4531/1
Physics
Paper 1
September
2010
1 ¼ hours

MAKTAB RENDAH SAINS MARA

SIJIL PELAJARAN MALAYSIA
TRIAL EXAMINATION 2010

PHYSICS

Paper 1

One hour and fifteen minutes

4531-1

DO NOT OPEN THIS QUESTION BOOKLET UNTIL TOLD TO DO SO

1. This paper is written in English and bahasa Melayu
   Kertas soalan ini adalah dalam dwibahasa.

2. The question in English is written on top while the bahasa Melayu version is below.
   Soalan di atas adalah dalam bahasa Inggeris dan soalan dalam bahasa Melayu terdapat di bawahnya.

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

This question booklet consists of 46 printed pages

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, $P = \frac{energy}{time}$

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

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

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

28. Atmospheric pressure at sea level / *tekanan atmosfera pada aras laut* = $1 \times 10^5 \; Pa$

29. Speed of light/*Halaju cahaya,* $c = 3.0 \times 10^8 \; m \; s^{-1}$

1 Which of the following is a scalar quantity?

Yang manakah di antara berikut adalah kuantiti skalar?

A Displacement
Sesaran

B Momentum
Momentum

C Force
Daya

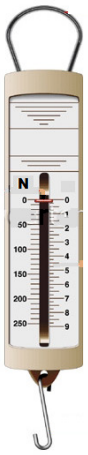
D Work
Kerja

2 Which of the following measuring instruments measures a derived quantity?

Yang manakah antara alat pengukur berikut mengukur satu kuantiti terbitan?

A

B



C

D

3 Which of the following is **not** an experimental procedure?

*Manakah di antara berikut **bukan** prosedur eksperimen?*

A Make a hypothesis
Membuat suatu hipotesis

B Control the manipulated variable
Mengawal pembolehubah manipulasi

C Measure the responding variable
Mengukur pembolehubah bergerakbalas

D Repeat the experiment with different values of manipulated variable
Mengulangi eksperimen dengan beberapa nilai pembolehubah manipulasi yang berbeza

4 Diagram 1 shows a car moving at 20 m s^{-1} slowing down when it approaches a red traffic light. The car travels 50 m before it stops completely.

Rajah 1 menunjukkan sebuah kereta bergerak pada kelajuan 20 m s^{-1} memperlahankan gerakan apabila menghampiri lampu isyarat merah. Kereta itu bergerak sejauh 50 m sebelum berhenti sepenuhnya.

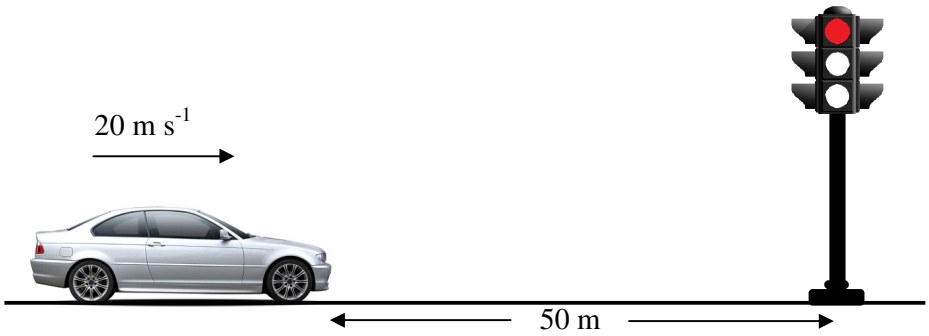


Diagram 1
Rajah 1

What is the acceleration of the car?

Apakah pecutan kereta itu?

A 4.0 m s^{-2}

B 8.0 m s^{-2}

C - 4.0 m s^{-2}

D - 8.0 m s^{-2}

5 Diagram 2 shows a Sumo wrestler with a mass of 350 kg.

Rajah 2 menunjukkan seorang ahli gusti Sumo yang berjisim 350 kg.

Diagram 2
Rajah 2

What is the advantage of the wrestler being heavy?

Apakah kelebihan ahli gusti itu berbadan berat?

A He is more stable
Dia adalah lebih stabil

B He has a large inertia
Dia mempunyai inersia yang besar

C He has a large momentum
Dia mempunyai momentum yang besar.

D He will exert a large impulsive force on impact
Dia akan mengenakan daya impuls yang besar bila berlanggar.

6 Diagram 3 shows a cross-section of a mortar and pestle placed on a piece of cloth.

Rajah 3 menunjukkan keratan rentas sebiji lesung batu dan antan yang diletakkan di atas sehelai kain.

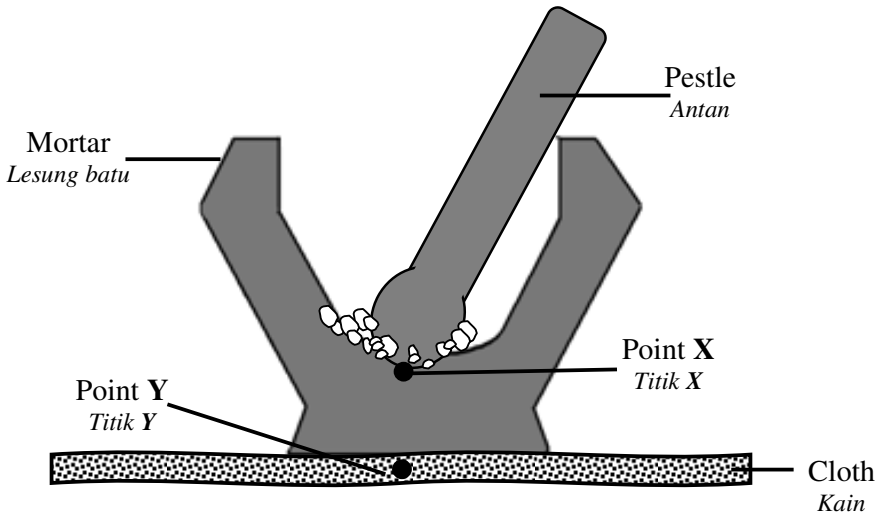


Diagram 3
Rajah 3

Which of the following correctly explains the impulsive force that acts at point **X** and **Y** when the pestle hits the mortar?

*Manakah antara berikut menjelaskan dengan betul tentang daya impuls yang bertindak ke atas titik **X** dan **Y** bila antan menghentam lesung?*

	At point **X** *Di titik **X***	At point **Y** *Di titik **Y***
A	Large *Besar*	Small *Kecil*
B	Large *Besar*	Large *Besar*
C	Small *Kecil*	Small *Kecil*
D	Small *Kecil*	Large *Besar*

7 Diagram 4 shows two steel ball bearings, P and Q with mass m and $2m$ respectively.

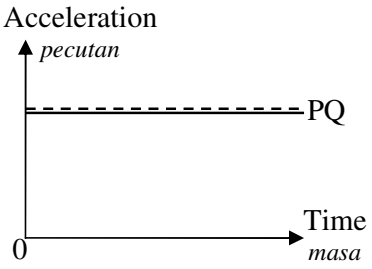
Rajah 4 menunjukkan dua bebola besi P dan Q berjisim m dan 2m masing-masing.

Diagram 4
Rajah 4

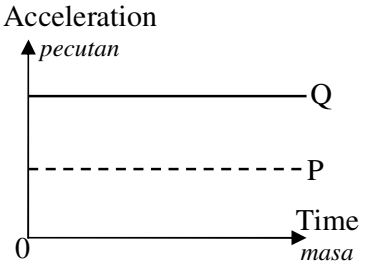
Which is the **correct** acceleration-time graph for the motion of P and Q if they are dropped from a tall building?

*Graf pecutan-masa yang manakah **betul** mengenai pergerakan P dan Q jika keduanya dijatuhkan dari bangunan tinggi?*

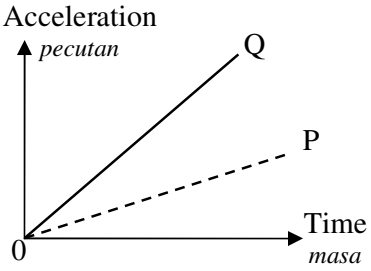
A



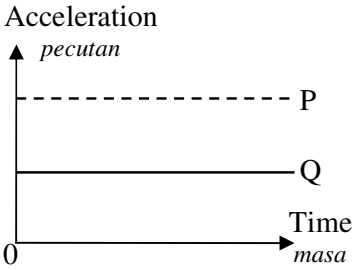
B



C



D



8 Diagram 5 shows a stationary trolley of mass 1.4 kg on an inclined plane.

Rajah 5 menunjukkan sebuah troli pegun yang berjisim 1.4 kg di atas sebuah satah condong.

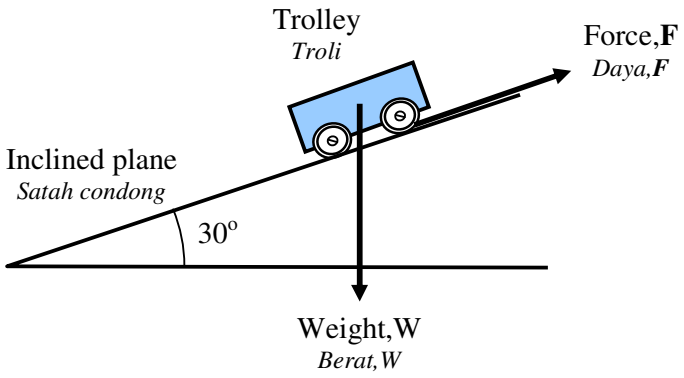


Diagram 5
Rajah 5

What is the magnitude of the force, **F** ?

