan
C The cloth lengthen the impact time so impulsive force is reduced
Kain itu memanjangkan masa perlanggaran maka daya impuls dikurangkan
D The cloth shorten the impact time so impulsive force is reduced
Kain itu memendekkan masa perlanggaran maka daya impuls dikurangkan

13 Diagram 9 shows a wooden block with a dimension of 10 cm x 40 cm x 60 cm being placed on a floor. The mass of the block is 0.2 kg.
Rajah 9 *menunjukkan sebuah bongkah kayu berukuran* 10 cm x 40 cm x 60 cm *diletakkan di atas lantai. Jisim bongkah itu adalah* 0.2 kg.

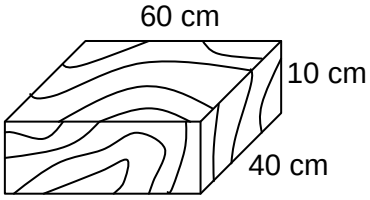


Diagram 9
Rajah 9

What is the minimum pressure that can be exerted by the block on the floor ?
Berapakah tekanan minimum yang boleh dikenakan oleh bongkah itu pada lantai ?

A 8.33 N m^{-2}
B 33.33 N m^{-2}
C 50.00 N m^{-2}
D 83.33 N m^{-2}

14 Diagram 10 shows a boy sitting on a chair. The weight of the boy, *W* acts vertically downward.
Rajah 10 *menunjukkan seorang budak duduk di atas sebuah kerusi. Berat budak itu, W bertindak tegak ke bawah.*

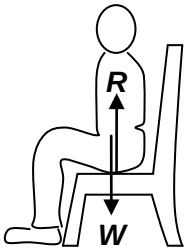


Diagram 10
Rajah 10

Name the force, *R* that balanced the weight, *W*.
Namakan daya R yang mengimbangi berat W.

A Frictional force
Daya geseran
B Resistance
Rintangan
C Normal reaction
Tindak balas normal
D Impulsive force
Daya impuls

15 Diagram 11 shows the roof panel of a house is flying off in a strong wind.
Rajah 11 *menunjukkan bumbung sebuah rumah tercabut semasa ribut kencang.*

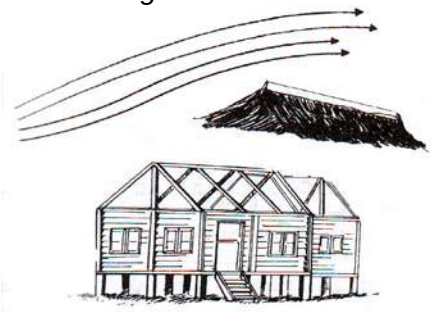


Diagram 11
Rajah 11

Which principle explains this event ?
Prinsip manakah menerangkan kejadian ini ?

A Pascal's Principle
Prinsip Pascal
B Bernoulli's Principle
Prinsip Bernoulli
C Archimedes' Principle
Prinsip Archimedes
D Principle of conservation of energy
Prinsip keabadian tenaga

16 A leaking rubber suction pump is pressed against a smooth wall as shown in Diagram 12.1. When released, the suction pump does not stick to the wall, as shown in Diagram 12.2.
Satu pam penyedut yang bocor ditekan kepada dinding yang licin seperti di Rajah 12.1*. Apabila dilepaskan,didapati pam penyedut tersebut tidak melekat pada dinding seperti yang ditunjukkan dalam Rajah* 12.2*.*

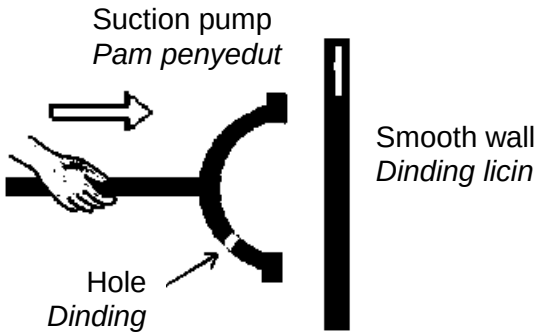


Diagram 12.1
Rajah 12.1

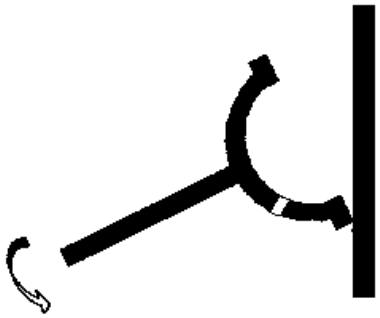


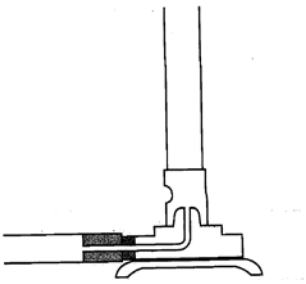
Diagram 12.2
Rajah 12.2

The suction pump does not stick to the wall because
Pam penyedut tidak melekat pada dinding kerana

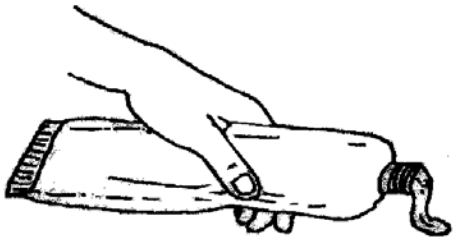
A the atmospheric pressure is equal to the pressure inside the pump
tekanan atmosfera adalah sama dengan tekanan udara di dalam penyedut
B the atmospheric pressure is less than the pressure inside the pump
tekanan atmosfera adalah kurang daripada tekanan udara di dalam penyedut
C the atmospheric pressure is more than the pressure inside the pump
tekanan atmosfera adalah lebih tinggi daripada tekanan udara di dalam penyedut

17 Which of the following situations obeys Pascal's principle?
Antara situasi berikut, yang manakah mematuhi prinsip Pascal?

A



B



C

D

18 Diagram 13 shows an apple is floating in a beaker of water.
Rajah 13 *menunjukkan sebiji epal sedang terapung dalam sebuah bikar berisi air.*

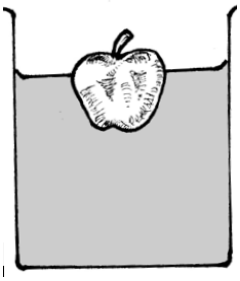


Diagram 13
Rajah 13

Which of the following statements describes the buoyant force correctly?
Manakah pernyataan berikut menerangkan daya keapungan dengan betul?

A The buoyant force equals to the mass of the water displaced
Daya keapungan sama dengan jisim air yang disesarkan
B The buoyant force equals to the weight of the apple
Daya keapungan sama dengan berat epal
C The buoyant force equals to the volume of the water displaced
Daya keapungan sama dengan isipadu air yang disesarkan
D The buoyant force equals to the mass of the apple
Daya keapungan sama dengan jisim epal

19 Diagram 14 shows objects P and Q are in thermal contact. Thermal equilibrium reached when
Rajah 14 *menunjukkan objek* P *dan* Q *dalam sentuhan terma. Keseimbangan terma tercapai bila*

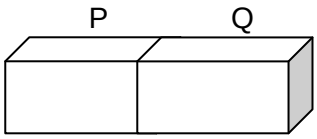


Diagram 14
Rajah 14

A no heat is lost to surroundings
tiada kehilangan haba ke persekitaran
B they have the same amount of heat energy
mereka mempunyai jumlah tenaga haba yang sama
C the rate of transfer of heat from P and Q is equal to the rate of transfer of heat from Q to P
kadar haba yang dipindahkan dari P ke Q adalah sama dengan kadar haba yang dipindahkan dari Q ke P
D the rate of increases in the temperature of P is equal to the rate of decreases in the temperature of Q
kadar kenaikan suhu pada P adalah sama dengan kadar penurunan suhu dalam Q

20 Diagram 15 shows the temperature against time graph for 600 g of liquid X that is heated by a 100 W electric immersion heater.
Rajah 15 *menunjukkan graf suhu melawan masa bagi* 600 g *cecair* X *yang dipanaskan oleh sebuah pemanas rendam yang mempunyai kuasa* 100 W.

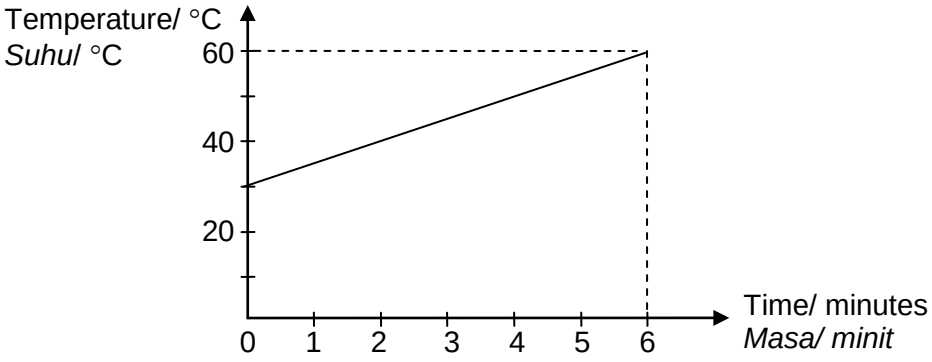


Diagram 15
Rajah 15

Determine the specific heat capacity of liquid X in J $kg^{-1}{}^{o}C^{-1}$.
Tentukan muatan haba tentu bagi cecair X *dalam* J $kg^{-1}{}^{o}C^{-1}$.

A 20
B 60
C 1200
D 2000

21 The specific heat capacity of aluminium is higher than copper. When heat is supplied at the same rate to two identical blocks of same mass, which of the following happens?
Muatan haba tentu aluminium adalah lebih tinggi daripada kuprum. Apabila kadar haba yang dibekalkan adalah sama pada kedua-dua blok yang mempunyai jisim yang sama, manakah antara berikut berlaku?

A the copper block will get heated up faster
blok kuprum akan lebih cepat panas
B the copper block will expand faster than aluminium
blok kuprum akan mengembang lebih cepat berbanding aluminium
C the aluminium block will expand faster than copper block
blok aluminium akan mengembang lebih cepat berbanding kuprum
D the rate of temperature rise in the aluminium block is higher
kadar kenaikan suhu dalam blok aluminium adalah tinggi

22 Diagram 16 shows temperature against time graph of a substance. The substance is heated at a steady rate. It changes from solid to a liquid, and then to gas.
Rajah 16 *menunjukkan graf suhu melawan masa bagi suatu bahan. Bahan itu dipanaskan pada kadar seragam. Ia berubah dari keadaan pepejal kepada cecair, kemudiannya kepada gas.*

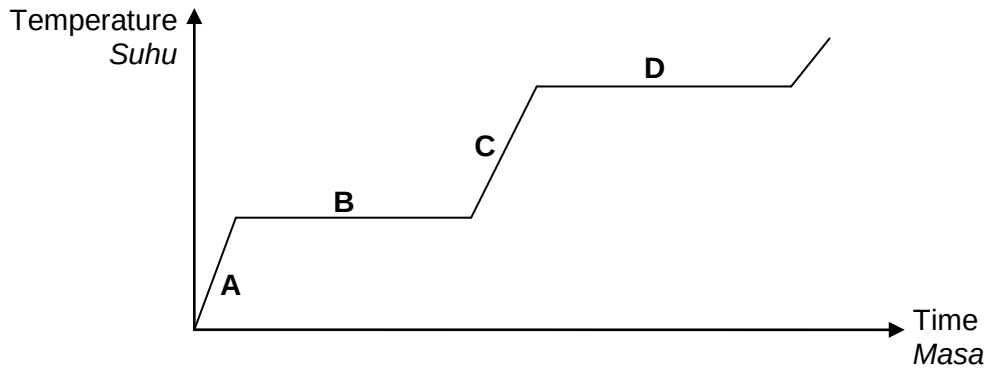


Diagram 16
Rajah 16

Which parts of the graph show a state with solid and liquid only?
Bahagian manakah pada graf menunjukkan keadaan pepejal dan cecair sahaja?

23 Mercury is used in the liquid-in-glass thermometer because it
Merkuri di gunakan di dalam termometer cecair dalam kaca kerana ia

A sticks to the glass wall
melekat pada dinding kaca
B has a lower boiling point
mempunyai takat didih yang rendah
C expands and contracts uniformly
mengembang dan mengecut sekata
D is transparent and therefore it is easier to read
adalah lutsinar dan mudah dibaca

24 Diagram 17 shows the image formed on the screen is not clear (not sharp).
Rajah 17 *menunjukkan imej yang dibentukkan pada skrin adalah kabur.*

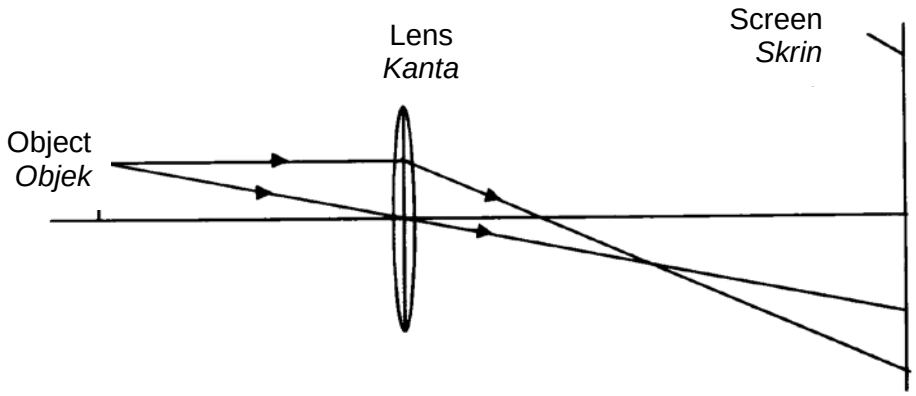


Diagram 17
Rajah 17

Which of the following changes will produce a sharp image on the screen?
Antara berikut, yang manakah perubahan yang akan menghasilkan satu imej yang jelas pada skrin?

A Move the screen towards the lens
Gerakkan skrin mendekati kanta

B Move the object further from the lens
Gerakkan objek itu lebih jauh daripada kanta

C Move the object until it is at the focal point of the lens
Gerakkan objek sehingga ia berada di titik fokus kanta itu

D Replace the lens with with another concave lens of shorter focal length
Gantikan kanta dengan sebuah kanta cekung yang mempunyai jarak fokus lebih pendek

25 What happens to light as it travel from glass into air?
Apakah yang akan berlaku kepada cahaya apabila merambat dari gelas ke air?

	Speed of light	**Angle of refraction**
A	decreases *berkurang*	decreases *berkurang*
B	increases *bertambah*	increases *bertambah*
C	decreases *berkurang*	increases *bertambah*
D	increases *bertambah*	decreases *berkurang*

26 Diagram 18 shows student A and student B standing in front of a plane mirror at a distance of 2.5 m and 4.5 m respectively.
Rajah 18 *menunjukkan pelajar* A *dan pelajar* B *berdiri di hadapan sebuah cermin satah pada jarak* 2.5 m *dan* 4.5 m *masing-masing.*

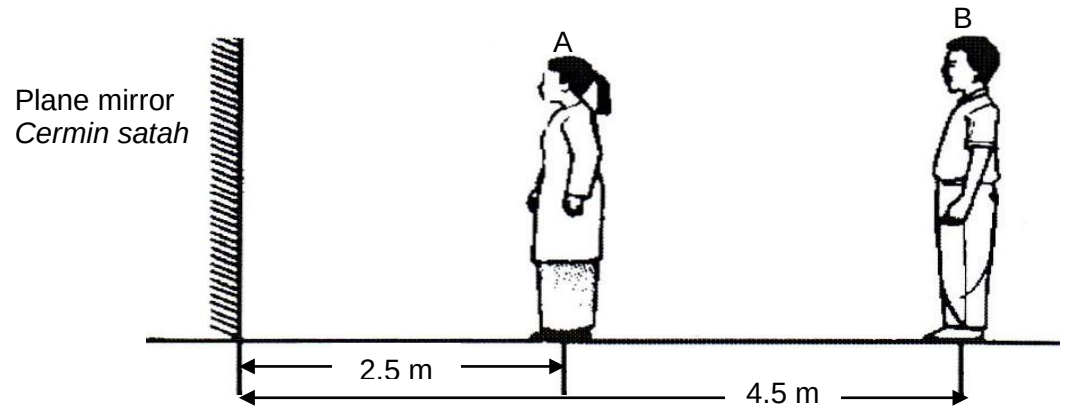


Diagram 18
Rajah 18

What is the distance between student B and the image student A?
Apakah jarak antara pelajar B *dengan imej pelajar* A?

A 2.0 m
B 4.5 m
C 5.0 m
D 7.0 m

27 The diagram 19 shows the phenomenon of total internal reflection which occurs at the boundary between two medium.
Rajah 19 *menunjukkan fenomena pantulan dalam penuh yang berlaku pada sempadan di antara dua medium.*

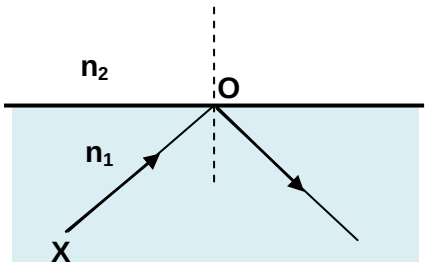


Diagram 19
Rajah 19

What is the correct relationship between n_1 and n_2 ?
Apakah hubungan yang betul antara n_1 *dan* n_2 ?

A $n_1 > n_2$

B $n_1 = n_2$

C $n_1 < n_2$

28 Diagram 20 shows a ray of light passing through a prism that has a refractive index of 1.56.
Rajah 20 *menunjukkan satu sinar cahaya yang melalui satu prisma yang mempunyai indeks biasan* 1.56.

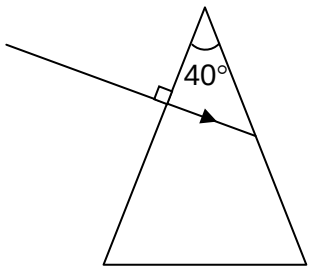
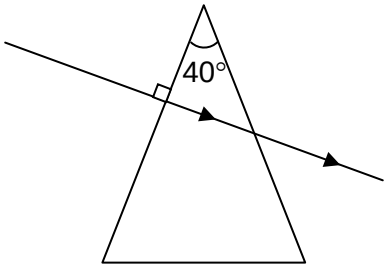


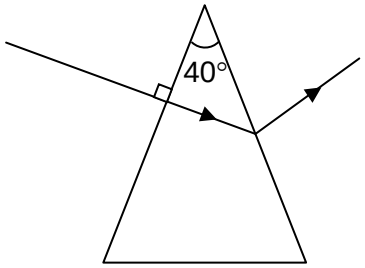
Diagram 20
Rajah 20

Which of the following shows correctly the refracted ray of the light through the prism?
Antara rajah berikut yang manakah betul menunjukkan lintasan sinar biasan melalui prisma?

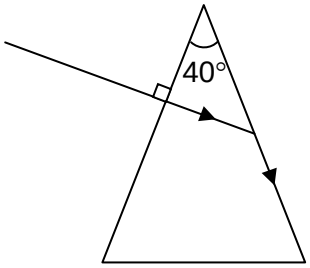
A



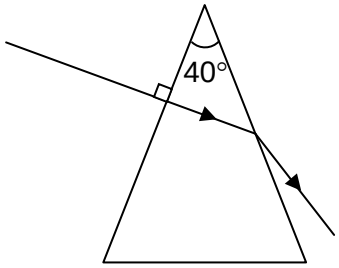
B



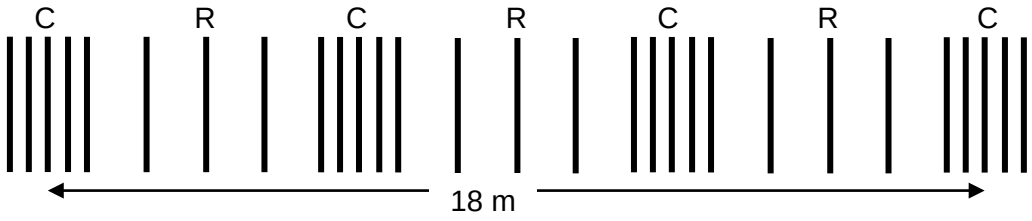
C



D



29 Diagram 21 shows a sound wave propagating in air.
Rajah 21 *menunjukkan gelombang bunyi di udara.*



C - compression
- mampatan
R - rarefaction
- regangan

Diagram 21
Rajah 21

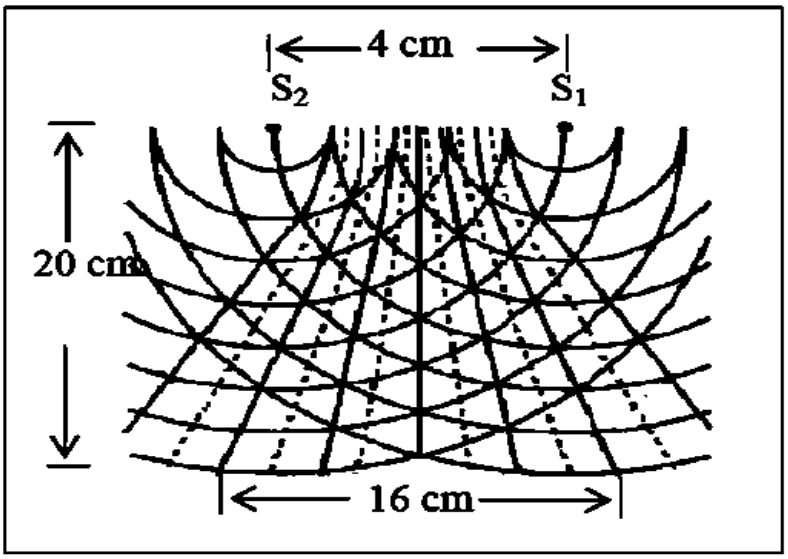
The speed of sound wave is 330 ms^{-1}. What is the frequency of the sound wave?
Kelajuan gelombang bunyi ialah 330 ms^{-1} *. Berapakah frekuensi gelombang bunyi* ?

A 18.3 Hz
B 55.0 Hz
C 73.3 Hz
D 110.0 Hz

30 Which of the following wave property changes when interference of waves occur?
Yang manakah di antara ciri gelombang berikut berubah apabila berlaku interferens gelombang?

A Speed
Kelajuan
B Wavelength
Panjang gelombang
C Amplitude
Amplitud
D Direction of propagation
Arah rambatan

31 Diagram 22 shows the phenomenon of interference of water waves.
Rajah 22 *menunjukkan fenomena inteferens gelombang air.*



S_1 : Wave source 1
:*Sumber gelombang* 1
S_2 : Wave source 2
:*Sumber gelombang* 2

Diagram 22
Rajah 22

What is the wavelength of the water waves ?
Berapakah panjang gelombang bagi gelombang air tersebut?

A 0.8 cm
B 1.2 cm
C 3.2 cm
D 5.0 cm

32 What would a drummer do to produce a lower pitch note?
Apa yang perlu dilakukan oleh pemain drum untuk menghasilkan not yang mempunyai kelangsingan lebih rendah?

A Hit the drum skin with a smaller force
Memukul drum dengan daya yang lebih kecil
B Hit the drum skin with a larger force
Memukul drum dengan daya yang lebih besar
C Loosen the drum skin
Mengendurkan permukaan drum
D Tighten the drum skin
Menegangkan permukaan drum

33 Diagram 23 shows a wave pattern.
Rajah 23 *menunjukkan satu corak gelombang.*

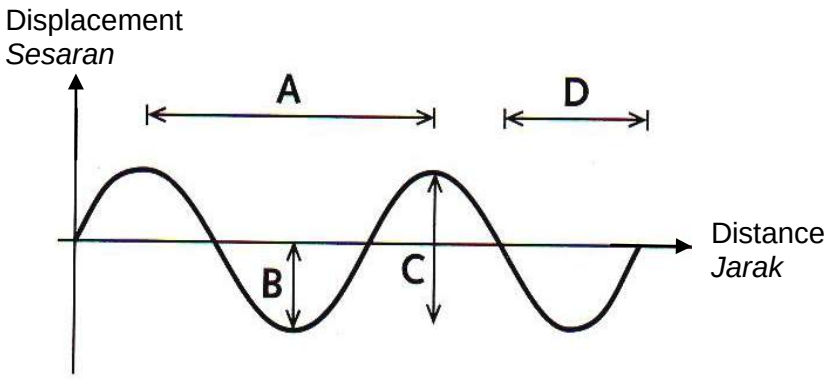


Diagram 23
Rajah 23

Which of the distances labelled **A, B, C** or **D**, represents one wavelength?
Antara jarak berlabel **A, B, C** *dan* **D**, *yang manakah mewakili satu panjang gelombang?*

34 Diagram 24 shows water waves are moving towards a harbour.
Rajah 24 *menunjukkan gelombang air merambat menuju sebuah perlabuhan.*

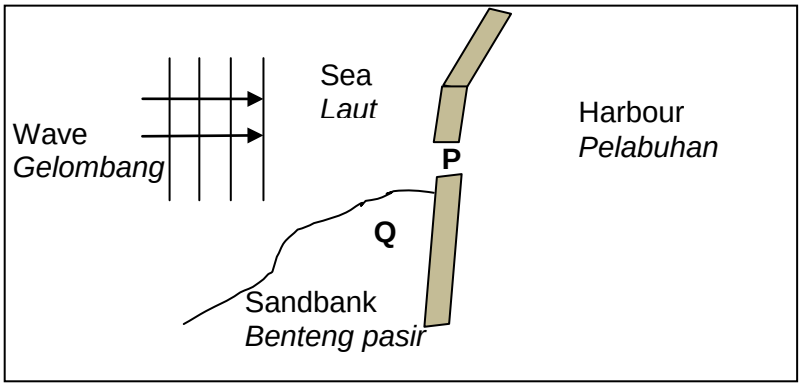


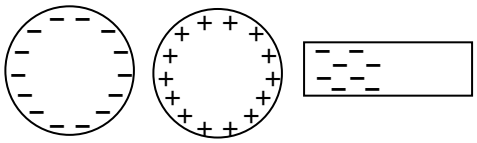
Diagram 24
Rajah 24

What will happen to the waves at P and Q?
Apakah yang akan berlaku kepada gelombang itu pada P *dan* Q?

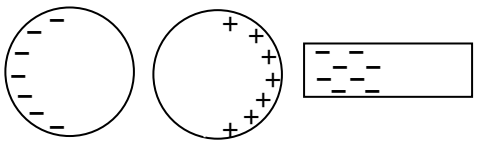
	P	Q
A	Reflections *Pantulan*	Refractions *Pembiasan*
B	Diffractions *Pembelauan*	Refractions *Pembiasan*
C	Reflections *Pantulan*	Interference *Interferens*
D	Diffractions *Pembelauan*	Interference *Interferens*

35 Two uncharged conducting spheres are placed apart. Which of the following diagrams best represents the charge distribution when a negatively charged rod is placed near one of them?
Dua sfera konduktor yang tidak bercas diletakkan berjauhan. Manakah antara rajah-rajah berikut paling sesuai menerangkan taburan cas apabila satu rod bercas negatif diletakkan berdekatan dengan salah satu daripadanya?

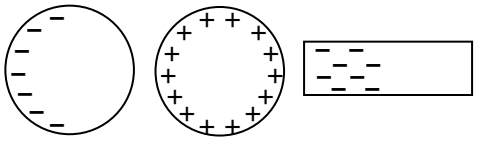
A



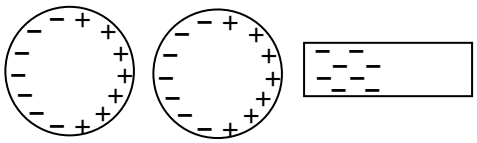
B



C



D



36 Diagram 25 shows an electrical circuit.
Rajah 25 *menunjukkan satu litar elektrik.*

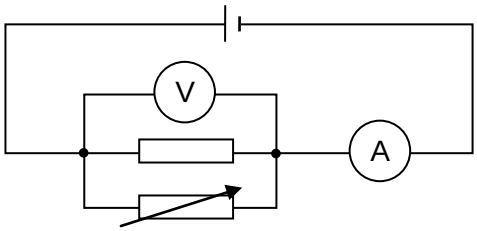


Diagram 25
Rajah 25

When the resistance of the variable resistor is increased,
Apabila rintangan bagi perintang boleh laras ditambah,

A the ammeter reading increases
bacaan ammeter bertambah
B the voltmeter reading increases
bacaan voltmeter bertambah
C the ammeter reading decreases
bacaan ammeter berkurang
D no change in readings on both meters
tiada perubahan bacaan bagi kedua-dua meter

37 Potential difference between two points is defined as
Beza keupayaan di antara dua titik ditakrifkan sebagai

A current flows is 1 ampere when 1 volt is applied across the two points
arus 1 ampere yang mengalir apabila 1 volt dikenakan merentasi dua titik itu

B energy released between two points when 1 coulomb of charge flow
tenaga yang dibebaskan di antara dua titik itu apabila 1 coulomb cas mengalir

C power released between two points when 1 coulomb of charge flow
kuasa yang dibebaskan di antara dua titik itu apabila 1 coulomb cas mengalir

D energy released between two points when 1 ampere of current flow through the two points
tenaga yang dibebaskan di antara dua titik itu apabila 1 ampere arus mengalir melalui dua titik itu

38 Diagram 26 shows a circuit consist of identical bulbs.
Rajah 26 *menunjukkan litar yang mengandungi mentol-mentol yang serupa.*

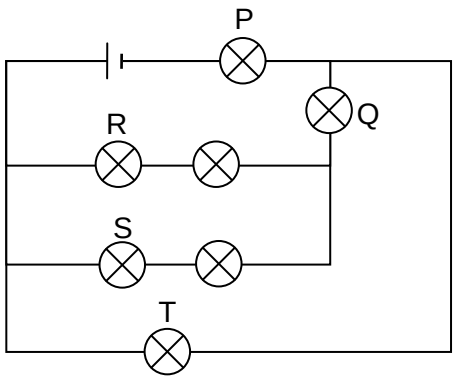


Diagram 26
Rajah 26

Which of the following statements is correct?
Manakah antara pernyataan-pernyataan berikut adalah benar?

A Bulb T is the dimmest
Mentol T adalah paling malap

B Bulb P is the brightest
Mentol P adalah paling terang

C Bulb S is brighter than bulb R
Mentol S adalah lebih terang daripada mentol R

D Bulb P and bulb Q are of the same brightness
Mentol P dan mentol Q mempunyai kecerahan yang sama

39 The motion of a current carrying conductor in an magnetic fields can be determined by
Gerakan konduktor yang membawa arus dalam medan magnet boleh ditentukan oleh

A Direction of current flow
Arah arus mengalir
B Fleming's Right Hand Rule
Petua Tangan Kanan Fleming
C Fleming's Left Hand Rule
Petua Tangan Kiri Fleming
D Right hand Grip Rule
Petua Genggaman Tangan Kanan

40 The diagram 27 shows a bar magnet moving towards a solenoid.
Rajah 27 *menunjukkan magnet bar digerakkan ke arah solenoid.*

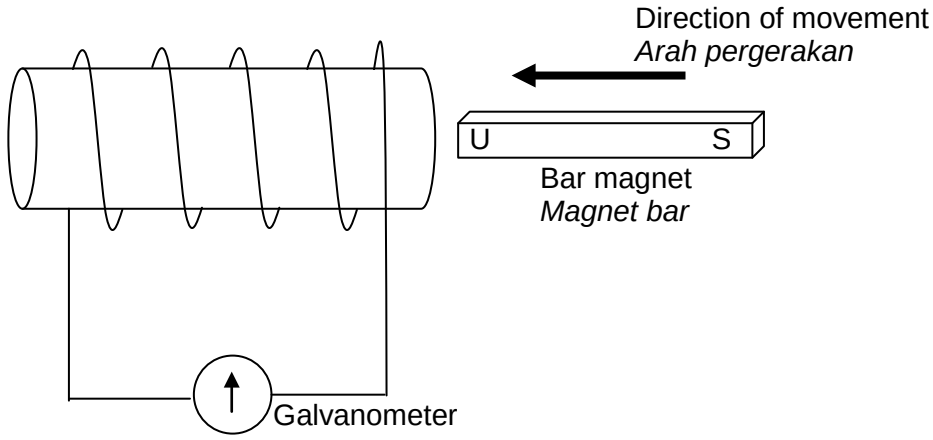


Diagram 27
Rajah 27

Which of these actions will not increase the deflection of the galvanometer pointer?
Tindakan manakah yang tidak akan menambah pesongan jarum galvanometer?

A Reversing the polarity of the magnet
Menukar kutub magnet
B Increasing the number of coils in the solenoid
Menambah lilitan solenoid
C Increasing the speed of the bar magnet
Menambah laju magnet bar
D Increasing the number of magnets used
Menambah bilangan magnet

41 Diagram 28 shows an electric motor.
Rajah 28 *menunjukkan sebuah motor elektrik.*

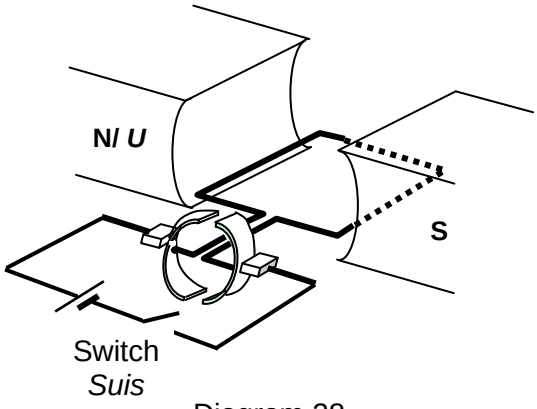
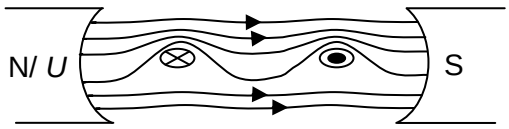


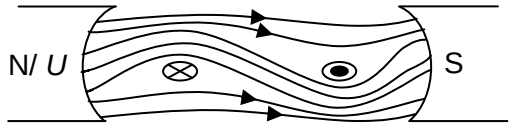
Diagram 28
Rajah 28

Which magnetic field pattern is correct when the switch is closed?
Corak medan magnet yang manakah adalah betul apabila suis ditutup?

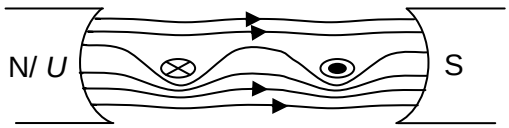
A



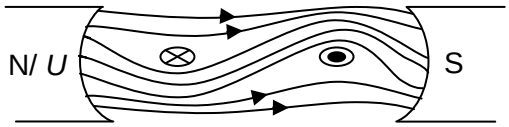
B



C



D



42 A laminated iron core is used in a transformer to reduces
Teras besi berlamina digunakan dalam satu transformer untuk mengurangkan

A the eddy currents
arus pusar
B the hysterisis loss
histerisis
C the resistance of the coil
rintangan gegelung
D the leakage of magnetic flux
kebocoran fluks magnet

43 The input voltage and the output voltage of an ideal transformer are 240 V and 12 V respectively. What is the current in the secondary coil if the current in the primary coil is 5 A.
Beza keupayaan primer dan beza keupayaan sekunder untuk satu transformer yang unggul adalah 240 V *dan* 12 V *masing-masing. Berapakah arus dalam gegelung sekunder jika arus dalam gegelung primer ialah* 5 A*.*

A 100 A
B 25 A
C 4 A
D 1 A

44 Diagram 29 shows two diodes which are connected in parallel in a circuit
Rajah 29 *menunjukkan dua diod disambung secara selari dalam satu litar*

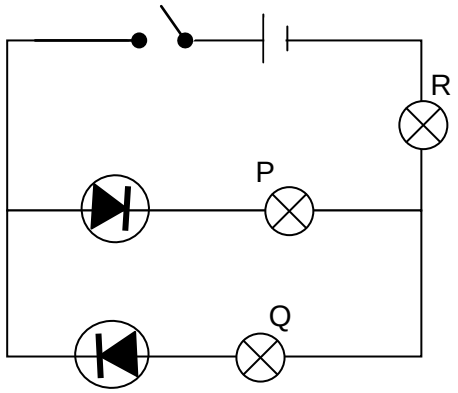


Diagram 29
Rajah 29

When switch S is closed, which bulb/bulbs will light up?
Apabila suis S *ditutup, mentol manakah yang akan menyala*?