*Apakah magnitud daya, **F**?*

A 7.0 N

B 12.7 N

C 16.2 N

D 28.0 N

9 Diagram 6 shows Amin getting ready to skate from a height of 5.0 m along a smooth track in an X-treme game competition.

Rajah 6 menunjukkan Amin sedang bersedia untuk meluncur dari ketinggian 5.0 m sepanjang landasan licin dalam satu pertandingan permainan X-treme.

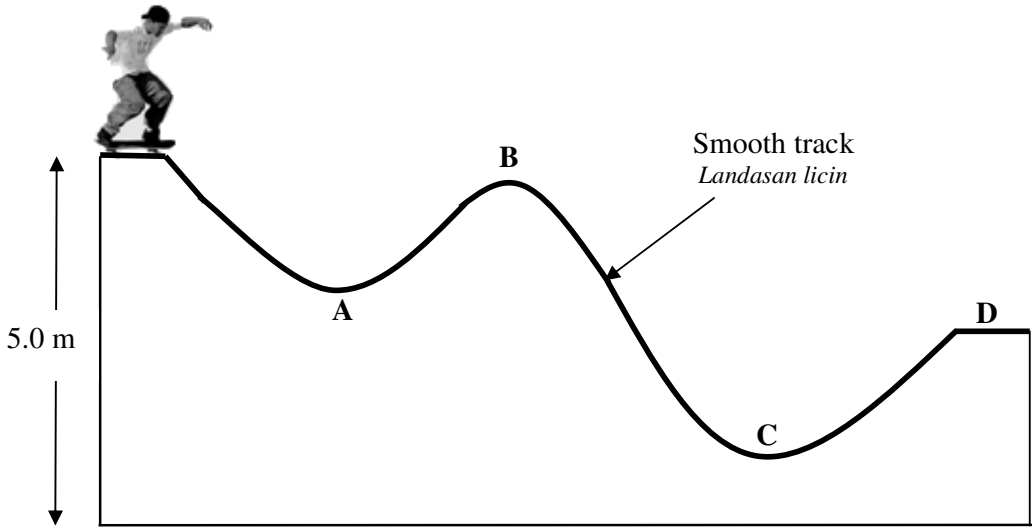


Diagram 6
Rajah 6

At which position does his velocity become maximum?

Pada kedudukan manakah halajunya menjadi maksimum?

10 Diagram 7(a) shows a spring without any load. When a load of mass *m* is placed on the spring, the compression of the spring is *x* cm.

Rajah 7(a) menunjukkan sebuah spring tanpa beban. Apabila suatu beban berjisim ,m diletakkan di atasnya, mampatan spring ialah x cm.

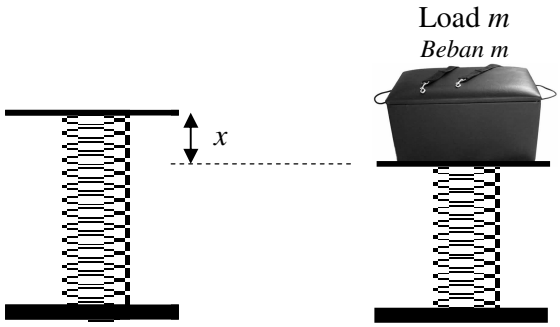


Diagram 7(a)
Rajah 7(a)

Diagram 7(b)
Rajah 7(b)

Diagram 7(c) shows two springs similar to the spring in (a), arranged in parallel and bearing a load of mass 2*m.*

Rajah 7(c) menunjukkan dua spring yang serupa dengan spring di (a) disusun secara selari dan beban berjisim 2m diletakkan di atasnya.

Diagram 7(c)
Rajah 7(c)

What is the compression of the spring in Diagram 7(c)?

Apakah mampatan spring dalam rajah 7(c)?

A ½ *x*

B *x*

C 2*x*

D 4*x*

11 Four vases of the same mass but of different shapes are placed on a table.

Empat buah pasu bunga yang berjisim sama tetapi mempunyai bentuk berbeza diletakkan di atas meja.

Which vase exerts the greatest pressure on the table?

Pasu bunga yang manakah mengenakan tekanan paling tinggi ke atas meja?

12 Diagram 8 shows some fishes in an aquarium.

Rajah 8 menunjukkan beberapa ekor ikan di dalam akuarium.

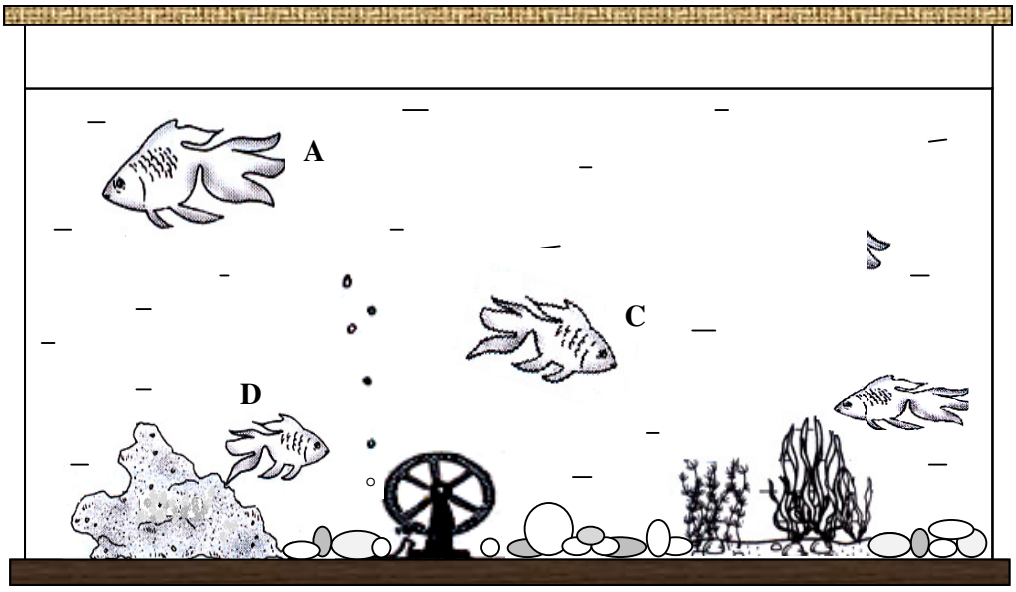


Diagram 8
Rajah 8

Which fish experiences the lowest pressure?

Ikan yang manakah mengalami tekanan paling rendah?

13 Diagram 9 shows a manometer connected to a gas supply.

Rajah 9 menunjukkan sebuah manometer disambung kepada suatu bekalan gas.

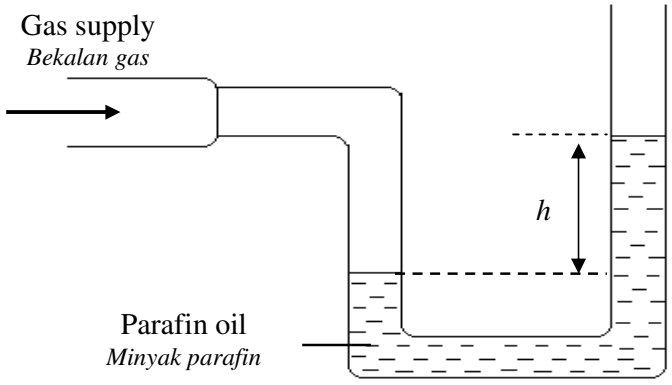


Diagram 9
Rajah 9

Which statement is **correct**?
[ρ = density of paraffin oil; g = gravitational field strength]

*Penyataan yang manakah **betul**?*
[ρ = ketumpatan minyak parafin; g = kekuatan medan graviti]

A Gas pressure = ρhg
Tekanan gas = ρhg

B Gas pressure + Atmospheric pressure = ρhg
Tekanan gas + Tekanan atmosfera = ρhg

C Gas pressure + ρhg = Atmospheric pressure
Tekanan gas + ρhg = Tekanan atmosfera

D Gas pressure = Atmospheric pressure + ρhg
Tekanan gas = Tekanan atmosfera + ρhg

14 Diagram 10 shows a man using a suction pump to lift the windscreen of a car.

Rajah 10 menunjukkan seorang lelaki sedang menggunakan pam penyedut untuk mengangkat cermin hadapan sebuah kereta.

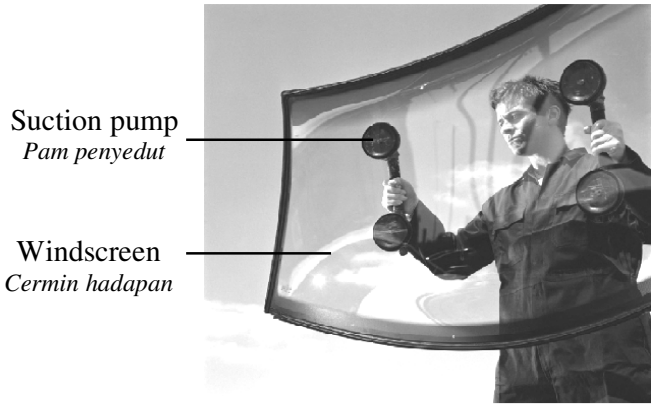


Diagram 10
Rajah 10

Why does the windscreen stick to the suction pump?

Mengapakah cermin itu melekat pada pam penyedut?