A P only
P *sahaja*
B P and Q only
P *dan* Q *sahaja*
C P and R only
P *dan* R *sahaja*
D P,Q and R
P,Q *dan* R

45 Diagram 30 shows a combination of logic gates.
Rajah 30 *menunjukkan satu kombinasi get logik.*

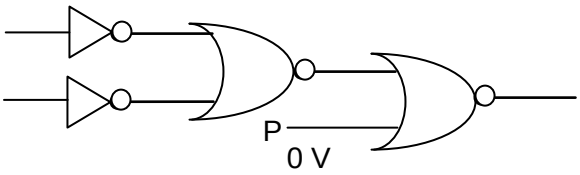


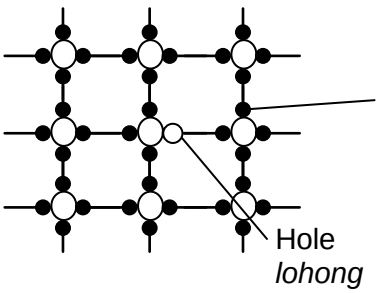
Diagram 30
Rajah 30

At input P, 0 V is given. Which of the following has a logic gate equivalent to that shown in the above diagram?
Pada input P, 0V *diberikan. Antara berikut , get logik yang manakah adalah setara dengan kombinasi get logik itu*?

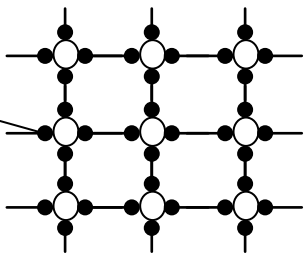
A NOT
TAK
B AND
DAN
C NOR
TAK-ATAU
D NAND
TAK-DAN

46 Which of the following is the doping of a p-type semiconductor?
Yang manakah antara berikut merupakan pendopan semikonduktor jenis p?

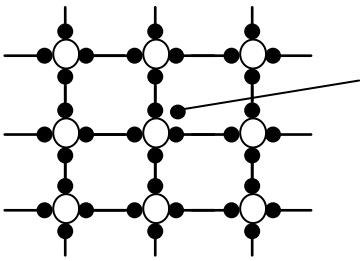
A



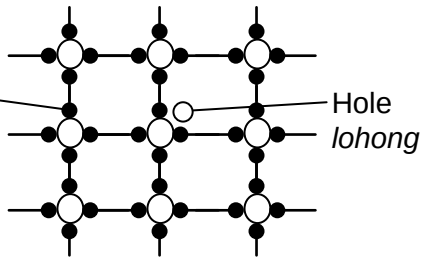
B



C



D



47 Diagram 31 shows the design of a cathode-ray oscilloscope. There is a constant potential difference across the deflection plates.
Rajah 31 *menunjukkan struktur sebuah tiub sinar katod. Beza keupayaan merentasi plat pemesong adalah tetap.*

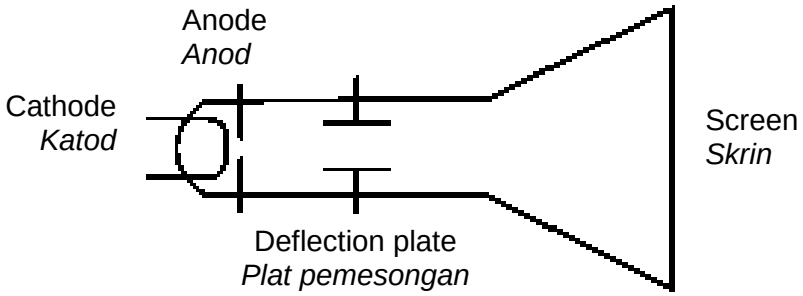


Diagram 31
Rajah 31

Which change will increase the deflection of the spot on the screen?
Perubahan manakah akan meningkatkan pemesongan titik cahaya pada skrin?

A increasing the length of the deflection plate
memanjangkan panjang plat pemesongan
B increasing the separation of the deflection plate
melebarkan jarak pemisahan antara plat-plat pemesongan
C decreasing the distance from the deflection plates to the screen
mengurangkan jarak antara plat pemesong dan skrin
D increasing the potential difference between cathode and anode
menambahkan beza keupayaan antara katod dan anod

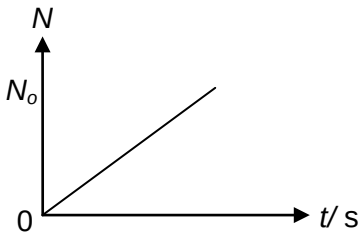
48 Nucleus $^{238}_{92}U$ decay through few stages until reach a stable nucleus.
Particles emitted in orders are α, β, β, α, α.
Which of the following nucleus is not the product from the decay series

Nukleus $^{238}_{92}U$ *mereput melalui beberapa peringkat sehingga mencapai satu nukleus yang stabil.*
Zarah-zarah yang terpancar ikut turutan adalah α, β, β, α, α.
Antara nukleus-nukleus berikut yang manakah bukan hasil dalam siri reputan itu?

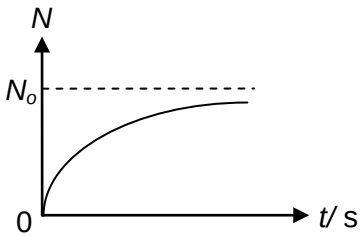
A $^{226}_{88}Ra$
B $^{230}_{90}Th$
C $^{234}_{91}Pa$
D $^{234}_{93}U$

49 A radioactive unstable nucleus decay becomes a stable nucleus. Which of the following graphs shows number of stable nucleus, *N* with time, *t*?
[Number of unstable nucleus is N_o]
Satu nukleus radioaktif yang tidak stabil mereput menjadi nukleus yang lebih stabil. Antara graf berikut yang manakah menunjukkan nukleus yang stabil, N dengan masa, t?
[*Bilangan nukleus yang tidak stabil adalah* N_o]

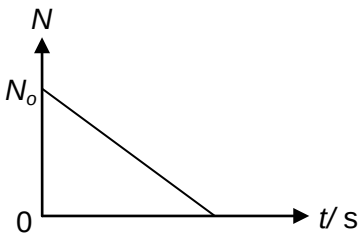
A



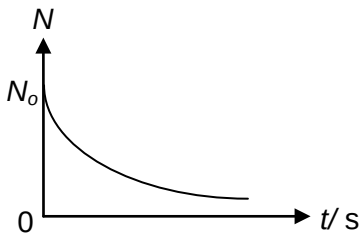
B



C



D



50 In the Geiger-Marsden experiment, a narrow beam of α-particles is bombarded to a thin piece of gold foil in a vacuum. A few of the particles were scattered through large angles. The result of the experiment provided evidence for the existence of
Dalam eksperimen Geiger-Marsden, satu alur halus zarah-zarah α telah dibedil pada satu kepingan kerajang emas dalam vakum. Beberapa zarah telah dipesongkan dengan sudut besar. Keputusan eksperimen ini membuktikan kehadiran

A nuclear reactions
tindak balas nuclear
B a very small nucleus
satu nukleus yang halus
C neutrons in the nucleus
neutrons dalam nukleus
D electrons orbiting the nucleus
elektron-elektron mengelilingi nukleus

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES

MAKLUMAT UNTUK CALON

1. This question paper consists of **50** questions.

   *Kertas soalan ini mengandungi **50** soalan.*

2. Answer **all** questions.

   Jawab **semua** *soalan.*

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

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

4. Blacken only one space for each question.

   Hitamkan **satu** *ruangan sahaja bagi setiap soalan.*

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

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

6. The diagrams in the questions provided are not drawn to scale unless stated.

   Gambar rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.

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

   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

8. A list of formulae is provided on page 2 and 3.

   Satu senarai formula disediakan di halaman 2 *dan* 3.

NO KAD PENGENALAN

ANGKA GILIRAN

JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010
PHYSICS
Kertas 2
Ogos 2010
2 ½ jam

4531/2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

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

Kod Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	**1**	4	
	2	5	
	3	7	
	4	7	
	5	7	
	6	8	
	7	10	
	8	12	
B	**9**	20	
	10	20	
C	**11**	20	
	12	20	
		Jumlah	

Kertas soalan ini mengandungi 28 halaman bercetak dan 0 halaman tidak bercetak

The following information may be useful. The symbols have their usual meaning.
Maklumat berikut mungkin berfaedah. Simbol-simbol mempunyai makna yang biasa.

1. $a = \frac{v-u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2}at^2$
4. Momentum = mv
5. $F = ma$
6. Kinetic energy / *Tenaga kinetik*
   $= \frac{1}{2}mv^2$
7. Gravitational potential energy /
   Tenaga keupayaan graviti $= mgh$
8. Elastic potential energy /
   Tenaga keupayaan kenyal $= \frac{1}{2}Fx$
9. Power, $P = \frac{\text{energy}}{\text{time}}$
   Kuasa, $P = \frac{tenaga}{masa}$
10. $\rho = \frac{m}{V}$
11. Pressure / *Tekanan*, $P = \frac{F}{A}$
12. Pressure / *Tekanan*, $P = h\rho g$
13. Heat / *Haba*, $Q = mc\theta$
14. Heat / *Haba*, $Q = ml$
15. $\frac{PV}{T}$ = constant / *pemalar*
16. $n = \frac{\sin i}{\sin r}$
17. $n = \frac{real\ depth}{apparent\ depth}$
    $n = \frac{dalam\ nyata}{dalam\ ketara}$
18. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
19. Linear magnification /
    Pembesaran linear, $m = \frac{v}{u}$
20. $v = f\lambda$
21. $\lambda = \frac{ax}{D}$
22. $Q = It$
23. $E = VQ$
24. $V = IR$
25. Power / *Kuasa*, $P = IV$
26. $g = 10\ ms^{-2}$
27. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
28. Efficiency / *Kecekapan*
    $= \frac{I_s V_s}{I_p V_p} \times 100\%$
29. $E = mc^2$
30. $c = 3.0 \times 10^8\ ms^{-1}$

Section A
BahagianA

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

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

1 Diagram 1 shows a ticker tape produced when a trolley move along an inclined runway.
Rajah 1 menunjukkan satu pita detik yang dihasilkan apabila sebuah troli bergerak menuruni landasan condong.

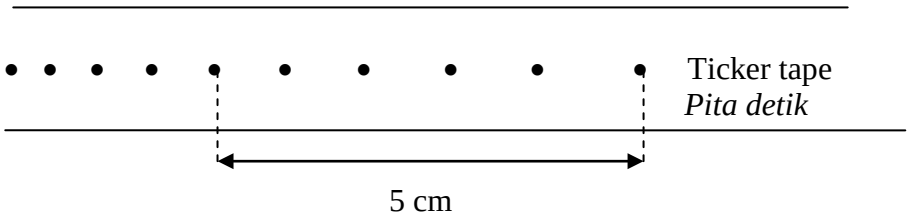


Diagram 1
Rajah 1

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

The type of current used for ticker timer
Jenis arus yang digunakan oleh jangka masa detik

alternating current.
arus ulang alik. ☐

direct current.
arus terus. ☐

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

(*b*) On Diagram 1 mark 'X' to show **one tick** .
Pada Rajah 1 *tandakan* 'X' *untuk menunjukkan* ***satu detik***.

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

(*c*) Based on Diagram 1 determine the velocity of the trolley?
Berdasarkan Rajah 1 tentukan halaju troli itu?

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

2 An experiment is carried out to investigate the relationship between the pressure, *P* and the temperature, *θ* of a fixed mass of a gas. The graph of pressure, *P* against temperature,θ obtained is as shown in Diagram 2.
Satu eksperimen telah dijalankan untuk mengkaji hubungan antara tekanan, P dan suhu,θ bagi satu jisim gas tetap. Graf bagi tekanan, P melawan suhu, θ diperolehi seperti ditunjukkan pada Rajah 2.

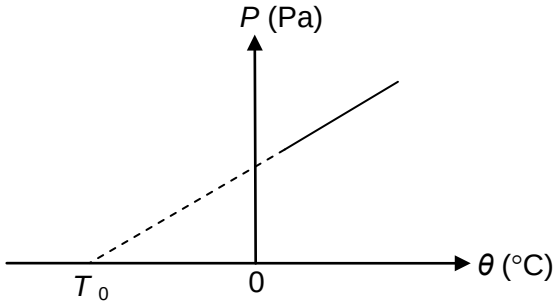


Diagram 2
Rajah 2

(*a*) (i) What is the value of temperature, T_0 when the pressure of the gas is zero?
Apakah nilai suhu T_0, apabila tekanan gas ialah sifar.

.....

[1 mark]
[1 *markah*]

(ii) What is the name given to T_0 ?
Apakah nama yang diberikan pada T_0 ?

.....

[1 mark]
[1 *markah*]

(*b*) Name the physics law that explain the observation of the above experiment.
Namakan hukum fizik yang menerangkan pemerhatian dalam eksperimen di atas.

.....

[1 mark]
[1 *markah*]

(*c*) In the space below, sketch the graph of pressure, *P* against temperature, *θ* when the temperature of a gas is expressed in Kelvin.
Pada ruangan di bawah, lakarkan graf tekanan, P melawan suhu, θ apabila suhu bagi satu gas dinyatakan dalam Kelvin.

[2 marks]
[2 *markah*]

3 Diagram 3.1 shows the pattern of the water wave when the water waves propagated from the sea to the beach.
Rajah 3.1 *menunjukkan corak bagi gelombang air apabila gelombang air merambat dari laut ke pantai.*

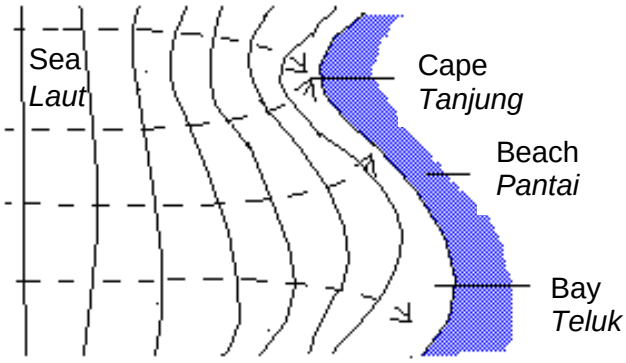


Diagram 3.1
Rajah 3.1

(*a*) Name the phenomenon that involved in the above observation.
Namakan fenomena yang terlibat dalam pemerhatian di atas.

.....

[1 mark]
[1 *markah*]

(*b*) Why are the water waves follow the shape of the beach when its propagated from the sea to the beach?
Mengapakah gelombang air mengikut bentuk pantai apabila ia merambat dari laut ke pantai?

.....

[1 mark]
[1 *markah*]

(c) Which of the following physical quantity decreases when the water waves propagated from the sea to the beach?
Tick (√) in the correct box.
Kuantiti fizik yang manakah akan berkurang apabila gelombang air merambat dari laut ke pantai.
Tandakan (√) pada petak yang betul.

Speed *Laju*	Wavelength *Panjang gelombang*	Frequency *Frekuensi*
☐	☐	☐

[1 mark]
[1 *markah*]

(*d*) The water waves with a wavelength of 1.2 m travels with velocity 2.5 ms^{-1} from the sea to the beach. The velocity of the waves when reaching the beach is 1.8 ms^{-1} .
Gelombang air dengan panjang gelombang 1.2 m *bergerak dengan halaju* 2.5 ms^{-1} *dari laut ke pantai. Halaju gelombang apabila menghampiri pantai ialah* 1.8 ms^{-1} .

Calculate,
Kirakan,

(i) the frequency of the water waves
frekuensi gelombang air itu.

[2 marks]
[2 *markah*]

(ii) the wavelength when reaching the beach
panjang gelombang apabila menghampiri pantai.

[2 marks]
[2 *markah*]

4 Diagram 4.1 shows the use of a transistor in a circuit.
Rajah 4.1 menunjukkan kegunaan transistor dalam suatu litar.

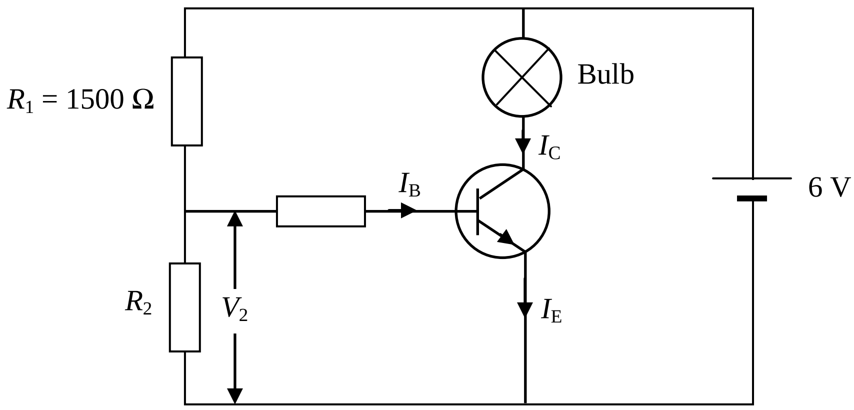


Diagram 4.1
Rajah 4.1

(a) Name the type of transistor used.
Namakan jenis transistor yang digunakan.

…………………………………………………………………………………………

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

(b) The transistor is switched on when the base voltage $V_2 \geq 2$ V.
Transistor itu dihidupkan apabila voltan tapak $V_2 \geq 2$ V

(i) Write an equation to show the relationship between I_B, I_C and I_E.
Tuliskan satu persamaan untuk menunjukkan hubungan antara I_B, I_C dan I_E.

.....

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

(ii) Calculate the minimum value of R_2 when the transistor is switched on.
Hitungkan nilai minimum R_2 *apabila transistor itu dihidupkan.*

[2 marks]
[2 *markah*]

(c) The resistor R_2 is then replaced with a light dependent resistor,LDR, which has high resistance when it is dark.
Perintang R_2 *kemudian digantikan dengan perintang peka cahaya, PPC ,yang mempunyai rintangan tinggi apabila gelap.*

(i) State whether the bulb will light up during the day. Give reason to your answer.
Nyatakan sama ada mentol itu akan menyala pada waktu siang. Jelaskan jawapan anda.

.....