A Atmospheric pressure > pressure inside the suction pump
Tekanan atmosfera > tekanan di dalam pam penyedut

B Atmospheric pressure = pressure inside the suction pump
Tekanan atmosfera = tekanan di dalam pam penyedut

C Atmospheric pressure < pressure inside the suction pump
Tekanan atmosfera adalah < tekanan di dalam pam penyedut

15 Diagram 11 shows a simple hydraulic system which consists of piston A and piston B. F_A and F_B are the forces which act on the piston.

Rajah 11 menunjukkan suatu sistem hidraulik yang terdiri daripada omboh A dan omboh B. F_A dan F_B adalah daya-daya yang bertindak ke atas omboh

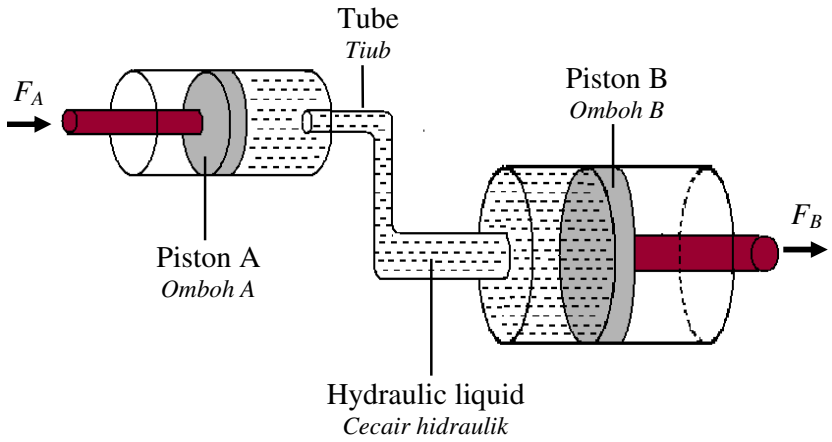


Diagram 11
Rajah 11

Which comparison is **correct**?

*Perbandingan yang manakah **betul**?*

A The forces on piston A and on piston B are equal
Tekanan pada omboh A dan omboh B adalah sama

B The pressures on piston A and on piston B are equal
Tekanan pada omboh A dan omboh B adalah sama

C The distances moved by piston A and by piston B are equal
Jarak pergerakan omboh A dan omboh B adalah sama

D The volumes of liquid displaced at piston A and at piston B are equal
Isipadu cecair yang disesarkan pada omboh A dan B adalah sama

16 Diagram 12 shows a hot air balloon which is stationary in the air.

Rajah 12 menunjukkan sebuah belon udara panas yang pegun di udara.

Diagram 12
Rajah 12

Which of the following will **not** make the balloon rise higher?

*Manakah antara berikut **tidak** akan membuatkan belon itu naik lebih tinggi?*

A Replace the air with helium
Gantikan udara dengan gas helium

B Reduce the weight of the balloon
Mengurangkan berat belon

C Increase the temperature of the hot air
Tingkatkan suhu udara panas

D Use a higher density material for the balloon
Gunakan belon bahan yang lebih tinggi ketumpatan untuk belon

17 An aeroplane takes off with the help of an upward lift.

Sebuah kapal terbang berlepas dengan bantuan daya angkatan.

Which principle explains this situation?

Prinsip manakah menerangkan situasi di atas?

A Bernoulli's principle
Prinsip Bernoulli

B Archimedes' principle
Prinsip Archimedes

C Pascal's principle
Prinsip Pascal

D Charles' principle
Prinsip Charles

18 Some ice cubes are added into a cup of hot coffee. The graph shown in Diagram 13 shows the temperature change of the coffee.

Beberapa ketul ais dimasukkan ke dalam secawan kopi panas. Graf yang ditunjukkan dalam Rajah 13 menunjukkan perubahan suhu air kopi tersebut.

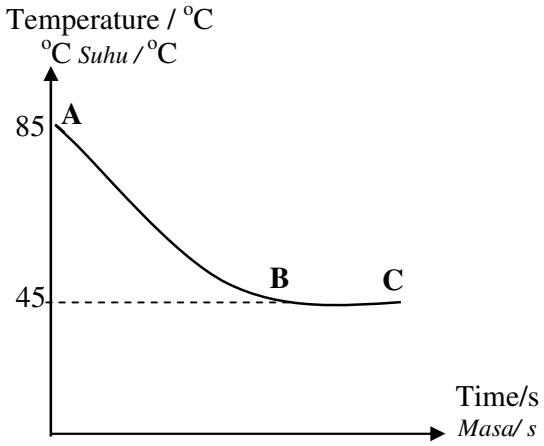


Diagram 13
Rajah 13

What is the physics concept which explains the phase labeled BC?

Apakah konsep fizik yang menerangkan fasa berlabel BC?

A Specific heat capacity
Muatan haba tentu

B Thermal equilibrium
Keseimbangan terma

C Specific latent heat of fusion
Haba pendam tentu pelakuran

D Specific latent heat of vaporization
Haba pendam tentu pengewapan

19 Three types of liquid **A, B and C** of equal mass are heated at a constant rate. Diagram 14 shows the temperature-time graph of the three liquids.

*Tiga jenis cecair **A, B dan C** yang berjisim sama dipanaskan pada kadar yang sama. Rajah 14 menunjukkan graf suhu melawan masa untuk ketiga-tiga cecair tersebut.*

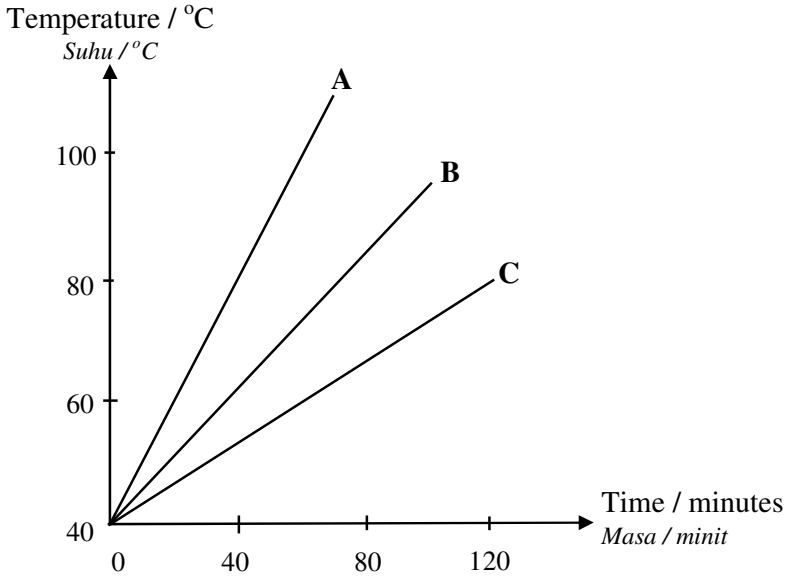


Diagram 14
Rajah 14

Which liquid has the largest specific heat capacity?

Cecair manakah mempunyai muatan haba tentu yang paling tinggi?

20 Diagram 15 shows an electric kettle which is used to boil some water.

Rajah 15 menunjukkan sebuah cerek elektrik digunakan untuk memasak air.

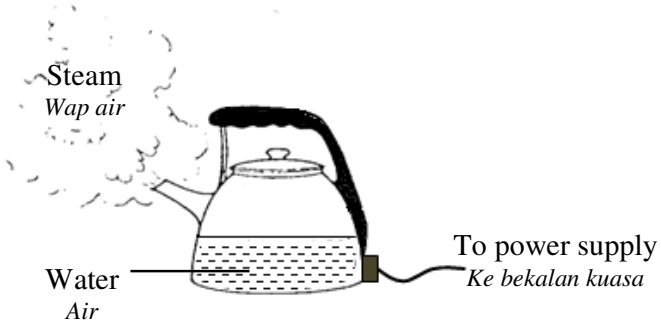


Diagram 15
Rajah 15

When the water boils, the energy supplied is used to

Apabila air mendidih, tenaga yang dibekalkan digunakan untuk

A increase the kinetic energy of water particles
meningkatkan tenaga kinetic zarah-zarah air

B break the bonds between water particles
memutuskan ikatan antara zarah-zarah air

C increase the vibrations of water particles
meningkatkan getaran zarah-zarah air

D increase the distance between water particles
meningkatkan jarak di antara zarah-zarah air

21 Diagram 16 shows a girl holding a balloon containing 20 cm^3 of air at a temperature of 20°C.

Rajah 16 menunjukkan seorang budak perempuan memegang belon yang mengandungi 20 cm^3 udara pada suhu 20°C.

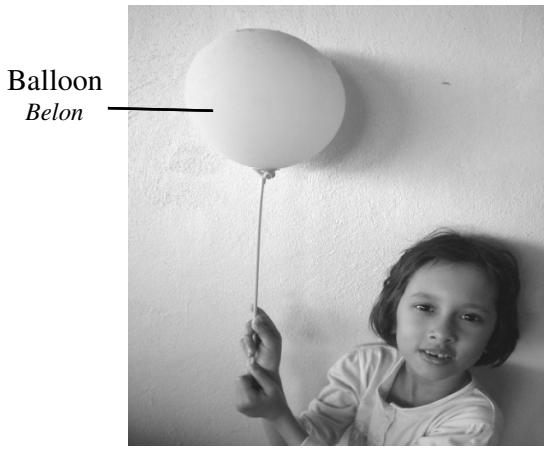


Diagram 16
Rajah 16

What will happen to the volume of the air in the balloon if the balloon is brought outdoors where the temperature is 32°C?

Apakah yang akan berlaku pada isipadu udara dalam belon jika belon itu di bawa keluar di mana suhu persekitaran ialah 32°C ?