.....

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

(ii) Besides being used as a switch, state other use of a transistor.
Selain daripada digunakan sebagai satu suis, nyatakan satu kegunaan lain bagi transistor .

.....

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

5 Diagram 5.1 and 5.2 show the deflection of a radioactive emission in an electric field.
Rajah 5.1 dan Rajah 5.2 menunjukkan pesongan satu pancaran radioaktif di dalam suatu medan elektrik.

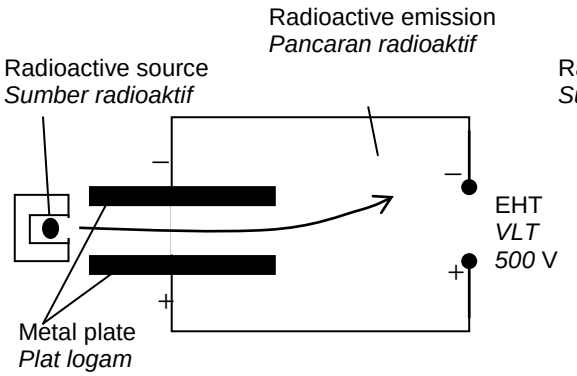


Diagram *5.1*
Rajah 5.1

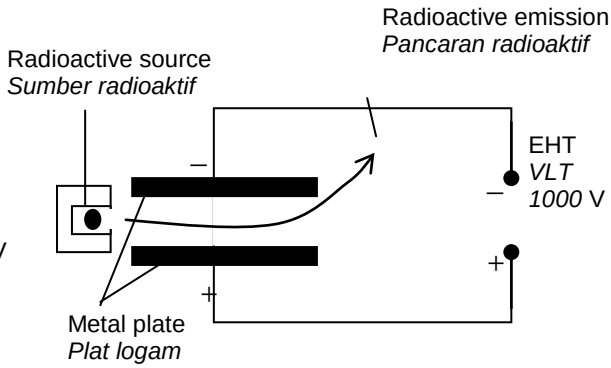


Diagram *5.2*
Rajah 5.2

(a) What is the meaning of radioactivity?
Apakah maksud keradioaktifan?

……
[1 *mark*]
[1 *markah*]

(b) Using Diagram 5.1 and Diagram 5.2,
Menggunakan Rajah 5.1 dan Rajah 5.2,

(i) state the charge of the radioactive emission
nyatakan cas pancaran radioaktif itu

……
[1 mark]
[1 markah]

(ii) compare the voltage of EHT and the deflection of the radioactive emission.
bandingkan voltan VLT dan pesongan pancaran radioaktif

……

……..
[2 marks]
[2 markah]

(c) state the relationship between
nyatakan hubungan antara

(i) the voltage of EHT and the strength of the electric field between the plates,
voltan VLT dengan kekuatan medan elektrik di antara plat

……
[1 mark]
[*1 markah*]

(ii) the strength of the electric field between the plates and the deflection of the radioactive emission
kekuatan medan elektrik di antara plat dengan pesongan pancaran radioaktif

……

[1 mark]
[1 *markah*]

(d) A radioactive decay involving the Radium nucleus is given by
Pereputan radioaktif yang melibatkan nucleus Radium di berikan sebagai

$$^{226}_{88}\text{Ra} \longrightarrow {}^{222}_{86}\text{Rn} + \text{X}$$

What is X?
Apakah X?

……

[1 mark]
[1 *markah*]

6 Diagram 6.1 shows the arrangement of Young's double-slit experiment. A source of white light is directed through a red filter to produce a *monochromatic light*.
Rajah 6.1 menunjukkan susunan eksperimen dwi-celah Young. Satu sumber cahaya putih ditujukan melalui penuras merah untuk menghasilkan cahaya monokromatik.

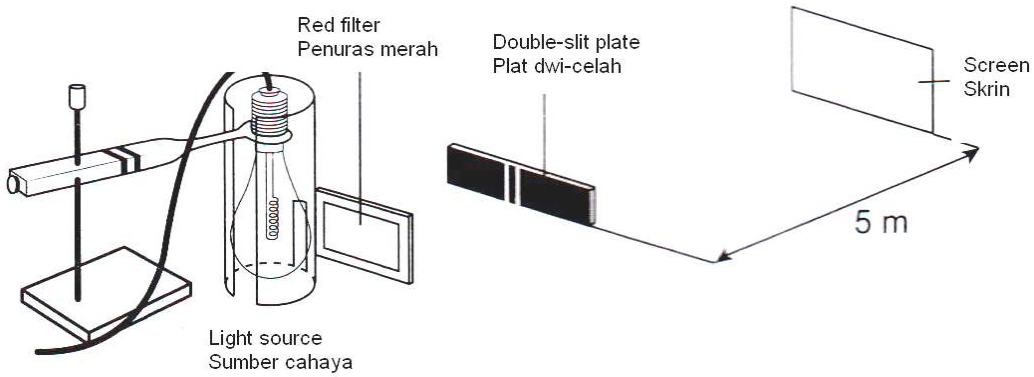


Diagram 6.1
Rajah 6.1

Diagram 6.2 and Diagram 6.3 show two double slit which have been used in the experiment.
Rajah 6.2 dan Rajah 6.3 menunjukkan dua dwi-celah yang digunakan dalam eksperimen ini.

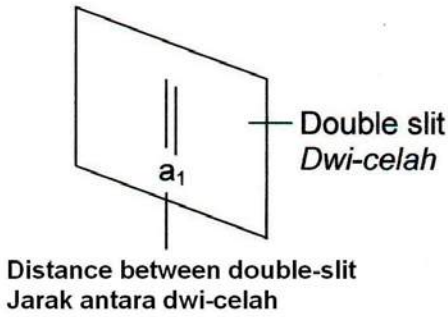


Diagram 6.2
Rajah 6.2

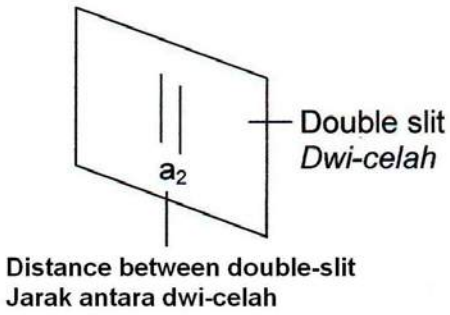


Diagram 6.3
Rajah 6.3

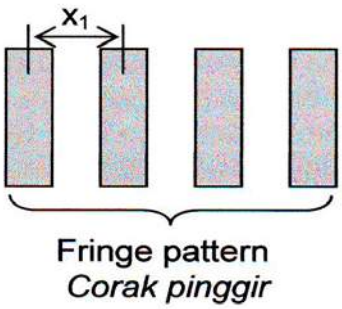


Diagram 6.4
Rajah 6.4

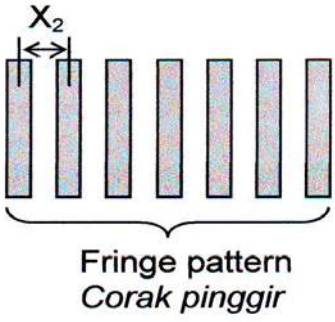


Diagram 6.5
Rajah 6.5

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

…… ……

[1 mark]
[1 *markah*]

(b) Based on
Berdasarkan

(i) Diagram 6.2 and Diagram 6.3, compare the distance of slit separation, a_1 and a_2 .
Rajah 6.2 dan Rajah 6.3, bandingkan jarak pemisahan celah, a_1 dan a_2 .

……

[1 mark]
[1 *markah*]

(ii) Diagram 6.4 and Diagram 6.5, compare the distance of two consecutive dark fringes separation, x_1 and x_2 .
Rajah 6.4 dan Rajah 6.5, bandingkan jarak pemisahan antara dua pinggir gelap berturutan, x_1 dan x_2 .

……
……
[1 mark]
[1 *markah*]

(c) (i) State the relationship between the distance of slit separation, a, to the distance of two consecutive dark fringes, x .
Nyatakan hubungan di antara jarak pemisahan celah , a, dengan jarak pemisahan antara dua pinggir gelap berturutan, x .

……...
[1 mark]
[1 *markah*]

(ii) State one constant variable in the experiment.
Nyatakan satu pembolehubah yang dimalarkan dalam eksperimen ini.

……
[1 mark]
[1 *markah*]

(d) Name the phenomenon of light that produces the fringe pattern in Diagram 6.4 and Diagram 6.5.
Namakan phenomenon cahaya yang menghasilkan corak jalur dalam Rajah 6.4 dan Rajah 6.5.

……
.[1 mark]
[1 *markah*]

(e) Explain how the fringe pattern in Diagram 6.4 and Diagram 6.5 are formed.
Terangkan bagaimana corak pinggir dalam Rajah 6.4 dan Rajah 6.5 terbentuk.

……

……

……
[2 marks]
[2 *markah*]

7 Diagram 7.1 shows cross-sectional of a wing of a moving aeroplane. The wing of aeroplane experiences a lift force.
Rajah 7.1 *menunjukkan suatu keratan rentas bagi sayap sebuah pesawat udara yang sedang bergerak. Sayap pesawat udara itu mengalami daya angkat.*

Diagram 7.1
Rajah 7.1

(a) Name the cross-section in Diagram 7.1.
Namakan bentuk keratan rentas dalam Rajah 7.1

……
[1 *mark*]
[1 *markah*]

(b) In Diagram 7.1,
Pada Rajah 7.1,

(ii) Draw and label the direction of the air flow.
Lukis dan labelkan arah aliran udara.

[1 mark]
[1 *markah*]

(iii) Label the region of high and low pressure.
Labelkan kawasan tekanan udara tinggi dan rendah.

[1 mark]
[1 *markah*]

(iv) Using an arrow, show the direction of the lift force, F,
Menggunakan anak panah, tunjukkan arah daya angkat F.

[1 mark]
[1 *markah*]

(b) Diagram 7.2 shows a Bunsen burner burning with yellow flame is produced.
Rajah 7.2 *menunjukkan sebuah penunu Bunsen menyala dengan nyalaan kuning.*

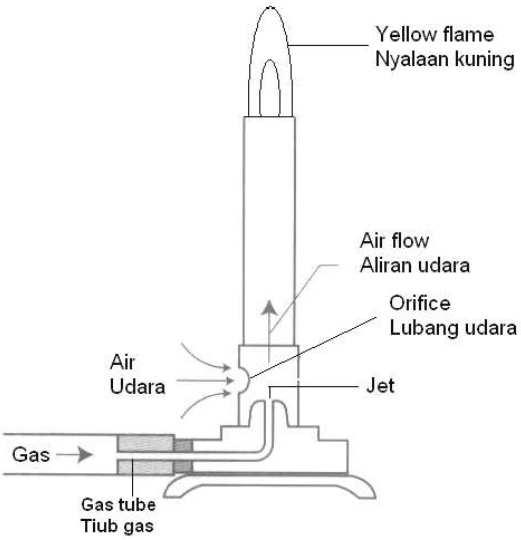


Diagram 7.2
Rajah 7.2

Based on Diagram 7.2,
Berdasarkan Rajah 7.2,

(i) Explain how a blue flame can be produced.
Terangkan bagaimana nyalaan biru dapat dihasilkan.

……

……

……

……

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

(ii) Suggest one modification to the burner to produce bigger flame.Give reason to your answer.
Cadangkan one pengubahsuaian kepada penunu itu untuk menghasilkan nyalaan yang lebih besar. Jelaskan jawapan anda.

……..

……

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

(iii) State the physics principle use in a Bunsen burner.
Nyatakan prinsip fizik yang digunakan dalam penunu Bunsen.

……..

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

8 (a) A student carries out an experiment to investigate the relationship between potential difference,V and current,I across a wire. Diagram 8.1 shows the graph obtained from the experiment.
Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara beza keupayaan,V dengan arus,I merentasi satu wayar. Rajah 8.1 *menunjukkan graf yang diperolehi daripada eksperimen itu.*

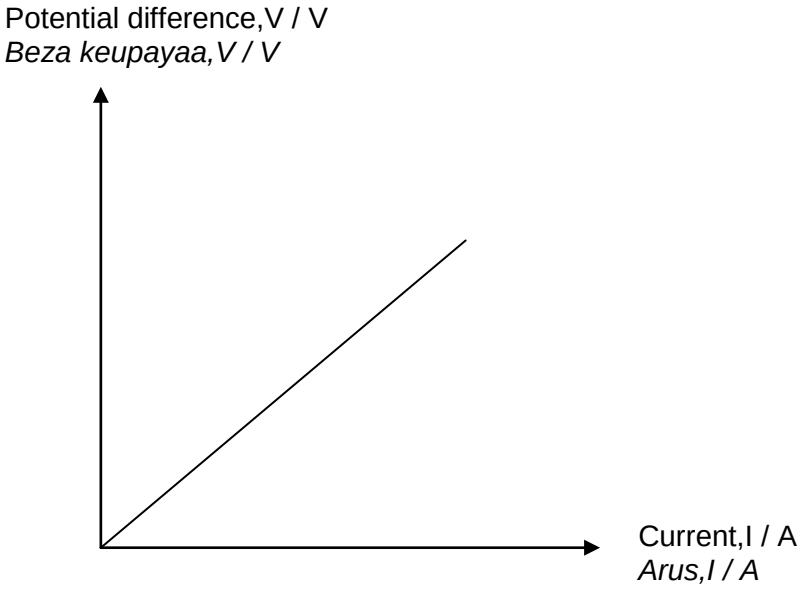


Diagram 8.1
Rajah 8.1

(i) State the relationship between potential difference, V and current I.
Nyatakan hubungan antara beza keupayaan, V dan arus, I.

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

(ii) State the law involved.
Nyatakan hukum yang terlibat.

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

(b) Diagram 8.2 shows a circuit consists of electrical appliances.
Rajah 8.2 menunjukkan satu litar mengandungi perkakasan elektrik.

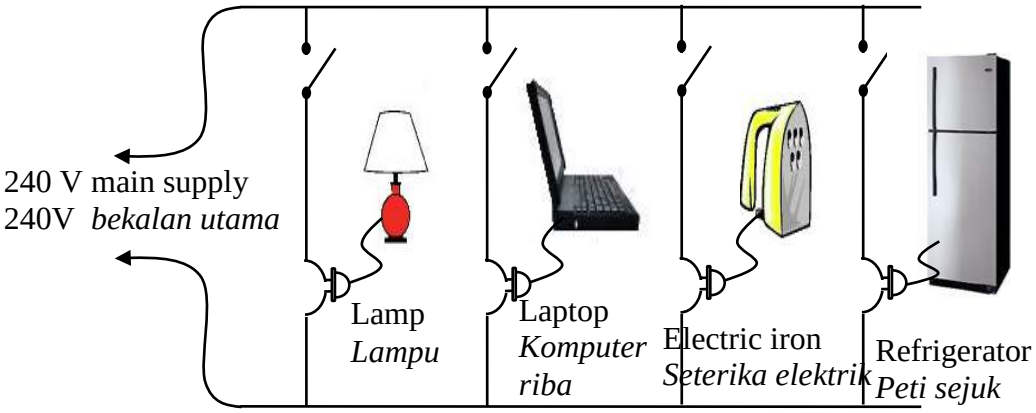


Diagram 8.2
Rajah 8.2

Table 1 shows the power rating and energy consumption per day of the electrical appliances shown in Diagram 8.2.
Jadual 1 *menunjukkan kadar kuasa dan tenaga yang digunakan sehari oleh perkakas-perkakas elektrik seperti yang ditunjukkan dalam Rajah* 8.2*.*

Appliance *Perkakas*	Power rating/ W *Kadar kuasa/ W*	Time of usage per day *Masa penggunaan satu hari*
Lamp *Lampu*	60	10 hours 10 *jam*
Laptop *Komputer riba*	50	6 hours 6 *jam*
Electric Iron *Seterika elektrik*	2000	3 hours 3 *jam*
Refrigerator *Peti sejuk*	400	24 hours 24 *jam*

Table 1
Jadual 1

(i) Calculate total energy consumed in one day.
Hitungkan jumlah tenaga yang digunakan dalam sehari

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

(ii) If the electricity cost is RM 0.218 per kWh, calculate the total cost for one month.
Jika kos elektrik ialah RM 0.218 per kWj, *kira jumlah kos untuk satu bulan.*

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

(c) Diagram 8.3 shows an electric kettle 240V,2500W is connected to the 240 V mains supply by an electric cable.
Rajah 8.3 menunjukkan satu cerek elektrik 240V,2500 disambungkan kepada bekalan utama 240 V dengan menggunakan kabel elektrik.

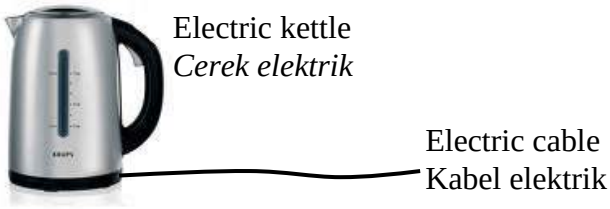


Diagram 8.3
Rajah 8.3

Table 2 shows the maximum current flows in electric cables with various diameters.
Jadual 2 menunjukkan arus maksimum yang mengalir dalam kabel elektrik yang berlainan diameter.

Electric cable *Kabel elektrik*	Diameter/ cm	Maximum Current/A *Arus maksimum/* A
P	0.50	3
Q	0.75	6
R	1.00	10
S	1.25	13
T	1.50	15

Table 2
Jadual 2

(i) What is meant by ’240 V, 2500 W’ ?
Apakah yang dimaksudkan dengan ’240 V, 2500 W’ ?

.....

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

(ii) Calculate the current flow in the cable.
Kira arus mengalir dalam kabel.

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

(iii) From Table 2, select the most suitable diameter of electric cable for the electric kettle.
Daripada Jadual 2, pilih kabel elektrik yang mempunyai diameter paling sesuai untuk cerek elektrik ini.

.....

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

Section B
BahagianB

[20 marks]
[20 *markah*]

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

9 Diagram 9.1 shows the effect of a man falls from a high position to the ground without opening the parachute. Diagram 9.2 shows a man with the same mass falls from the same height when the parachute is open.