A Decreases
Berkurang

B Increases
Bertambah

C Remains unchanged
Tidak berubah

22 Diagram 17 shows the different placements of a capillary tube where air is trapped using 5 cm of mercury. P_1 , P_2 and P_3 are the pressures of the trapped air.

Rajah 17 menunjukkan kedudukan berbeza sebuah tiub kapilari di mana udara diperangkap oleh merkuri. P_1 , P_2 *dan* P_3 *adalah tekanan udara yang terperangkap.*

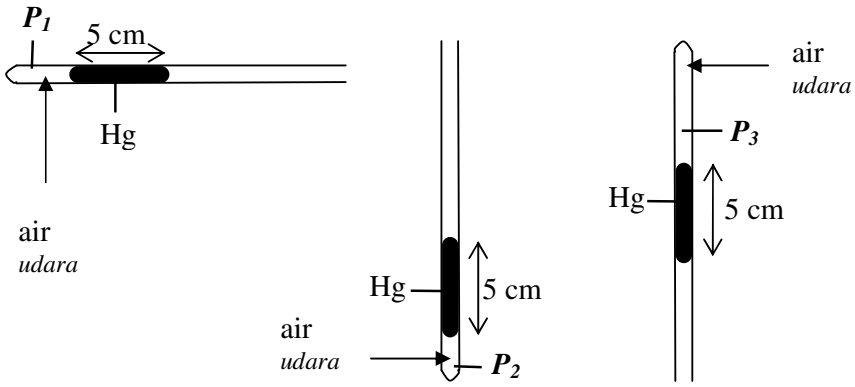


Diagram 17
Rajah 17

Which comparison is c**orrect**?

*Perbandingan manakah yang **betul**?*

A $P_1 = P_2 = P_3$

B $P_3 > P_2 > P_1$

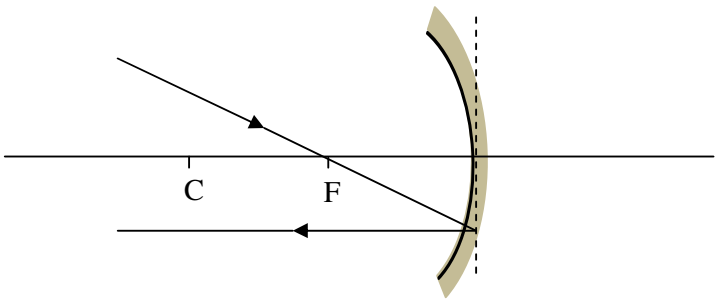
C $P_2 > P_1 > P_3$

D $P_1 < P_3 < P_2$

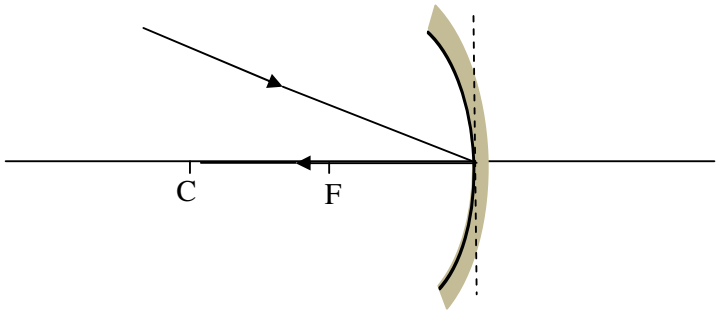
23 Which ray diagram is **correct** for a concave mirror?

*Rajah sinar manakah **betul** bagi cermin cekung?*

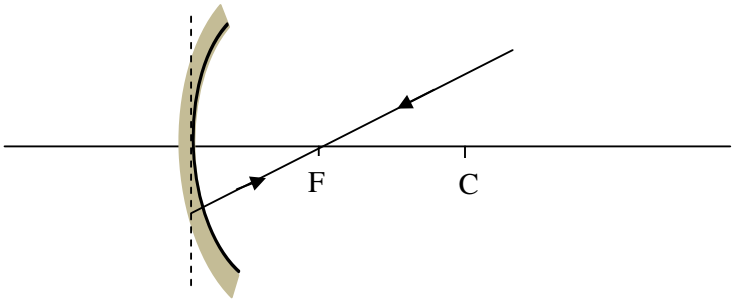
A



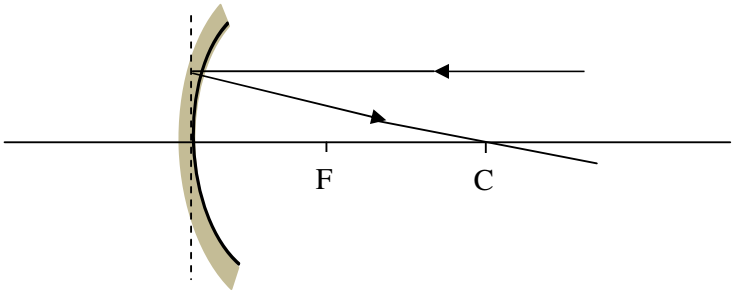
B



C



D



24 Diagram 18 shows a ray of light passing through a glass prism.

Rajah 18 menunjukkan satu sinar cahaya melalui satu prisma kaca.

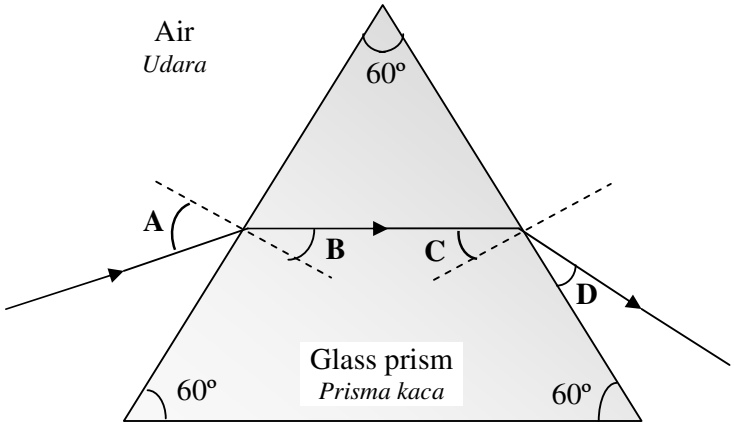


Diagram 18
Rajah 18

Which of the angles **A**, **B**, **C** or **D** shows the angle of refraction?

*Antara sudut **A, B, C** dan **D**, yang manakah menunjukkan sudut pembiasan?*

25 Diagram 19 shows a light ray travelling from medium Y to Medium X with an angle of incidence of 42°

Rajah 19 menunjukkan sinar cahaya merambat dari medium Y ke medium X dengan sudut tuju 42°.

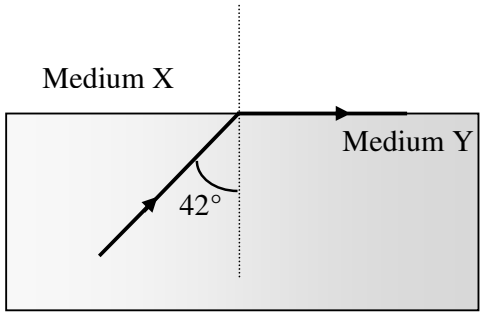
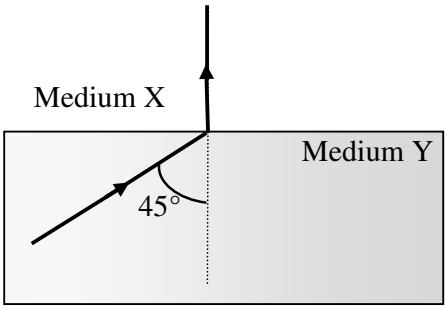


Diagram 19
Rajah 19

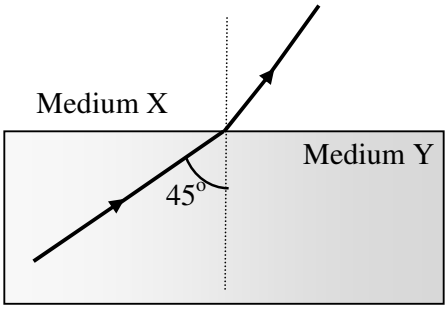
If the angle of incidence is increased to 45°,which diagram shows the **correct** pathway?

*Jika sudut tuju dibesarkan menjadi 45°, rajah manakah menunjukkan laluan cahaya yang **betul**?*

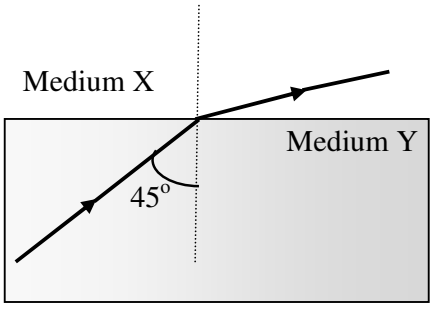
A



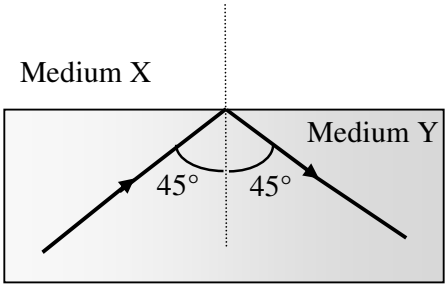
B



C



D



26 Diagram 20 shows a positioning of bulb-lens-screen which produces a sharp image on the screen.

Rajah 20 menunjukkan kedudukan mentol-kanta-skrin dan jarak pemisahan yang menghasilkan satu imej yang tajam di atas skrin .

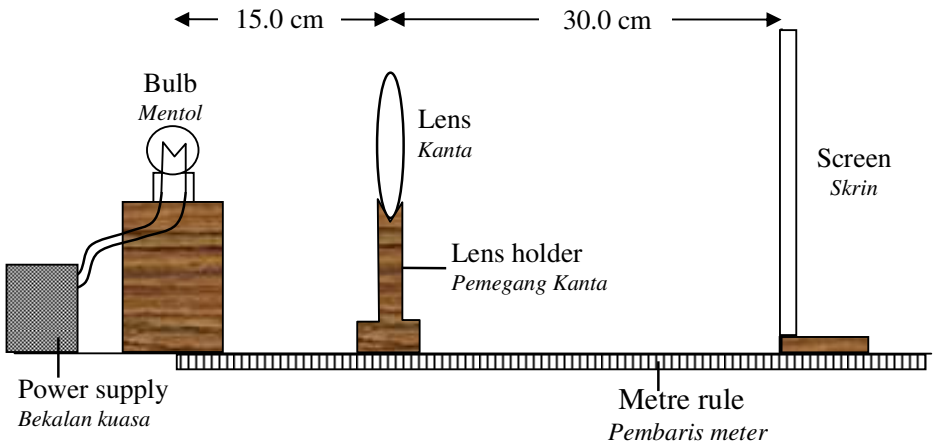


Diagram 20
Rajah 20

Calculate the focal length of the lens.

Kirakan panjang fokus kanta.

A 2.0 cm

B 10.0 cm

C 15.0 cm

D 45.0 cm

27 Diagram 21 shows a spring with a slotted weight of mass *m* that is allowed to oscillate. The mass *m* is later replaced with the mass 2*m*.

Rajah 21 menunjukkan satu spring dengan jisim m dan dibiarkan berayun. Jisim m kemudian digantikan dengan jisim 2m.

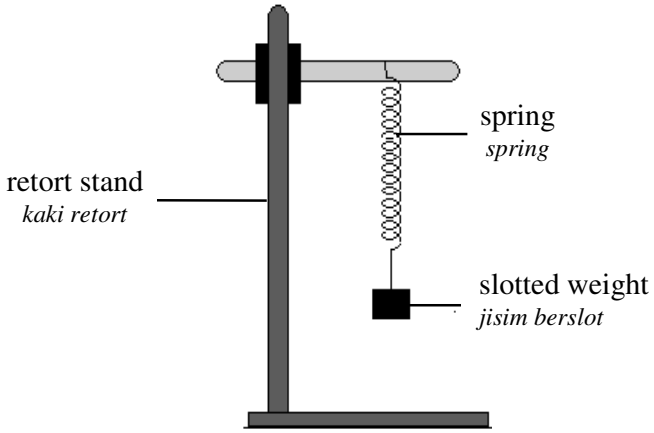
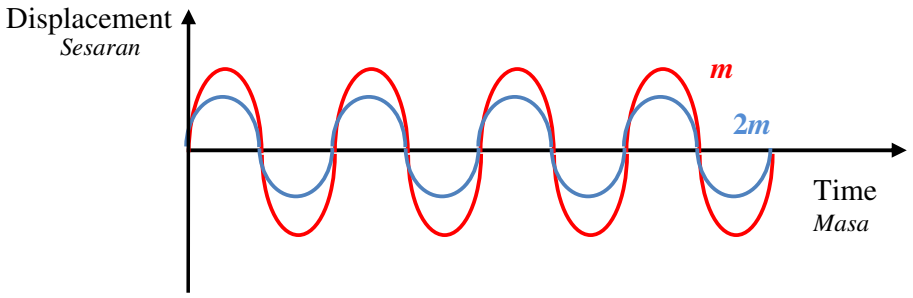


Diagram 21
Rajah 21

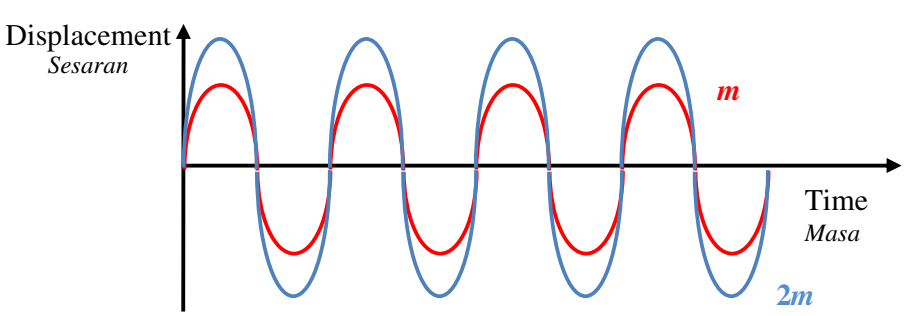
Which of the following shows the **correct** displacement-time graph?

*Manakah di antara berikut menunjukkan graf sesaran-masa yang **betul**?*

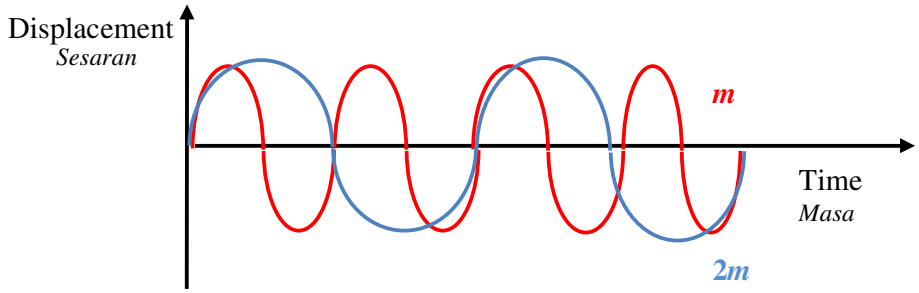
A


Displacement
Sesaran
m
2m
Time
Masa

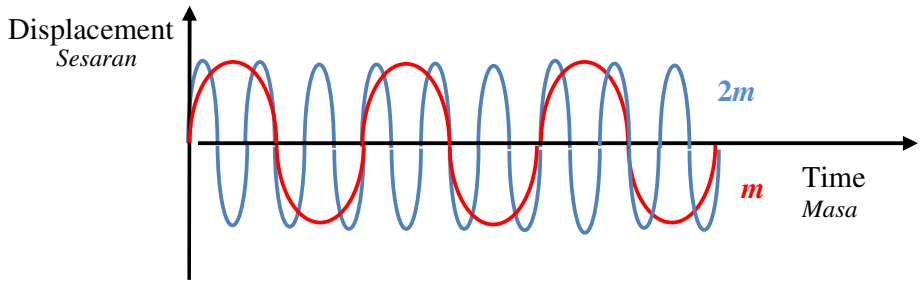
B


Displacement
Sesaran
m
Time
Masa
2m

C


Displacement
Sesaran
m
Time
Masa
2m

D


Displacement
Sesaran
2m
m
Time
Masa

28 Diagram 22 shows a plane wave moving towards a convex reflector placed in the ripple tank .

Rajah 22 menunjukkan gelombang satah merambat ke arah pemantul cembung yang terletak di dalam tangki riak.

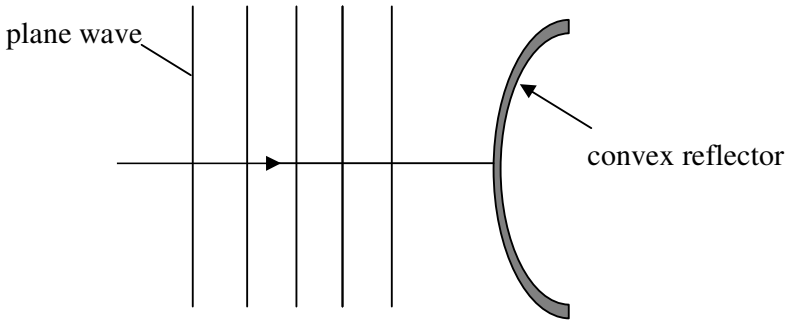
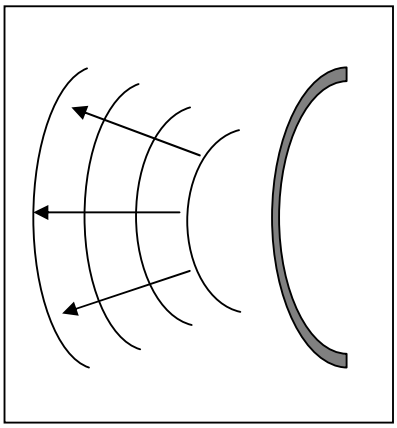


Diagram 22
Rajah 22

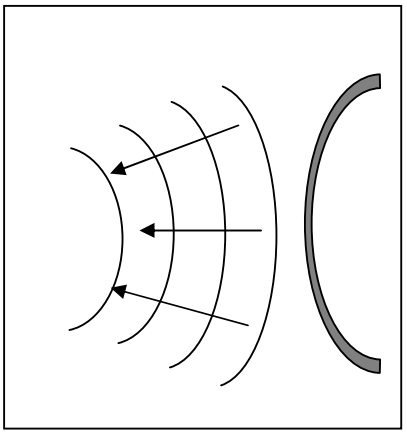
Which diagram show the **correct** reflected wave pattern?