Rajah 9.1 *menunjukkan kesan orang yang jatuh dari tempat yang tinggi ke tanah apabila payung terjun tidak terbuka. Rajah* 9.2 *menunjukkan seorang yang mempunyai jisim yang sama jatuh dari ketinggian yang sama dengan payung terjun terbuka.*

Diagram 9.1
Rajah 9.1

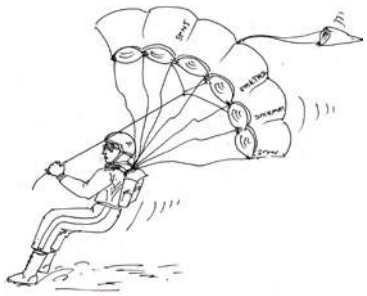


Diagram 9.2
Rajah 9.2

(a) (i) What is the meaning of free fall? [1 *mark*]
Apakah maksud jatuh bebas? [1 *markah*]

(ii) Based on diagram 9.1 and Diagram 9.2, compare the acceleration, the rate of change of momentum and the time of impact.
Relate the rate of change of momentum with the time of impact to make a deduction on the relationship between the acceleration and the rate of change of momentum.
[5 *marks*]
Perhatikan Rajah 9.1 *dan Rajah* 9.2. *Bandingkan pecutan , kadar perubahan momentum dan masa perlanggaran.*
Hubungkaitkan kadar perubahan momentum dengan masa perlanggaran untuk membuat kesimpulan tentang hubungan antara pecutan dengan kadar perubahan momentum. [5 *markah*]

(b) A hovercraft moves on a cushion of air which is trapped underneath it, as shown in Diagram 9.3. The trapped air reduces the friction. The hovercraft starts from rest and as it starts, the propeller produces a forward force until it reaches a constant velocity .

Sebuah hoverkraf bergerak diatas kusyen udara yang terperangkap di bawahnya seperti ditunjukkan dalam Rajah 9.3 *. Udara yang terperangkap menggurangkan geseran. Hoverkraf bergerak dari keadaan rehat dan semasa ia bergerak kipas yang berputar menghasilkan daya ke hadapan sehingga ia mencapai halaju sekata .*

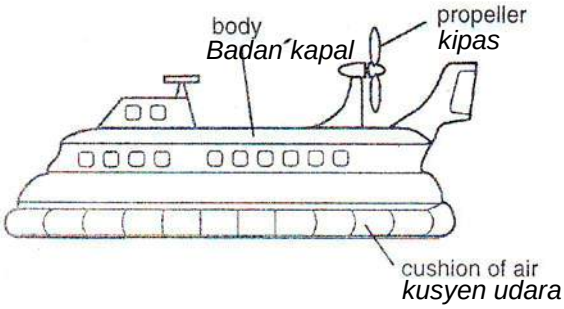


Diagram 9.3
Rajah 9.3

(i) Sketch a velocity-time graph to show the motion of hovercraft.
Lakarkan graf halaju-masa untuk menunjukkan gerakan hoverkraf.

(ii) Explain why the hovercraft moves with constant velocity in terms of the force acting on it
Terangkan mengapakah hoverkraf bergerak dengan halaju seragam dari segi daya yang bertindak ke atasnya

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

(c) Diagram 9.4 shows a canoe
Rajah 9.4 menunjukkan sebuah kayak

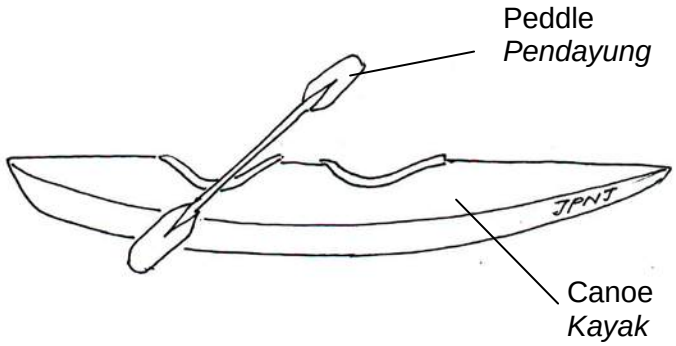


Diagram 9.4
Rajah 9.4

You are required to give some suggestions to design a canoe which can travel faster and safer
Using the knowledge on motion, forces and the properties of materials, explain the suggestions based on the following aspects:

Anda dikehendaki memberikan beberapa cadangan untuk merekabentuk sebuah kayak yang boleh bergerak lebih laju dan selamat
Menggunakan pengetahuan tentang gerakan, daya dan sifat-sifat bahan, terangkan cadangan itu yang merangkumi aspek-aspek berikut:

(i) the surface of the canoe
permukaan kayak

(ii) the shape of the canoe
bentuk kayak

(iii) the material of the canoe
bahan yang digunakan untuk kayak

(iv) the size of a peddle
Saiz pendayung

(v) material used for peddle
Bahan yang digunakan untuk pendayung

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

10 Diagram 10.1 and Diagram 10.2 show two identical *electromagnets*, X and Y. The current flow in electromagnet X is 2 A and the current flow in electromagnet Y is 3 A.

Rajah 10.1 dan Rajah 10.2 menunjukkan dua elektromagnet X dan Y yang serupa. Arus yang mengalir melalui electromagnet X ialah 2 A dan arus mengalir melalui elektromagnet Y ialah 3 A.

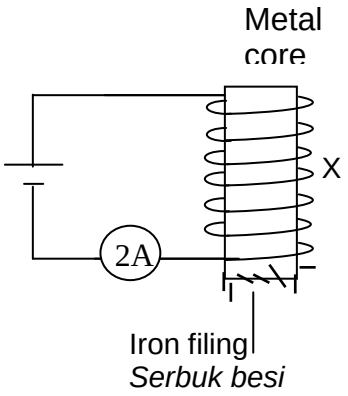


Diagram 10.1
Rajah 10.1

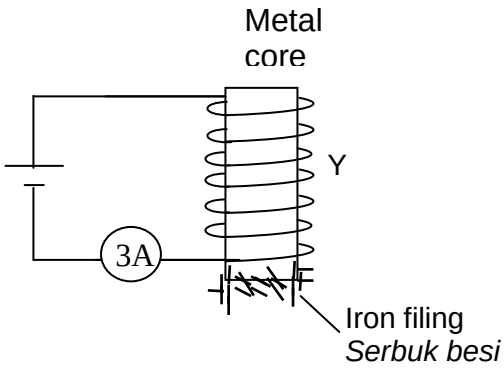


Diagram 10.2
Rajah 10.2

(a) What is the meaning of *electromagnet* ? [1 *mark*]
Apakah yang dimaksudkan dengan elektromagnet ? [1 *markah*]

(b) Using Diagram 10.1 and Diagram 10.2, compare the amount of iron filings attracted, current flow and the magnetic field strength of the two electromagnets. Relate the current flow with the magnetic field strength to make a deduction on the relationship between magnetic field strength and the amount of iron filings attracted in this situation.

[5 *marks*]

Menggunakan Rajah 10.1 dan Rajah 10.2, bandingkan kuantiti serbuk besi yang melekat, arus mengalir dan kekuatan medan magnet bagi kedua-dua elektromagnet itu.
Hubungkaitkan arus yang mengalir dengan kekuatan medan magnet untuk membuat kesimpulan tentang hubungan antara kekuatan medan magnet dengan kuantiti serbuk besi yang melekat dalam situasi ini.

[5 *markah*]

(c) Diagram 10.3 shows an electromagnet crane.
Rajah 10.3 *menunjukkan sebuah kren elektromagnet.*

Diagram 10.3
Rajah 10.3

Explain how the electromagnet crane can be used to lift scrap metal.

[4 *marks*]

Terangkan bagaimana kren elektromagnet itu dapat digunakan untuk mengangkat besi buruk.

[4 *markah*]

(d) A man needs an adaptor to charge his handphone as shown in Diagram 10.4. The transformer inside the adaptor is used to reduce the 240 V alternating current (a.c) to 12 V direct current (d.c).

Seorang lelaki memerlukan pengecas untuk mengecas telefon bimbitnya seperti yang ditunjukkan dalam Rajah 10.4*. Sebuah transformer di dalam pengecas digunakan untuk menurunkan* 240 V *arus ulang alik(a.u) kepada* 12 V *arus terus (a.t).*

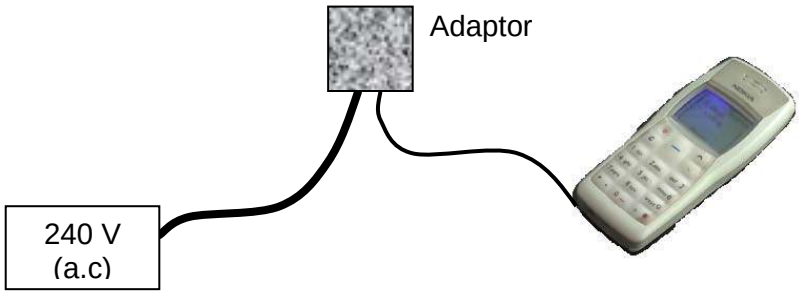


Diagram 10.4
Rajah 10.4

Using the knowledge of a transformer and rectifier, suggest and explain how to built an adaptor which can be used to charge the handphone.

Menggunakan pengetahuan tentang transformer dan rektifier, cadang dan terangkan bagaimana untuk membina sebuah adaptor (pengubah) yang dapat digunakan untuk mengecas telefon bimbit itu.

(i) The type of transformer
Jenis transformer

(ii) The ratio of number of turns in primary coil to the number of turns in secondary coil
Nisbah bilangan lilitan pada gegelung primer kepada gegelung sekunder

(iii) The type of core
Jenis teras

(iv) The electronic component that should be connected to the output of the secondary coil
Komponen elektronik yang perlu disambungkan kepada output gegelung sekunder

(v) The material of wire used
Bahan dawai digunakan

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

Section C
Bahagian C

[20 marks]
[20 *markah*]

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

11 Diagram 11.1 shows Ali standing at the side of a pond. Ali can see the image of the fish and the image of the dragon-fly in the water as shown by the ray diagram.

Rajah 11.1 *menunjukkan Ali berdiri di tepi kolam. Ali dapat melihat imej ikan dan imej pepatung di dalam air seperti yang ditunjukkan oleh rajah sinar.*

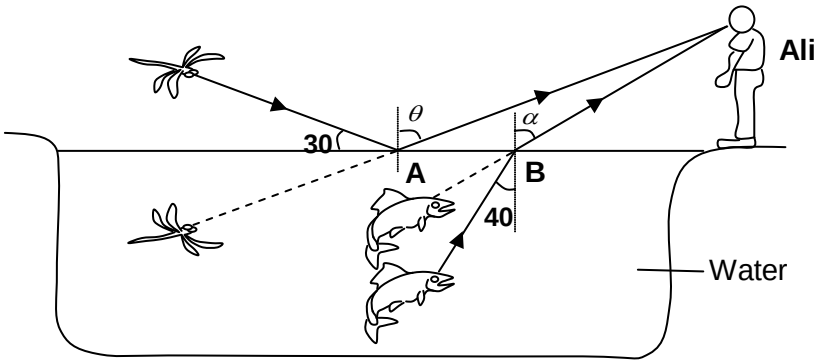


Diagram 11.1
Rajah 11.1

(a) (i) What is the meaning of virtual image ? [1 mark]
Apakah maksud imej maya ? [1 *markah*]

(ii) Explain how Ali can see the image of the fish and the image of the dragon-fly. State the phenomenon of light that is involved in each case.
[4 marks]

Terangkan bagaimana Ali dapat melihat imej ikan dan imej pepatung. Nyatakan fenomena cahaya yang terlibat dalam setiap kes.
[4 *markah*]

(b) (i) Calculate the angle θ and α.
[Refractive index of water is 1.33] [4 marks]

Hitung sudut θ *dan* α.
[*Indeks biasan air ialah* 1.33] [4 *markah*]

(ii) State one characteristic of the image of the dragon-fly. [1 mark]
Nyatakan satu ciri bagi imej pepatung. [1 markah]

(c) Table 11 shows the design of five torchlights P, Q, R, S and T.
Jadual 11 menunjukkan reka bentuk bagi lima lampu suluh P, Q, R, S dan T.

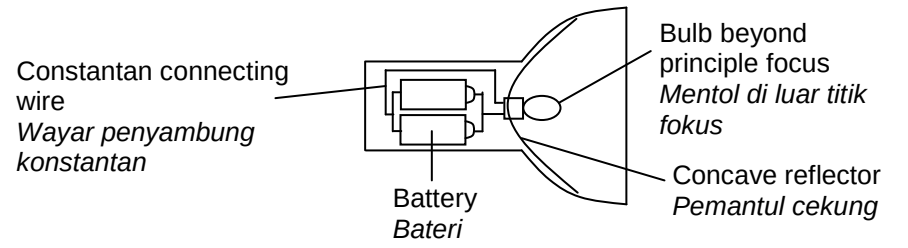
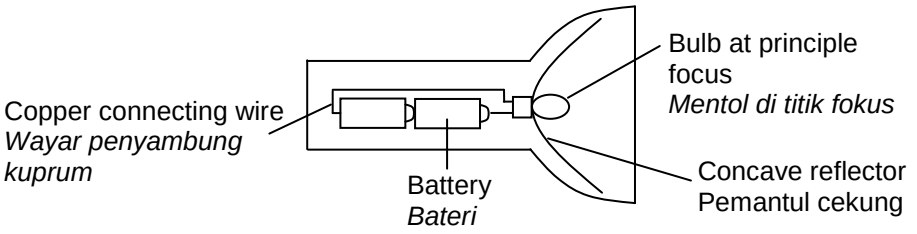
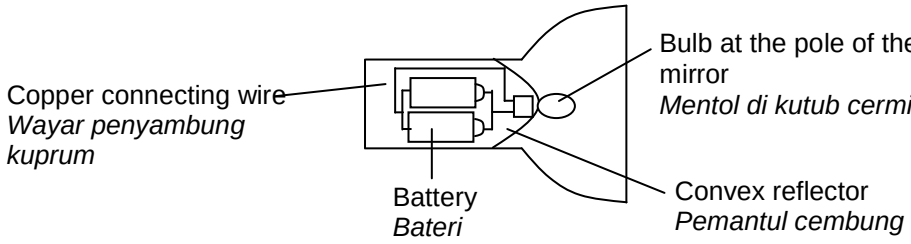
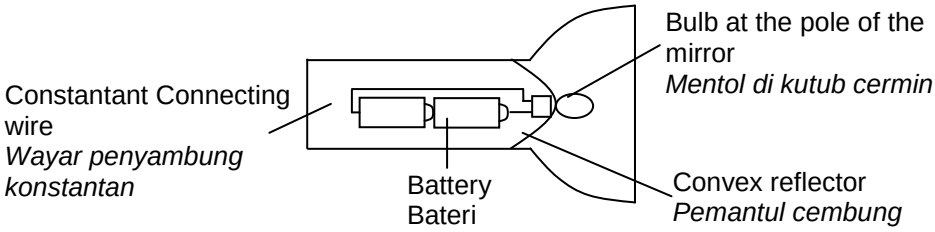
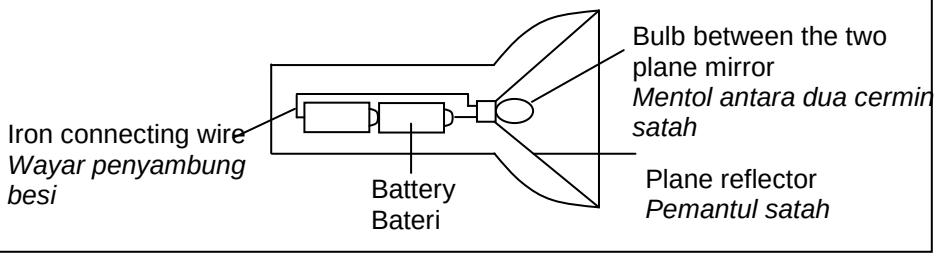
P	
Q	
R	
S	
T	

Table 11
Jadual 11

You are asked to investigate the characteristics of the five torchlights shown in Table 11. Explain the suitability of each characteristics of the torchlight and determine the torchlight which can produce a strong parallel beam of light.
Give reasons for your choice. [10 marks]

Anda ditugaskan untuk mengkaji ciri-ciri bagi lima lampu suluh seperti yang ditunjukkan dalam Jadual 11.
Terangkan kesesuaian setiap ciri lampu suluh itu dan tentukan lampu suluh yang boleh menghasilkan satu alur cahaya selari yang terang.
Beri sebab untuk pilihan anda. [10 *markah*]

12 As a research engineer in a factory, you are asked to investigate the characteristics of several substances in order to produce semiconductors with better conductivity.

Sebagai jurutera penyelidik di sebuah kilang, kamu dikehendaki mengkaji ciri-ciri beberapa bahan untuk menghasilkan semikonduktor yang mempunyai kekonduksian yang tinggi.

(a) What is meant by semiconductor? [1 *mark*]
Apakah maksud semikonduktor? [1 *markah*]

(b) Name two types of semiconductors. Explain the differences between this two types of semiconductors [5 *marks*]
Namakan dua jenis semikonduktor. Jelaskan perbezaan di antara keduanya. [5 *markah*]

(c) Table 12 shows the characteristics of five substances P, Q, R, S and T
Jadual 12 menunjukkan ciri lima bahan P, Q, R, S dan T

Characteristics *Ciri* / Substance *Bahan*	Resistivity at 0^0C /μΩ cm *Kerintangan pada* 0^0C/μΩ *cm*	Melting point /^{0}C *Takat lebur /^{0}C*	Electron valence of the doping substance *Elektron valens atom pendopan*	Size of the doping atom compared with the size of the atom *Size atom pendopan berbanding saiz atom bahan*
P	10^5	100	4	Very big *Sangat besar*
Q	10^7	600	3	Almost the same *Hampir sama*
R	10^{18}	800	4	Big *Besar*
S	10^3	120	2	Very small *Sangat kecil*
T	10^{24}	300	2	Small *Kecil*

Table 12
Jadual 12

Explain the suitability of the characteristics of the substances to be used in the production of a semiconductor with better conductivity and determine the most suitable substance to be used

Jelaskan kesesuaian ciri bahan yang akan digunakan untuk menghasilkan semiconductor yang mempunyai kekonduksian yang baik dan tentukan bahan yang manakah yang paling sesuai.

Give reasons for your choice
Beri sebab bagi pilihan anda

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

(d) An extra high voltage (EHT) supply gives 4 kV across the anode and the cathode of a vacuum tube.

Satu voltan lampau tinggi (VLT) 4kV merentasi anod dan katod sebuah tiub vakum.

(i) Name the process that occurs. [1 *mark*]
Namakan proses yang berlaku. [1 *markah*]

(ii) Calculate the velocity of the electron when it reaches the anode tube.
[mass of electron , m = 9.1 x 10^{-31} kg, charge of electron, e = 1.6 x 10^{-19} C]

Kira halaju electron apabila ia sampai ke tiub anod.
[*jisim satu electron, m = 9.1 x* 10^{-31} *kg, cas satu electron, e = 1.6 x* 10^{-19}*C*]
[3 marks]
[3*markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **three** sections: **Section A, Section B** and **Section C**
   Kertas soalan ini mengandungi **tiga** *bahagian:* ***Bahagian A, Bahagian B*** *dan* ***Bahagian C****.*

2. Answer **all** questions in **Section A.** Write your answer for **Section A** in the spaces provided in the question paper.
   Jawab **semua** *soalan dalam* ***Bahagian A.*** *Jawapan anda bagi* ***Bahagian A*** *hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*

3. Answer **one** question from **Section B** and **one** question from **Section C**.
   Write your answer for **Section B** and **Section C** on the `helaian tambahan' provided by the invigilators.
   Jawab **satu** *soalan daripada* ***Bahagian B*** *dan* **satu** *soalan daripada* ***Bahagian C.***
   Jawapan anda bagi ***Bahagian B*** *dan* ***Bahagian C*** *hendaklah ditulis dalam helaian tambahan yang dibekalkan oleh pengawas peperiksaan.*

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

5. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
   Jika anda hendak menukar sesuatu jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.

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

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

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

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

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

11. Detach **Section B** and **Section C** from this question paper. Tie the `helaian tambahan' together with this question paper and hand in to the invigilator at the end of the examination.
    Ceraikan Bahagian B dan Bahagian C daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.

NO KAD PENGENALAN:

ANGKA GILIRAN:

JABATAN PELAJARAN NEGERI JOHOR

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010

4531/3

PHYSICS
Kertas 3
Ogos/Sept. 2010
1 ½ jam

Satu jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tulis **nombor kad pengenalan** dan **angka giliran** anda pada ruang yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan di bahagian atas dalam bahasa Inggeris. Soalan di bahagian bawah yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.*
5. *Calon dikehendaki membaca maklumat di halaman 2 atau 3.*

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

Kertas soalan ini mengandungi 14 halaman bercetak dan 2 halaman tidak bercetak

Lihat halaman sebelah

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

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

1 An experiment is carried out to investigate the relationship between the height of air inside the tube, h and the frequency of sound wave, f generated. The air pump is used to blow the air on top of the tube so that it will produce a sound. The sound is then detect by a microphone and the pattern of sound wave is displayed on the screen of CRO. The arrangement of the apparatus for this experiment is shown in Diagram 1.1.
Satu eksperimen dijalankan untuk mengkaji perkaitan di antara ketinggian udara dalam tiub ujikaji, h dan frekuensi bunyi, f yang dikeluarkan. Pam udara digunakan untuk meniup udara di atas tiub ujikaji supaya ianya mengeluarkan satu bunyi. Bunyi itu dikesan menggunakan mikrofon dan corak gelombang bunyi dipamerkan pada skrin OSK. Susunan radas eksperimen ini seperti dalam Rajah 1.1.

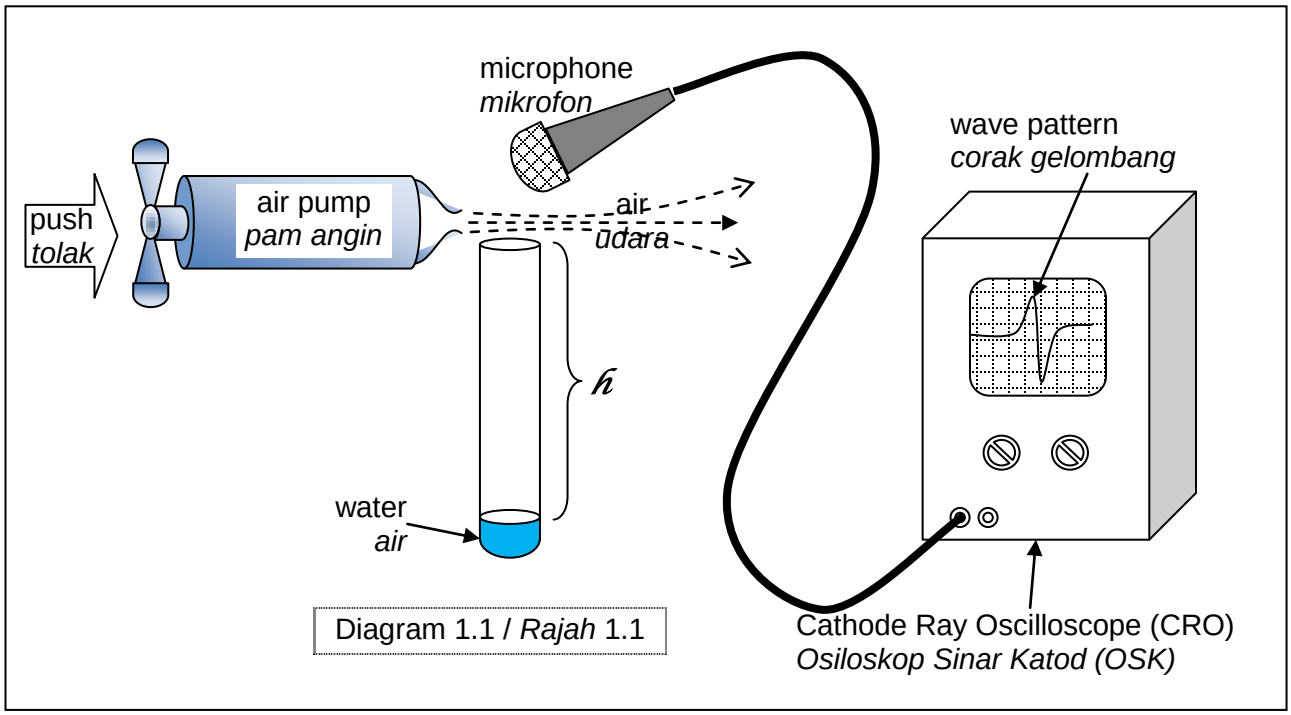


Diagram 1.1 / *Rajah* 1.1

From the pattern of the wave, the period of the wave generated, **T** can be calculated by using the equation,
Daripada corak gelombang, tempoh gelombang terhasil, **T** *boleh dikira menggunakan rumus,*

$$\mathbf{T} = d\,(0.05)\text{s cm}^{-1},$$

where d is the length of one wave in cm.
di mana d ialah panjang satu gelombang dalam cm.

The frequency of the wave, f can be calculated by using equation,
Frekuensi gelombang, f *boleh dikira dengan menggunakan rumus,*

$$f = \frac{1}{\mathrm{T}}$$

Diagram 1.2 shows the example of illustration of the wave pattern from the CRO screen.
Rajah 1.2 *menunjukkan satu contoh ilustrasi corak gelombang dari skrin OSK.*

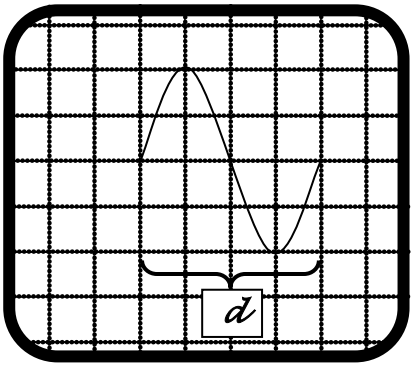


Diagram 1.2 / *Rajah* 1.2

Scale: 1 square = 1cm x 1 cm

d = 4.0 cm

T = 4.0 cm (0.05 s cm^{-1})
= 0.20 s

$f = \frac{1}{T} = \frac{1}{0.2}$ = 5.0 Hz

The experiment begins with the height of the air, h = 30.0 cm and the pattern of the wave produced on the CRO's screen is shown in Diagram 1.3.
The experiment is then repeated by using different height, h = 25.0 cm, 20.0 cm, 15.0 cm and 10.0 cm and the corresponding pattern of wave is shown in Diagram 1.4, 1.5, 1.6 and 1.7.
Eksperimen ini dimulakan dengan ketinggian udara, h = 30.0 *cm dan corak gelombang terhasil ditunjukkan pada skrin OSK dalam Rajah* 1.3.
Eksperimen ini kemudiannya diulang dengan menggunakan ketinggian yang berlainan h= 25.0 *cm,* 20.0 *cm,* 15.0 *cm dan* 10.0 *cm.*

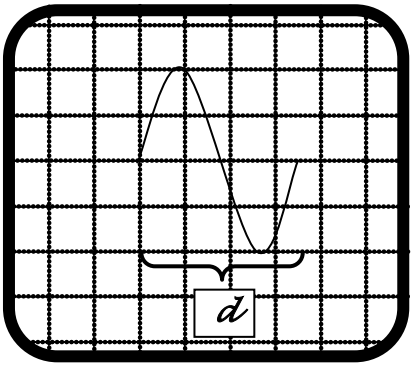


Diagram 1.3 / *Rajah* 1.3

Scale: 1 square = 1cm x 1 cm

h = 30.0 cm

d = ... cm

T =

f = ... Hz

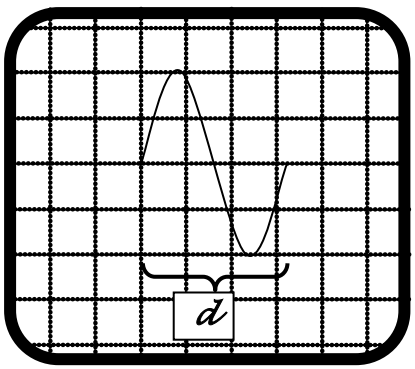


Diagram 1.4 / *Rajah* 1.4

Scale: 1 square = 1cm x 1 cm

h **=** 25.0 cm

d = ... cm

T =

f = ... Hz

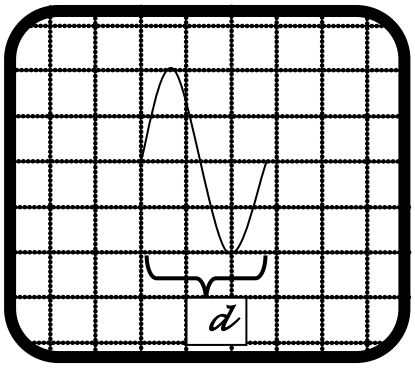


Diagram 1.5 / *Rajah* 1.5

Scale: 1 square = 1cm x 1 cm

h **=** 20.0 cm

d = ... cm

T =

f = ... Hz

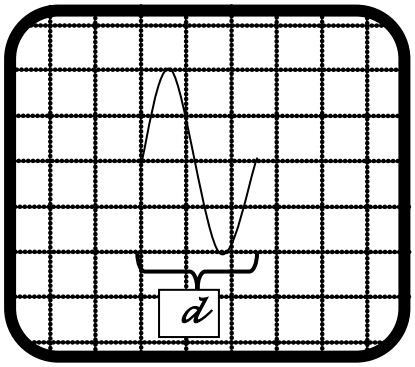


Diagram 1.6 / *Rajah* 1.6

Scale: 1 square = 1cm x 1 cm

h = 15.0 cm

d = ... cm

T =

f = ... Hz

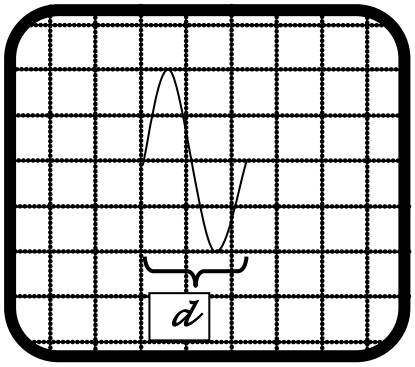


Diagram 1.7 / *Rajah* 1.7

Scale: 1 square = 1cm x 1 cm

h **=** 10.0 cm

d = ... cm

T =

f = ... Hz

(a) For the experiment described on page 2,3 and 4 identify:
Bagi eksperimen yang diterangkan di halaman 2,3 *dan* 4 *kenal pasti:*

(i) The manipulated variable,
Pembolehubah dimanipulasikan,

……

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

(ii) The responding variable,
Pembolehubah bergerak balas,

……

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

(iii) A constant variable.
Satu pembolehubah dimalarkan.

……

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

(b) Based on Diagrams 1.3, 1.4, 1.5, 1.6 and 1.7 on pages 3 and 4, determine the length of one wave, λ, and period of wave, **T**, for the corresponding height of air in the tube, h.
For each value of *h*, calculate the frequency of wave f.
Tabulate your results for λ, T *and* f for every value of h in the space below.

Berdasarkan Rajah 1.3, 1.4, 1.5, 1.6 *dan* 1.7 *di halaman* 3 *dan* 4*, tentukan jarak satu gelombang,* λ *dan tempoh gelombang,* **T** *yang sepadan dengan ketinggian udara,* h*. Bagi setiap nilai* h*, hitungkan frekuensi,* f *bagi dawai itu.*
Jadualkan keputusan anda bagi λ*,* T *dan* f *bagi setiap nilai* h *pada ruang di bawah.*

[6 *marks*]
[6 *markah*]

(c) On the graph paper on Page 6, plot a graph of f against h.
Pada kertas graf di halaman 6, lukiskan graf f *melawan* h.

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

(d) Based on your graph, state the relationship between f and h.
Berdasarkan graf anda, nyatakan hubungan antara f *dan* h.

……

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

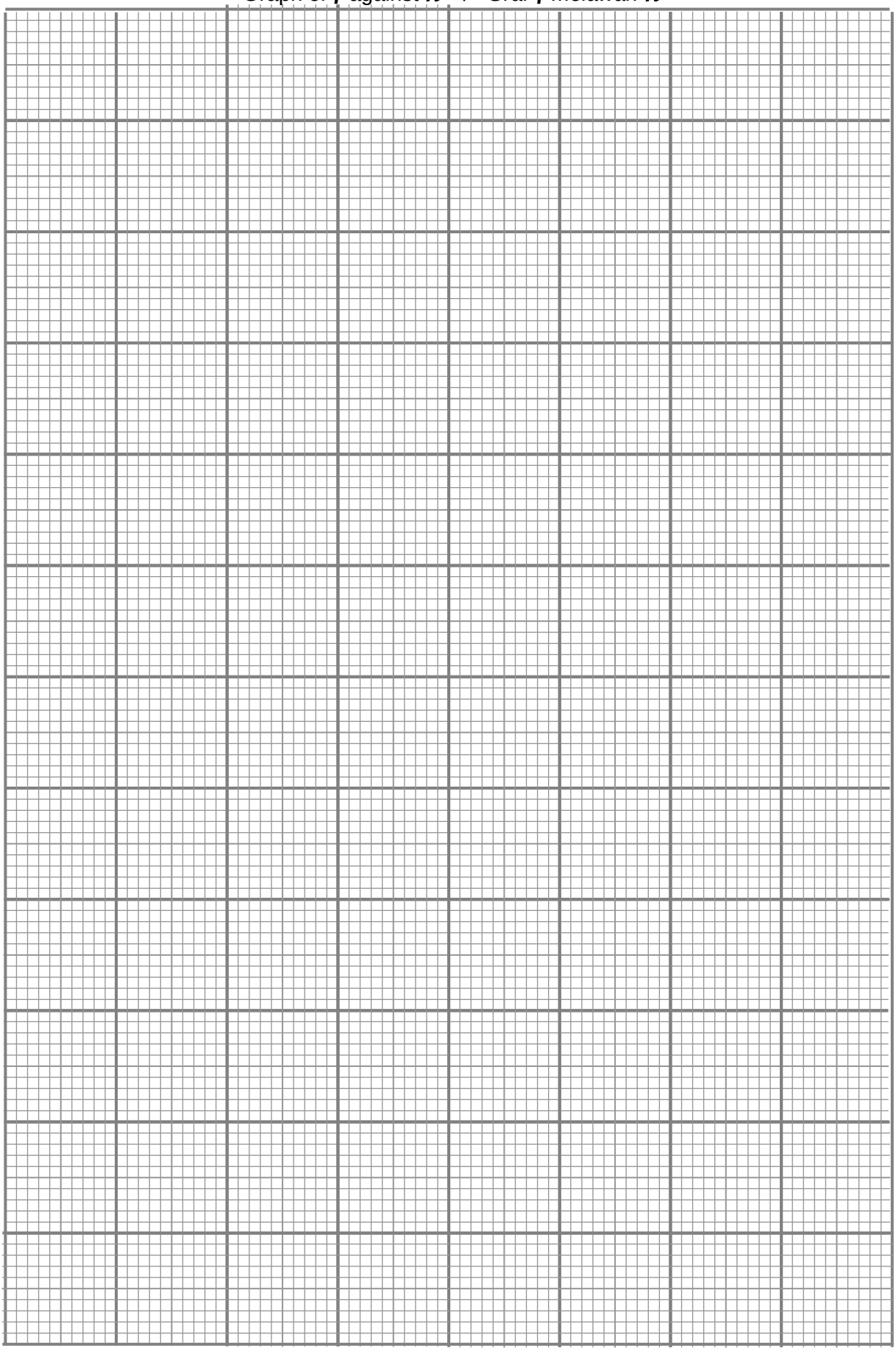
(e) State one precaution that should be taken to obtain accurate readings in this experiment.
Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk mendapatkan bacaan yang lebih jitu dalam eksperimen ini.

……

……

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

Graph of f against h / *Graf* f *melawan* h



2 A student carries out an experiment to investigate the relationship between the pressures in liquid, P and depth, h of liquid X. The result of the experiment is shown in the graph pressure,P against depth,h as in Diagram 2.1 on page 8.
Seorang murid sedang menjalankan satu eksperimen untuk mengkaji hubungan diantara tekanan dalam cecair,P dan kedalaman,h. Keputusan eksperimen ditunjukkan oleh graf tekanan,P melawan kedalaman,h pada Rajah 2.1 *di halaman* 8*.*

(a) Based on the graph in Diagram 2.1
Berdasarkan graf pada rajah 2.1.