*Rajah yang manakah menunjukkan corak gelombang yang **betul**?*

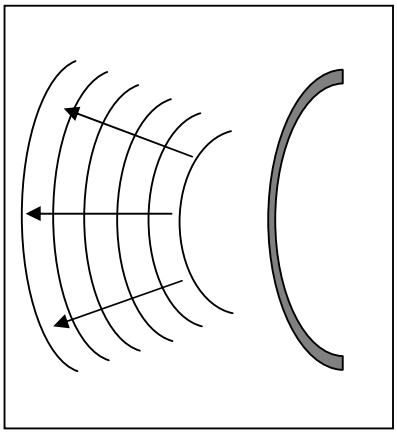
A



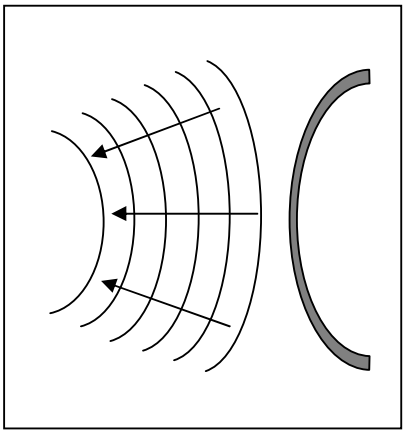
B



C



D



29 Which statement is **correct** about refraction of waves?

*Pernyataan manakah **betul** bagi pembiasan gelombang?*

A Blue light is refracted more than red light.
Cahaya biru dibiaskan lebih banyak dari cahaya merah.

B Light wave is refracted towards the normal when the wave propagates from denser to less dense medium.
Gelombang cahaya dibiaskan mendekati garis normal apabila merambat dari medium tumpat ke medium kurang tumpat.

C Sound wave is refracted away from the normal when the wave propagates from hot air to cold air.
Gelombang bunyi dibiaskan menjauhi garis normal apabila merambat dari medium kurang tumpat ke medium lebih tumpat.

D Water wave is refracted away from the normal when the wave propagates from shallow to deep area.
Gelombang air dibiaskan menjauhi garis normal apabila merambat dari kawasan cetek ke kawasan dalam.

30 Which of the following describes the changes in wavelength and amplitude when sound waves are diffracted?

Antara berikut, yang manakah menerangkan perubahan panjang gelombang dan amplitud apabila gelombang bunyi dibelaukan?

	Wavelength ***Panjang gelombang***	**Amplitude** ***Amplitud***
A	Unchanged *Tidak berubah*	Decreases *Berkurang*
B	Unchanged *Tidak berubah*	Unchanged *Tidak berubah*
C	Increases *Bertambah*	Decreases *Berkurang*
D	Decreases *Berkurang*	Increases *Bertambah*

31 Diagram 23 shows an interference pattern formed when a monochromatic light passes through a double slit. The slit separation is 0.022 cm and the distance between the screen and the double slit is 125 cm.

Rajah 23 menunjukkan corak interferens yang terbentuk bila cahaya monokromatik melalui dwicelah. Pemisahan dwi celah adalah 0.022 cm dan jarak antara skrin dan dwi celah ialah 125 cm.

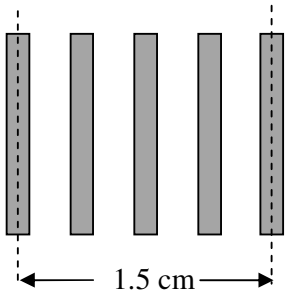


Diagram 23
Rajah 23

Calculate the wavelength of the monochromatic light.

Kirakan panjang gelombang cahaya monokromatik tersebut.

A 8.80×10^{-5} cm

B 6.60×10^{-5} cm

C 2.64×10^{-4} cm

D 1.83×10^{-4} cm

32 In which medium does sound travel the fastest?

Dalam medium apakah bunyi bergerak paling laju?

A Solid
Pepejal

B Liquid
Cecair

C Gas
Gas

D Vacuum
Vakum

33 Which of the following characteristics of microwave makes it suitable to be used in satellite communication?

Manakah antara sifat gelombang mikro berikut menjadikan ia sesuai digunakan dalam komunikasi satelit?

A It is neutral
Ia bersifat neutral

B It has a high frequency
Ia mempunyai frekuensi yang tinggi

C It has a long wavelength
Ia mempunyai panjang gelombang yang panjang

D It needs a medium to propagate
Ia memerlukan medium untuk merambat

34 Diagram 24 shows a Van de Graaff generator.

Rajah 24 menunjukkan sebuah penjana Van de Graaff.

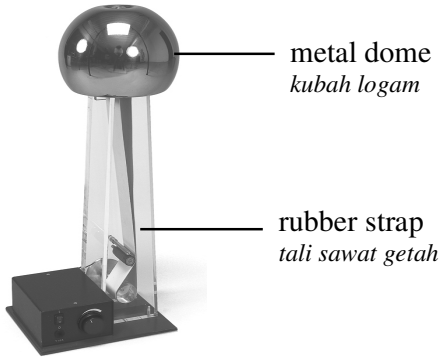


Diagram 24
Rajah 24

The generator is used to produce

Penjana ini digunakan untuk menjana

A electric current
arus elektrik

B high resistance
rintangan yang tinggi

C electric charges
cas-cas elektrik

D magnetic field
medan magnet

35 Diagram 25 shows a circuit used to investigate the relationship between voltage and electric current. Ignore the internal resistance of the battery.

Rajah 25 menunjukkan satu litar elektrik digunakan untuk mengkaji hubungan di antara voltan dan arus elektrik. Abaikan rintangan dalam bateri.

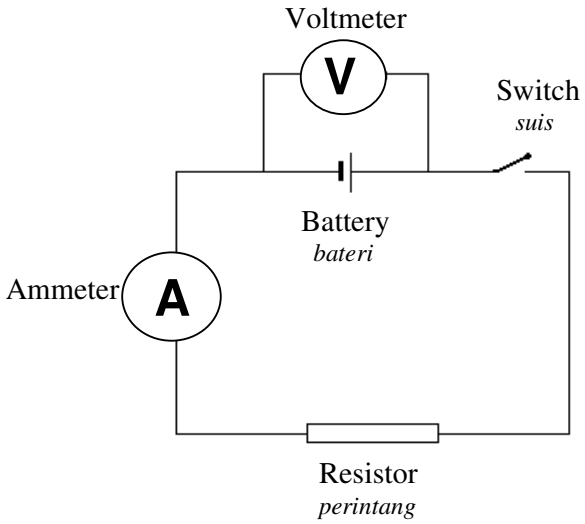


Diagram 25
Rajah 25

Which of the following is **correct** about the ammeter and voltmeter readings if a similar resistor is connected parallel to the existing resistor and the switch is closed?

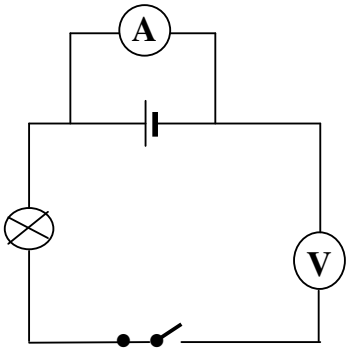
*Yang manakah di antara berikut adalah **betul** mengenai bacaan ammeter dan voltmeter jika satu perintang yang serupa disambung secara selari dengan perintang sedia ada dan suis ditutup?*

	Ammeter Reading ***Bacaan ammeter***	**Voltmeter Reading** ***Bacaan voltmeter***
A	Increases *Bertambah*	Decreases *Berkurang*
B	Decreases *Berkurang*	Increases *Bertambah*
C	Increases *Bertambah*	No change *Tiada perubahan*
D	Decreases *Berkurang*	No change *Tiada perubahan*

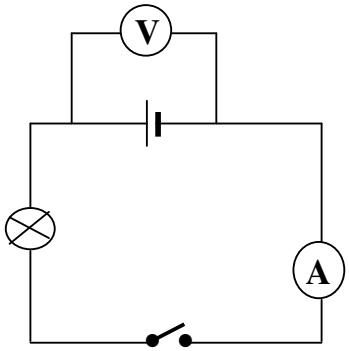
36 Which circuit is used to determine the electromotive force of a cell?

Litar yang manakah digunakan untuk menentukan daya gerak elektrik suatu sel?

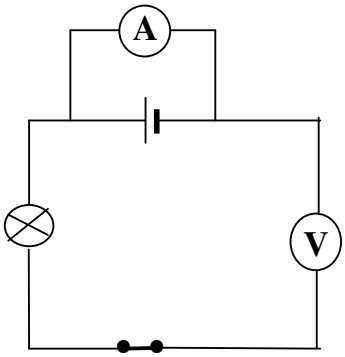
A



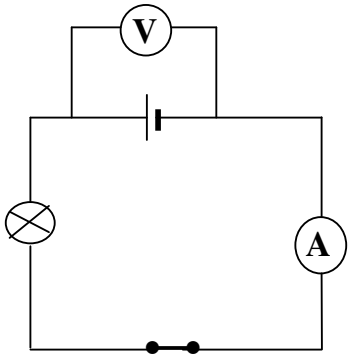
B



C



D



37 Diagram 26 shows an electric circuit which consists of three resistors.

Rajah 26 menunjukkan satu litar elektrik yang terdiri daripada tiga perintang.