(i) What happen to P when h increase?
Apakah yang berlaku kepada P apabila h bertambah?

.....

[1 mark]
[*1markah*]

(ii) Determine the value of P when h = 0.53 m . Show on the graph how you determine value of P.
Tentukan nilai P apabila h = 0.53 *m. Tunjukkan pada graf bagaimana anda menentukan nilai P.*

P = ...

[3 marks]
[*3 markah*]

(b) The pressure in liquid,P is given by the formula,
Tekanan dalam cecair,P diberi oleh rumus,

$$P = h \rho g$$

Where ρ is density of liquid and g is gravity.
Dimana ρ *ialah ketumpatan cecair dan g ialah graviti..*

(i) Calculate the gradient of graph P against h. Show on the graph how you determine the gradient of graph.
Hitungkan kecerunan graf bagi P melawan h. Tunjukkan pada graf bagaimana anda menentukan kecerunan graf.

[3 marks]
[*3 markah*]

Graph of P against h / *Graf P lawan h*

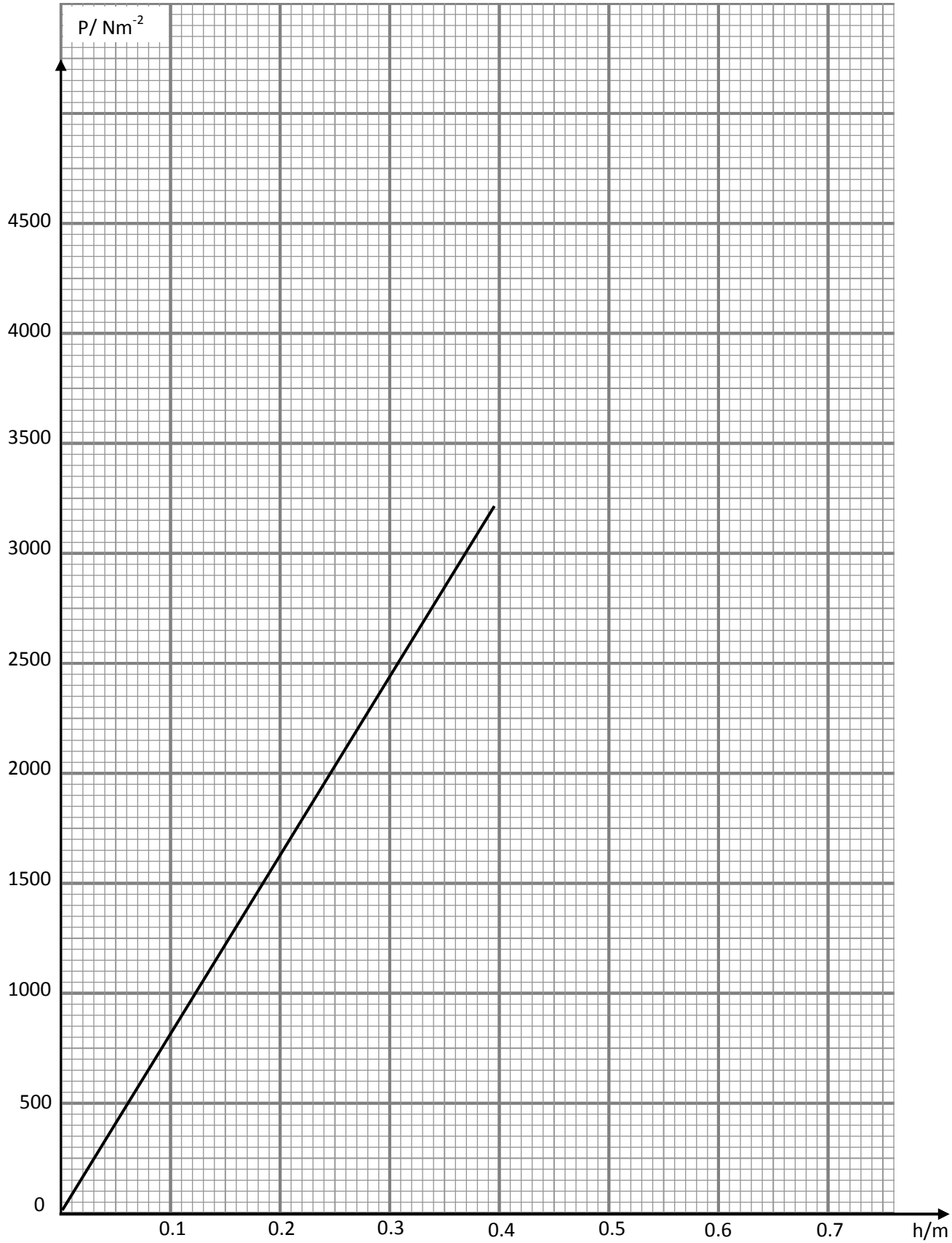


Diagram 2.1
Rajah 2.1

(ii) By using the formula P = hρg and the value obtained in b (i). Calculate the density of liquid X, ρ. Given g = 9.8 N kg^{-1}.
Dengan mengunakan rumus P = hρg *dan nilai kecerunan di b(i). Hitungkan ketmpatan cecair X,* ρ. *Diberi g* = 9.8 *N* kg^{-1}.

[2marks]
[2 *markah*]

(iii) By using the formula P = hρg and value of ρ in b(ii), find the pressure in liquid X at 2 m depth.
Dengan mengunakan rumus P = hρg dan nilai ρ dalam b(ii), kirakan tekanan dalam cecair X pada kedalaman 2 m.

[2 marks]
[2 *markah*]

(a) State one precaution that should be taken during this experiment.
Nyatakan satu langkah berjaga-jaga yang perlu diambil semasa eksperimen ini dilakukan.

……

……
[1 marks]
[1 *markah*]

Section B
Bahagian B

[12 marks]
[12 *markah*]

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

The time suggested to answer this section is 30 minutes.
Masa yang dicadangkan untuk menjawab bahagian ini ialah 30 *minit.*

3 Diagram 3.1 shows a half glass of hot coffee that is left for ten minutes. Diagram 3.2 shows a full glass of similar hot coffee that is left for the same time. It is notice that the hot coffee in Diagram 3.1 cools down faster than Diagram 3.2.
Rajah 3.1 *menunjukkan separuh gelas air kopi panas yang dibiarkan sejuk selama sepuluh minit. Rajah* 3.2 *menunjukkan segelas air kopi yang sama yang juga dibiarkan sejuk dalam tempoh masa yang sama. Didapati bahawa air kopi dalam Rajah* 3.1 *lebih cepat menyejuk daripada Rajah* 3.2*.*

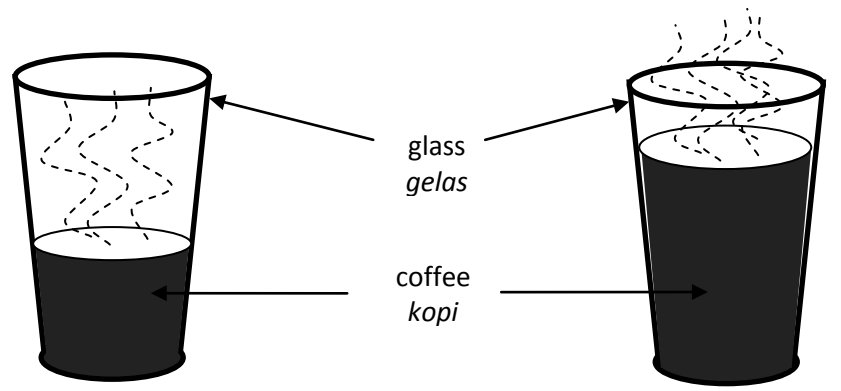


Diagram 3.1
Rajah 3.1

Diagram 3.2
Rajah 3.2

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

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

[1 mark]
[1 *markah*]

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

[1 mark]
[1 *markah*]

(c) With the use of apparatus such as immersion heater, beaker and other apparatus, describe an experiment framework to investigate the hypothesis stated in **3**(b).
Dengan mengunakan alat radas seperti pemanas rendam, bikar dan lain-lain radas, terangkan satu rangka eksperimen untuk menyiasat hipotesis yang anda nyatakan di **3***(b).*

In your description, state clearly the following;
Dalam penerangan anda sila nyata dengan jelas perkara-perkara berikut;

(i) Aim of the experiment.
Tujuan eksperimen.

(ii) Variables in the experiment.
Pembolehubah dalam eksperimen.

(iii) List of apparatus and materials.
Senarai radas dan bahan.

(iv) Arrangement of the apparatus.
Susunan radas.

(v) The procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable.
Prosedur eksperimen termasuk kaedah mengawal pemboleh ubah dimanipulasikan dan kaedah mengukur pemboleh ubah bergerak balas.

(vi) The way you would tabulate the data.
Cara anda akan menjadualkan data.

(vii) The way you would analyse the data.
Cara anda akan menganalisis data.

[10 marks]
[10 *markah*]

4 Diagram 4.1 shows a worker lifting a load using a reel and a pulley. The worker notices that it takes a longer time to lift a heavier load to the top of the building.
Rajah 4.1 *menunjukkan seorang pekerja sedang menaikkan beban dengan menggunakan gelendung dan takal. Pekerja itu mendapati bahawa dia memerlukan masa yang lebih panjang untuk menaikkan beban yang lebih berat ke atas bangunan itu.*

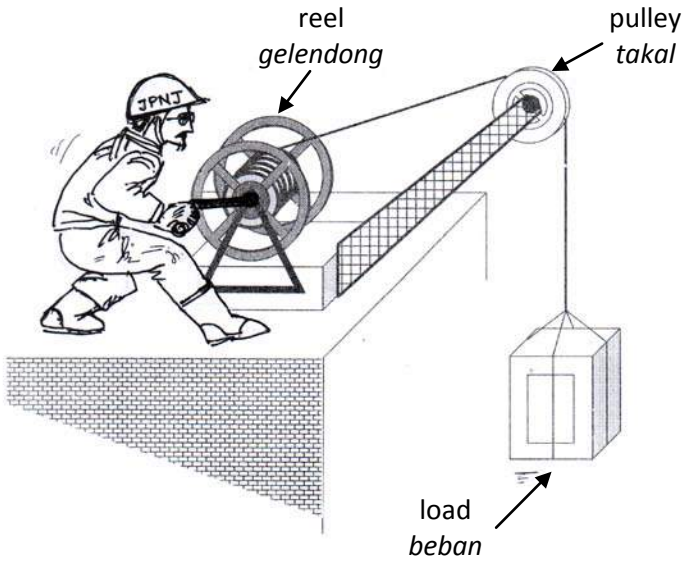


Diagram 4.1
Rajah 4.1

Based on the situation above,
Berdasarkan situasi di atas,

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

[1mark]
[1 *markah*]

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

[1 mark]
[1 *markah*]

(c) With the use of apparatus such as d.c. motor (12V), slotted weight and others apparatus, describe an experiment to investigate the hypothesis stated in **4**(b).
Dengan menggunakan radas seperti motor a.t.(12V), jisim berbeban dan radas lain, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di **4***(b).*

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

(i) Aim of the experiment,
Tujuan eksperimen,

(ii) Variables in the experiment,
Pembolehubah yang terlibat dalam eksperimen,

(iii) List of apparatus and materials,
Senarai radas dan bahan,

(iv) Arrangement of the apparatus,
Susunan radas,

(v) The procedure of the experiment, which includes the method of controlling the manipulated variable and the method of measuring the responding variable,
Procedur eksperimen termasuk kaedah mengawal pembolehubah dimasipulasi dan kaedah mengukur pembolehubah bergerak balas.

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

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

[10 marks]
[10 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of **two** sections: **Section A** and **Section B**
Kertas soalan ini mengandungi **dua** *bahagian:* ***Bahagian A*** *dan* ***Bahagian B***

2. Answer **all** questions in **Section A.** Write your answer for **Section A** in the spaces provided in the question paper.
Jawab **semua** *soalan dalam* ***Bahagian A.*** *Jawapan anda bagi* ***Bahagian A*** *hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*

3. Answer **one** question from **Section B** . Write your answer for **Section B** on the 'helaian tambahan' provided by the invigilators. You may use equations, diagram, table, graphs and other suitable methods to explain your answers.
Jawab ***satu*** *soalan daripada Bahagian B.Tulis jawapan bagi* ***Bahagian B*** *pada helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*

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

5. The diagram in the question are not drawn to scale unless stated.
Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan

6. The marks allocated for each question or part question are shown in brackets.
Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

7. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.
Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru

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

9. You are advised to spend 60 minutes to answer questions in **Section A** and 30 minutes for **Section B** .
Anda dinasihatkan supaya mengambil masa 60 minit untuk menjawab soalan dalam ***Bahagian A*** *dan 30 minit untuk* ***Bahagian B.***

10. Detach **Section B** and **Section C** from this question paper. Tie the `helaian tambahan' together with this question paper and hand in to the invigilator at the end of the examination.
Ceraikan Bahagian B dan Bahagian C daripada kertas soalan ini. Ikat helaian tambahan bersama-sama kertas soalan ini dan serahkan kepada pengawas peperiksaan pada akhir peperiksaan.

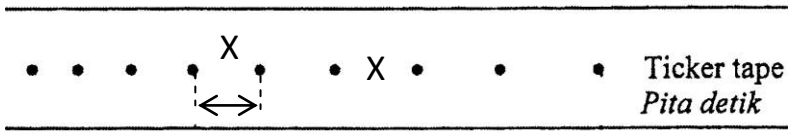
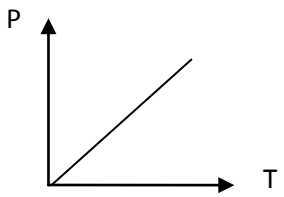
MARKING SCHEME
PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010
PHYSICS PAPER 1

1	C
2	D
3	C
4	C
5	D
6	A
7	C
8	C
9	C
10	B
11	**D**
12	C
13	A
14	C
15	B
16	A
17	B
18	B
19	C
20	D

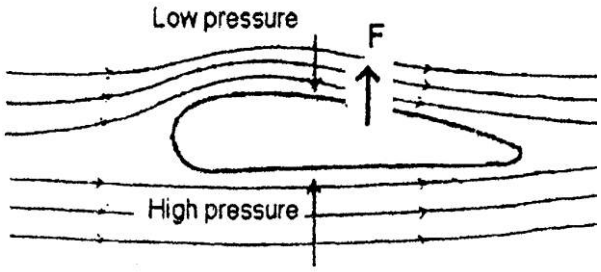
21	A
22	B
23	C
24	A
25	B
26	D
27	A
28	**C**
29	B
30	C
31	A
32	C
33	A
34	B
35	D
36	C
37	B
38	B
39	**C**
40	A

41	B
42	A
43	A
44	C
45	D
46	A
47	D
48	**D**
49	B
50	B

MARKING SCHEME
PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2010
PHYSICS PAPER 2

Questions			Mark Scheme	Sub Mark	Total Mark
1	(a)		**Tick the correct box** Alternating current	1	1
	(b)		**Mark 'X' on any two dots** 	1	1
	(c)		**Correct substitution** $\frac{5}{0.02\ x\ 5}$ or $\frac{5}{0.1}$	1	
			Correct answer and correct unit 50 cm s^{-1} or 0.5 m s^{-1}	1	2
					4
2.	(a)	(i)	**State the value correctly** -273^0C	1	1
		(ii)	**State the name correctly** Absolute zero	1	1
	(b)		**State the physics law correctly** Pressure law	1	1
	(c)		**Sketch the graph correctly** 1 Correct axis 2 Draw a straight line from origin 	1 1	2
					5
3.	(a)		**State the phenomenon correctly** Refraction / Refract	1	1
	(b)		**State the reason correctly** Propagate from deep water to shallow water / move to shallow water	1	1

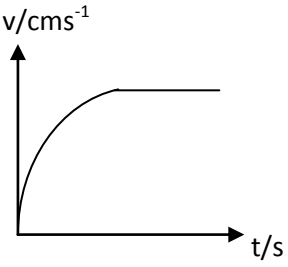
			/ different depth / change velocity / change of wavelength		
	(c)		**Tick the correct box** Speed or wavelength	1	1
	(d)	(i)	**Shows a correct substitution** 2.5 ÷ 1.2	1	
			Answer with correct unit 2.083 Hz/s^{-1}	1	2
		(ii)	**Shows a correct substitution** 1.8 ÷ 2.083	1	
			Correct answer and correct unit 0.869 m	1	2
					7
4.	(a)		**State the name correctly** npn / NPN	1	1
	(b)	(i)	**State the equation correctly** $I_b + I_c = I_e$	1	1
		(ii)	**Shows a correct substitution** $V_2 = \frac{R_2}{R_{2\ +1500}}$ (6)	1	
			Correct answer and correct unit 750 Ω	1	2
	(c)	(i)	**Able to state the condition of the bulb** Not light up	1	
			Able to state the reason Resistance R_2 small // V_2 is small // V_B small	1	2
		(ii)	**State the correct use of transistor** Current amplifier	1	1
					7
5.	(a)		**State the meaning of radioactivity** Unstable nucleus become stable with the emitting radioactive ray / energetic particle / photons / α, β and γ particles. Decay/disintegration of unstable nucleus accompanied by the emission of radioactive rays.	1	1
	(b)	(i)	**State the correct charge of the radioactive** Positive / +	1	1
		(ii)	**State the correct comparison** The voltage of EHT in 5.1 is smaller or vice versa. The deflection in 5.1 is smaller or vice versa.	1 1	1 1
	(c)	(i)	**State the correct relationship** The higher the EHT voltage, the stronger the strength of the electric field / directly proportional	1	1
		(ii)	**State the correct relationship** The stronger the strength of the electric between the plates, the greater deflection of the radioactive emission / directly proportional	1	1