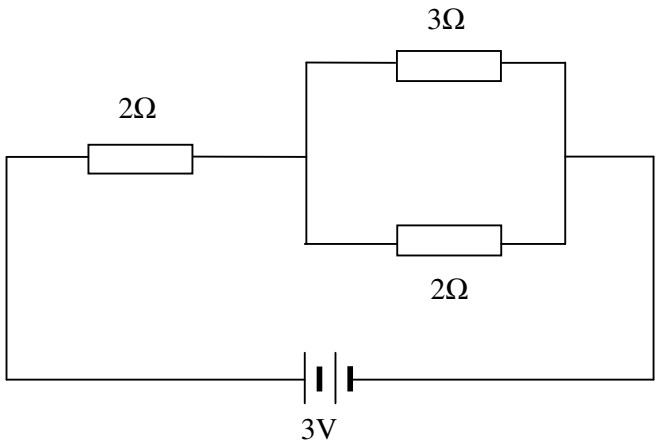


Diagram 26
Rajah 26

What is the effective resistance of the circuit?

Berapakah rintangan berkesan litar di atas?

A 1.33 Ω

B 2.83 Ω

C 3.20 Ω

D 4.33 Ω

38 Diagram 27 shows the heating element of an electric iron.

Rajah 27 menunjukkan elemen pemanas dalam sebuah seterika elektrik.

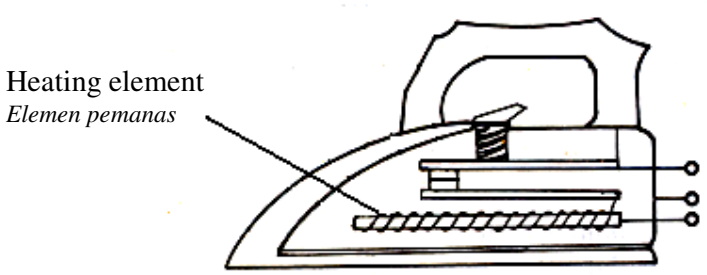


Diagram 27
Rajah 27

The heating element is made in the shape of a coil to

Elemen pemanas itu dibuat dalam bentuk gelung untuk

A allow a large current flow
membenarkan arus yang besar mengalir

B produce a large potential difference
menghasilkan beza upaya yang besar

C decrease the resistance in the circuit
mengurangkan rintangan dalam litar

D increase the power of heat released
meningkatkan kuasa haba yang terbebas

39 Diagram 28 shows a piece of insulated wire wound round an iron nail. When the switch is closed, the nail becomes an electromagnet.

Rajah 28 menunjukkan seutas dawai bertebat dililit mengelilingi sebatang paku besi. Bila suis ditutup, paku itu menjadi sebuah elektromagnet.

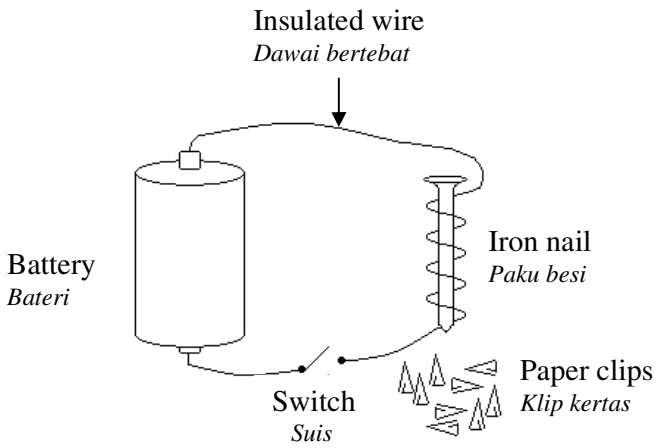


Diagram 28
Rajah 28

The strength of the electromagnet increases when

Kekuatan elektromagnet bertambah apabila

A the magnitude of the current is decreased
magnitud arus berkurang.

B insulated wire of smaller diameter is used for the coil
wayar bertebat dengan diameter yang lebih kecil digunakan

C the diameter of the coil is decreased
diameter gelung dikurangkan

D the number of turns of the coil is decreased
bilangan lilitan gegelung berkurang

40 Diagram 29 shows a coil placed between the poles of a permanent magnet and is connected to the external circuit.

Rajah 29 menunjukkan gegelung diletakkan di antara dua kutub magnet dan disambungkan ke litar luar.

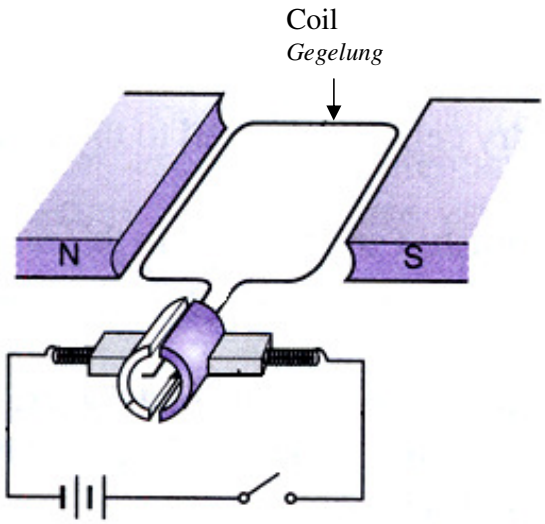


Diagram 29
Rajah 29

Determine the direction of rotation of the coil when the switch is closed.

Tentukan arah putaran gegelung apabila suis dihidupkan.

A Clock wise
Pusingan ikut jam

B Anti clock wise
Pusingan lawan jam

C Alternately, anticlockwise then clockwise
Berulangalik,, pusingan lawan jam diikuti pusingan ikut jam

D Alternately, clockwise then anticlockwise
Berulangalik,, pusingan ikut jam diikuti pusingan lawan jam

41 Diagram 30(a) shows a magnet being moved slowly towards a solenoid and the pointer of the galvanometer deflects to the right as shown in Diagram 30(b).

Rajah 30(a) menunjukkan satu magnet bergerak dengan perlahan kearah gegelung dan jarum penunjuk galvanometer terpesong ke kanan seperti yang ditunjukkan pada rajah 30(b).

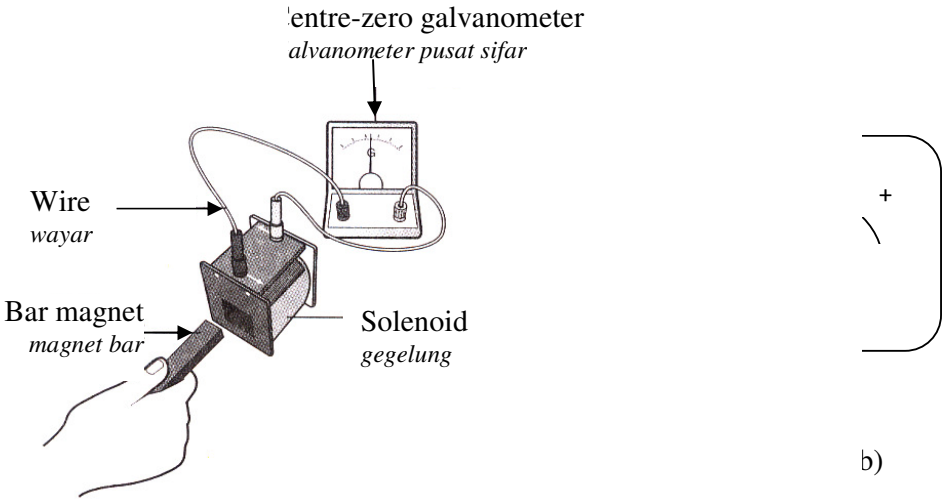
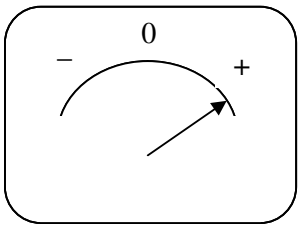


Diagram 30(a)
Rajah 30(a)

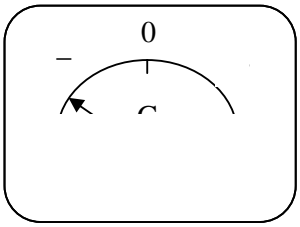
What is the deflection of the pointer if the same magnet pole is pulled away **quickly** from the same end of the solenoid?

*Bagaimanakah pesongan jarum penunjuk jika kutub magnet yang sama ditarik dengan **laju** dari hujung solenoid yang sama?*

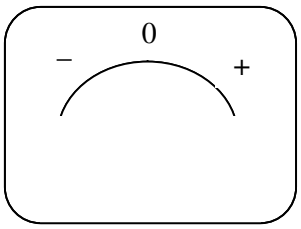
A



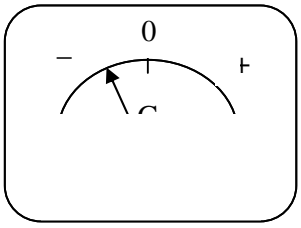
B



C



D



42 Diagram 31 shows a step down transformer.

Rajah 31 menunjukkan transformer injak turun.

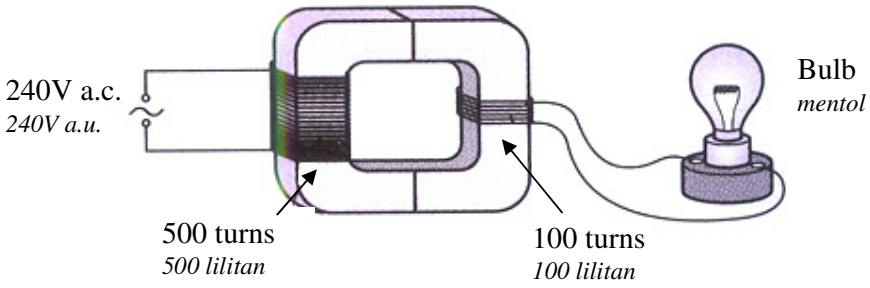


Diagram 31
Rajah 31

What is the potential difference across the bulb?