	(d)		**State the correct particle** Helium nuclei / α / ^4_2He	 1	 1
					7
6.	(a)		**State the meaning correctly** One colour / One wavelength / lambda / λ / frequency	1	1
	(b)	(i)	**State the comparison correctly** a_1 is shorter than a_2 // $a_1 < a_2$ // vice versa	1	1
		(ii)	**State the comparison correctly** x_1 is longer (than x_2) // $x_1 > x_2$ // vice versa	 1	 1
	(c)	(i)	**State the relationship correctly** a increases, x decreases // a $\alpha \frac{1}{x}$ // inversely proportional	 1	 1
		(ii)	**State the constant variable correctly** Wavelength / λ / lambda / distance between double slit to screen / D	 1	 1
	(d)		**State the phenomenon correctly** Interference	 1	 1
	(e)		**Explain correctly** Constructive interference correspond to bright fringes Destructive interference correspond to dark fringes	 1 1	 2
					8
7.	(a)		**State the shape correctly** Aerofoil	 1	 1
	(b)	(i)	**Draw the direction of the air flow correctly**	1	1
		(ii)	**Label the region of high and low pressure correctly**	1	1
		(iii)	**Show the direction of the lift force correctly**	1	1
					
	(c)	(i)	**Explain correctly** 1 High velocity of gas produce low pressure at the jet 2 Higher atmospheric pressure pushes the air inside and mix with the gas 3 Enlarge the orifice to allow more air	 1 1 1	 3
		(ii)	**State the modification and the reason correctly** 1 Reduce the diameter of gas tube // reduce the size of the jet 2 Higher velocity / lower pressure	 1 1	 2
		(iii)	**State the physics principle correctly** Bernoulli	 1	 1
					10

8.	(a)	(i)	**State the relationship correctly** Potential difference is directly proportional to current or symbol // V α I // directly proportional	1	1
		(ii)	**State the law correctly** Ohm's law	1	1
	(b)	(i)	**Shows the correct substitution** (0.06 x 10) // (0.05 x 6) // (2 x 3) // (0.4 x 24)	1	
			Shows the correct substitution (0.06 x 10) + (0.05 x 6) + (2 x 3) + (0.4 x 24)	1	
			Answer with correct unit 16.5 kWh // 16500 Wh	1	3
		(ii)	**Shows the correct substitution** 16.5 kWh x RM0.218	1	
			State the days use correctly 16.5 x 0.218 x 30	1	
			State the correct answer RM107.91	1	3
	(c)	(i)	**State the correct meaning** 2500 J of energy is release in one second when connected to 240 V power supply or The cattle use/connected/applied 240 V and released/produced/dissipated/consumed/generate 60 W/60 Joule per second. *Reject:* *The voltage is 240 V and the power is 60 W*	1	1
		(ii)	**Shows the correct substitution** $\frac{2500}{240}$ // 2500 = 240 I	1	
			State the correct answer with the correct unit 10.4167 A // 10.417 A // 10.42 A	1	2
		(iii)	**State the most suitable diameter** S	1	1
					12

SECTION B

9.	(a)	(i)	**State the meaning correctly** Falling under the force of gravity only // falling without any air resistance // falling with acceleration of 9.8 ms^{-2}	1	1
		(ii)	**State the comparison on acceleration correctly** Acceleration in diagram 9.1 is larger than in diagram 9.2 //vice versa / using symbol	1	1
			State the comparison on the rate of change of momentum correctly The rate of change of momentum in diagram 9.1 is more than in diagram 9.2 / vice versa // using symbol	1	1
			State the comparison on the time of impact correctly Time of impact in diagram 9.1 smaller than in diagram 9.2 // vice-	1	1

			versa // using symbol		
			Relate the rate of change of momentum with time correctly The smaller the time of impact the bigger the rate of change of momentum // vice-versa / inversely proportional	1	1
			State the correct relationship between the acceleration and the rate of change of momentum As the acceleration increases, the rate of change of momentum increases // acceleration α the rate of change of momentum // directly proportional	1	1
	(b)	(i)	 1 **State the correct axis** 2 **Draw the correct shape of graph**	1 1	
		(ii)	**State the correct explanation** 1 The forward force = friction // forward thrust = drag 2 The resultant force is zero	1 1	

<table>
<tr><td></td><td>(c)</td><td></td><td>State the suggestions and the explanations correctly
<table>
<tr><td>Smooth surface</td><td>Reduce water resistance
Reduce drag
Reduce resistance</td></tr>
<tr><td>Aerodynamic
Streamline
Sharp end
Acute end
Torpedo</td><td>Reduce water resistance
Reduce drag
Reduce resistance</td></tr>
<tr><td>Low density
Strong material
Tough material
Fiber glass
Reject: Hard, Rubber, Fibre, Aluminium, Plastic, Synthetic, Composit</td><td>Light
Easy to float
Small mass
Not easy to brake</td></tr>
<tr><td>Big
Large
Wide</td><td>Increases the force
Bigger force
Trap more water</td></tr>
<tr><td>Strong
Light
Low density
Carbon composit</td><td>Light
Small mass
Not easy to brake</td></tr>
</table></td><td>1 1

1 1

1 1

1 1</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>20</td></tr>
<tr><td>10</td><td>(a)</td><td></td><td>State the meaning correctly
An electromagnet is a coil wrapped around a soft iron core which will be magnetized when current flow and demagnetized when no current flow // Electromagnet is a temporary magnet</td><td>1</td><td>1</td></tr>
<tr><td></td><td>(b)</td><td></td><td>State the comparison on the amount of iron filings attracted
Amount of iron filings attracted in diagram 10.1 is smaller / vice-versa</td><td>1</td><td rowspan="5">5</td></tr>
<tr><td></td><td></td><td></td><td>State the comparison on the current flow
Current flow in diagram 10.1 is smaller / vice-versa</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>State the comparisons on the magnetic field strength
Magnetic strength in diagram 10.1 is weaker / vice-versa</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>Relate the current flow and the magnetic field strength
The higher the current flow the stronger the magnetic field strength</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td>State the correct relationship between the acceleration and the rate of change of momentum
The stronger the magnetic field the bigger the amount of iron filing attracted / vice-versa</td><td>1</td></tr>
<tr><td></td><td>(c)</td><td></td><td>Explain the electromagnet correctly
1 Current flow through the solenoid, magnetic field is produced</td><td>1</td><td>4</td></tr>
</table>

			2 Soft iron core will be magnetized 3 The scrap metal attracted to the iron core 4 No current flow soft iron demagnetized or metal scrap fall down	1 1 1	
	(d)		**State the suggestions and the explanations correctly** Step down transformer — Reduce/decreases the voltage 240 V to 12 V Ratio primary to secondary is 240 : 12 or 20 : 1 — Reduce / decreases the voltage 240 V to 12 V; To produce 12 V output voltage Soft iron core / Laminated soft iron core — Easy magnetized and demagnetized; Reduce eddy current Connected the diode / Rectification circuit — Convert alternating to direct current/ ac to dc; Current flow in one direction Copper wire — Low resistance; More current flow; Less heat produce	1 1 1 1 1 1 1 1 1 1	10
					20

SECTION C

11.	(a)	(i)	**State the meaning correctly** Cannot be shown/capture/form on screen	 1	1
		(ii)	**State the explanation correctly** 1 Ray from the fish refracted/bending/change direction at B 2 Refraction 3 Light ray from the dragon fly reflected at A 4 Reflection	 1 1 1 1	4
	(b)	(i)	**Shows the correct substitution** $\theta = 90 - 30$	 1	4
			Shows the correct answer $\theta = 60^0$	 1	
			Shows the correct substitution $1.33 = \frac{\sin \propto}{\sin 40}$	 1	
			Shows the correct answer $\alpha = 58.75^0$	 1	

<table>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>(ii)</td><td>State one of the characteristic correctly
Virtual / same size / same distance / laterally inverted</td><td>1</td><td>1</td></tr>
<tr><td></td><td>(c)</td><td></td><td>State suitable characteristics and reason
<table>
<tr><td>Concave mirror</td><td>Converging the reflected ray</td></tr>
<tr><td>Bulb at principle focus</td><td>Reflected ray as parallel beam</td></tr>
<tr><td>Batteries connected in series</td><td>Large current
Large voltage</td></tr>
<tr><td>Copper connecting wire</td><td>Low resistance
Large current</td></tr>
<tr><td>Q</td><td>Concave mirror, bulb at principle focus, batteries in series and copper wire</td></tr>
</table></td><td>1 1

1 1

1 1

1 1

1 1</td><td>10</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>20</td></tr>
<tr><td>12</td><td>(a)</td><td></td><td>State the meaning correctly
Conductivity between a conductor and an insulator</td><td>1</td><td>1</td></tr>
<tr><td></td><td>(b)</td><td></td><td>State the type of conductor correctly
1 n-type semiconductor
2 p-type semiconductor

Explain the difference correctly
1 n-type majority charge carries are electron
2 p-type majority charge carries are holes
3 n-type is doping with pentavalens atoms
4 p-type is doping with trivalens atoms
* Any two answers</td><td>1
1

1
1</td><td>4</td></tr>
</table>

<table>
<tr><td></td><td>(c)</td><td></td><td>State suitable characteristics and reason

<table>
<tr><td>Low resistivity</td><td>More current
Increasing the conductivity
Reduce heat</td></tr>
<tr><td>High melting point</td><td>Not melt easily</td></tr>
<tr><td>3 electron valens</td><td>To make n-type semiconductor</td></tr>
<tr><td>Almost the same size of doping atoms</td><td>Easy to doping
Maintain crystal line structure of the substance</td></tr>
<tr><td>Q</td><td>Low resistivity, high melting point, 3 elctron valens and almost the same size of doping atoms</td></tr>
</table></td><td>1 1

1 1

1 1

1 1

1 1</td><td>10</td></tr>
<tr><td></td><td>(d)</td><td>(i)</td><td>State the process correctly
Thermionic emission</td><td>1</td><td>1</td></tr>
<tr><td></td><td></td><td>(ii)</td><td>Use the correct formula
$eV = \frac{1}{2} mv^2$</td><td>1</td><td rowspan="4">4</td></tr>
<tr><td></td><td></td><td></td><td>Shows the correct conversion of 4kV</td><td rowspan="2">1
1</td></tr>
<tr><td></td><td></td><td></td><td>Shows the correct substitution
$= \sqrt{\frac{2 \times 1.6 \times 10^{-19} \times 4000}{9.1 \times 1010^{-31}}}$</td></tr>
<tr><td></td><td></td><td></td><td>Answer with the correct unit
$3.75 \times 10^7 \ ms^{-1}$</td><td>1</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>20</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

PEPERIKSAAN PERCUBAAN SPM 2009
PHYSICS 3
Question 1

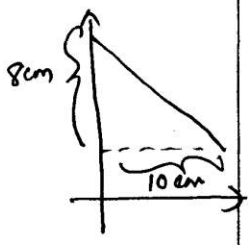
1 (a)	(i)	1	**State the correct manipulated variable** Height // h
	(ii)	1	**State the correct responding variable** ~~Frequency~~ Frequency // ~~Period~~ // wave length
	(iii)	1	**State one fixed variable correctly** Speed of sound / apparatus.
(b)		6	**Tabulate** h, d, T and f Give a tick (✓) based on the following: **A** • *Columns of h,d,T and f* ✓ **B** • *Correct units for h,d,T and f* ✓ **C** • *All values of d correct* ✓ **D** • *All values of T consistent to 2 d.p.* – based on d. ✓ **E** • *All values of f correct to 2 d.p.* ✓ **F** • *All values of h,T and f consistent to 1 or 2 d.p.* ✓

h/cm	d/cm	T/s	f/Hz
30.0	3.6/3.5	0.18	5.56
25.0	3.2	0.16	6.25
20.0	2.8	0.14	7.14
15.0	2.6	0.13	7.69
10.0	2.4	0.12	8.33

Note for **F** : Accept e.c.f. from **D** and **E**

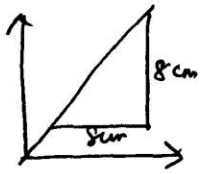
Total marks : 6

(d)		5	**Draw correctly a graph of *f* against *h*** Give a tick (✓) based on the following: **A** • *f* at the *y*-axis, h at the *x*-axis ✓ **B** • Correct units at both axes ✓ **C** • Uniform scale at both axes ✓ **D** • 5 points plotted correctly ✓✓ [**Note : 3 or 4 points plotted correctly** : ✓] **E** • Best straight line ✓ **F** • Minimum size of graph 5 x 4 big squares ✓ (Big square : 2 cm x 2 cm) (From the origin to the last point)



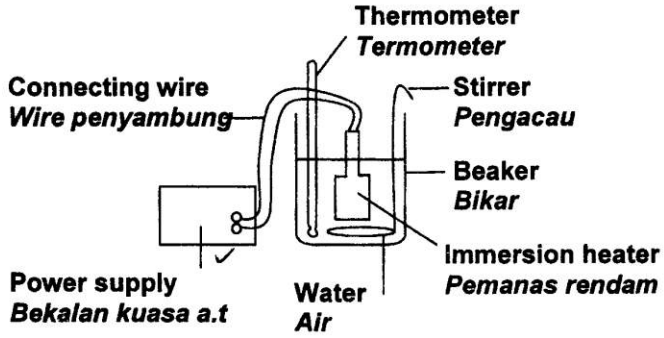
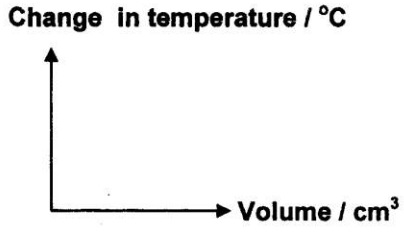
			Marks awarded : Number of ✓ / Marks 7 ✓ / 5 5-6 ✓ / 4 3-4 ✓ / 3 2 ✓ / 2 1 ✓ / 1 **Total marks** : 5
(e)		1	**State the correct relationship based on the straight line drawn** **For a straight line with negative gradient passing with y-axis interception,** Frequency is decrease linearly to height / f is decrease linearly to h
(f)		1	**State one suitable precaution** ~~Correct the zero error by calibrating the zero adjustment of~~ CRO // Position of the pump must be perpendicular to the tiub and near to the top // Repeat experiment and calculate the average // ~~Position of microphone must be at the same distance~~ //All connection of the circuit must be tight
		16	

QUESTION 2

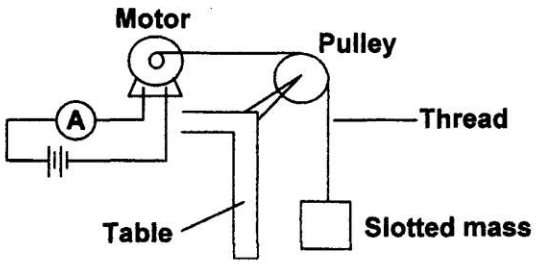
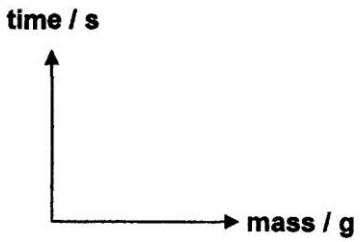
No.	Marking criteria	Mark Sub	Mark Total
2(a)(i)	**State the changes correctly** - increases	1	1
(ii)	**State the value of *P* within the acceptable range** - show graphical extrapolation correctly - show horizontal line from the graph to the P-axis - state the value within 4325 ± 5 ignore unit and decimal places	1 1 1	3
b(i)	**Calculate the gradient, *k*, and state the value of k within the acceptable range** - Draw sufficiently large triangle > 4 sq x 4 sq - Correct substitution (follow candidate's triangle) - State the value / answer with correct unit. $= \frac{4500-0}{0.55}$ $= 8181.82 \text{ N m}^{-3}$ 	1 1 1	3
(ii)	**Calculate the value of density, ρ, by using gradient and state the value of ρ within the acceptable range** - ρg = gradient = 8181.822 $\rho = \frac{8181.82}{9.8}$ $= 834.88 \text{ kg m}^{-3}$	 1 1	2
(iii)	**Calculate the value of P within the acceptable range** $P = h\rho g = (2)(834.88)(9.8)$ = 16 363.64 (w/o unit)	 1 1	2

(c)	**State one correct precautions** - The eye must be perpendicular to the scale of the metre rule to avoid parallax error. - Repeat ~~readings~~ the experiment and calculate average. - Do not let the bubble inside the tube	1	1
		Total	12

the rate of change in temp.

3(a)	**The change in temperature of water depends on its volume / mass**	**1 mark**
(b)	**When the volume / mass increases, change in temperature decreases**	**1 mark**
(c)(i)	**To investigate the relationship between the volume / mass and temperature**	**1 mark**
(ii)	**Manipulated variable : volume / mass of water** ✗ 1 **Responding variable : change in temperature** ✓ 1 **Fixed variable : heating time / power of immersion heater**	**1 mark** **1 mark**
(iii)	**Power supply, immersion heater, connecting wires, beaker, stirrer, thermometer, water, measuring cylinder / balance , heater and stop watch.**	**1 mark**
(iv)		**1 mark**
(v) or symbol	**1. 20 cm³//g of water is heated by an immersion heater for 5 minutes.** **2. Final temperature is recorded after 5 minutes.** the change in temp. calculated **3. Repeat step 1 and 2 using 40 cm³, 60 cm³, 80 cm³ and 100 cm³ of water** or use a symbol. / 4 times.	**1 mark** **1 mark** **1 mark**
(vi)		**1 mark**
(vii)		**1 mark**
	Total	**12 marks**

Volume / cm³ // Mass/g	Change Temperature / °C
20	
40	
60	
80	
100	

4(a)	The time to reach the top depends on the mass // The current supply depends on the mass	1 mark
(b)	When the mass increases, time / current increases	1 mark
(c)(i)	To investigate the relationship between the mass and time / current	1 mark
(ii)	Manipulated variable : mass Responding variable : time / current Fixed variable : height	1 mark 1 mark
(iii)	Battery / DC power supply, slotted mass, connecting wires, 12V DC motor, pulley with clamp, ammeter / stop watch, thread.	1 mark
(iv)		1 mark
(v)	1. 20 g of slotted mass is lifted by a motor to a height of 1 m. 2. The time taken to reach the top is recorded // The ammeter reading is recorded. 3. Repeat step 1 and 2 using 40 g, 60 g, 80 g and 100 g of slotted mass	1 mark 1 mark 1 mark
(vi)	<table><tr><th>mass / g</th><th>time / s / current</th></tr><tr><td>20</td><td></td></tr><tr><td>40</td><td></td></tr><tr><td>60</td><td></td></tr><tr><td>80</td><td></td></tr><tr><td>100</td><td></td></tr></table>	1 mark
(vii)		1 mark
	Total	12 marks