Apakah beza keupayaan merentasi mentol?

A 4.0 V

B 4.8 V

C 48.0 V

D 60.0 V

43 Why is the electrical energy generated at a voltage of 25 kV in power stations increased to 132 kV before transmission?

Mengapakah tenaga elektrik yang dijanakan pada beza upaya 25 kV di stesen-stesen janakuasa dinaikkan ke 132 kV sebelum penghantaran ?

A To increase the current in the transmission cables.
Untuk mengurangkan arus dalam kabel penghantaran.

B So that step-down transformers can be used in the substations.
Supaya transformer injak turun boleh digunakan di substesen.

C To distribute the power equally to all consumers.
Untuk menyebarkan kuasa sama rata kepada semua pengguna.

D To reduce the power loss in the transmission cables.
Untuk mengurangkan kehilangan kuasa alam kabel penghantaran.

44 Diagram 33 shows the trace formed on the screen of a cathode ray oscilloscope.

Rajah 33 menunjukkan surihan yang terhasil pada skrin osiloskop sinar katod, OSK.

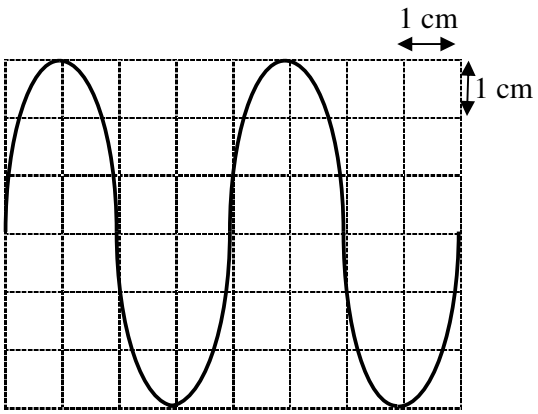


Diagram 33
Rajah 33

What is the potential difference if the Y-gain is set to 4.00 V/cm?

Berapakah beza keupayaan jika gandaan-Y ditetapkan pada 4.00 V/cm?

A 4.0 V

B 10.0 V

C 12.0 V

D 24.0 V

45 Diagram 34 shows a rectifier circuit.

Rajah 34 menunjukkan litar rektifikasi.

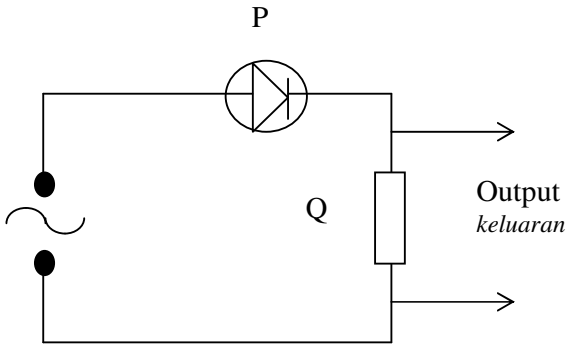


Diagram 34
Rajah 34

Which statement is **correct** about the circuit or its components?

*Pernyataan yang manakah **betul** tentang litar di atas atau komponennya?*

A Component Q acts as a rectifier
Komponent Q bertindak sebagai rektifier

B Component P allows current to flow in any direction
Komponen P membenarkan arus mengalir dalam semua arah

C A rectifier changes direct current to alternating current
Rektifier menukarkan arus terus kepada arus ulangalik

D The rectifier circuit will still function if component P is reversed
Litar rektifikasi di atas masih berfungsi jika komponen P di songsangkan.

46 Diagram 35 shows a transistor circuit which functions as an alarm system.

Rajah 35 menunjukkan litar transistor yang berfungsi sebagai satu sistem penggera

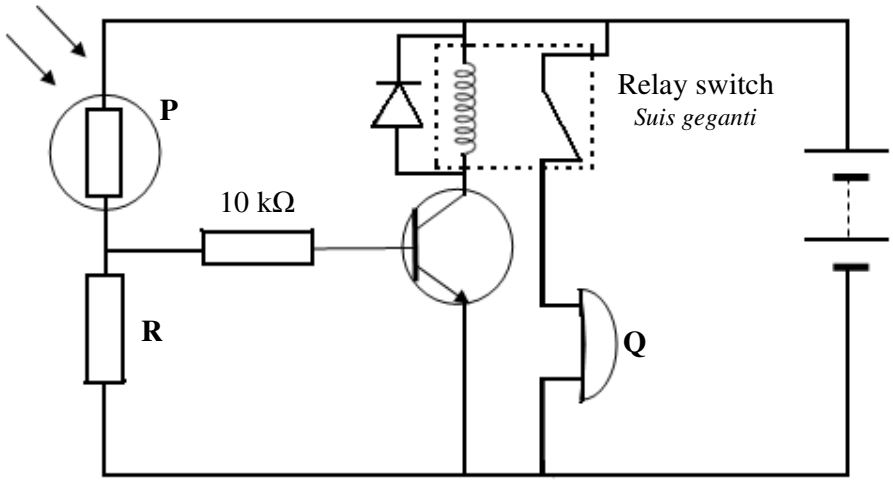


Diagram 35
Rajah 35

What happens to the resistance of **P** and the state of **Q** when the surrounding is dark?

*Apakah yang berlaku kepada rintangan **P** dan keadaan **Q** apabila persekitarannya menjadi gelap?*

	Resistance of **P** *Rintangan **P***	State of **Q** *Keadaan **Q***
A	Low *Rendah*	Activated *Dihidupkan*
B	Low *Rendah*	Not activated *Tidak dihidupkan*
C	High *Tinggi*	Activated *Dihidupkan*
D	High *Tinggi*	Not activated *Tidak dihidupkan*

47 Diagram 36 shows a combination of two logic gates with two input signals, J and K.

Rajah 36 menunjukkan satu kombinasi dua get logik dengan dua isyarat input, J dan K.

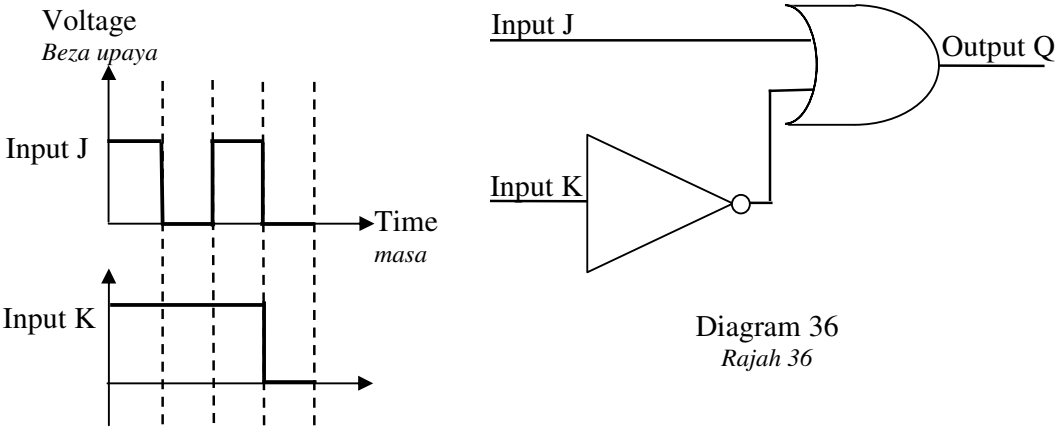
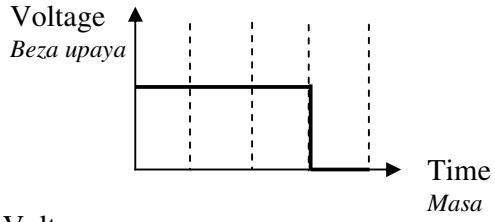


Diagram 36
Rajah 36

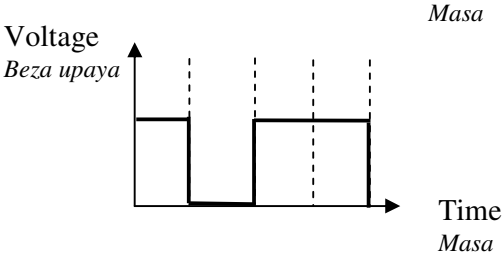
Which is the **correct** signal for output Q?

*Isyarat yang manakah **betul** untuk output Q?*

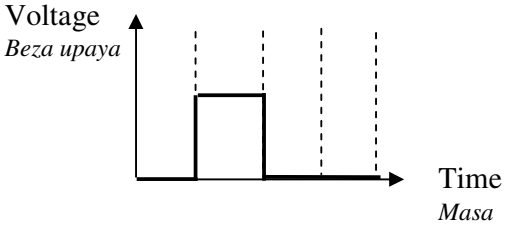
A



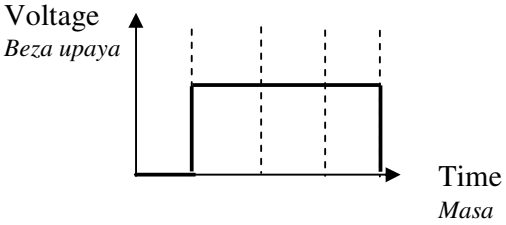
B



C



D



48 How many protons, neutrons and electrons are there in the radioisotope $^{32}_{15}P$?

Berapakah bilangan proton, neutron dan elektron bagi radioisotop $^{32}_{15}P$?

	Number of protons *Bilangan proton*	**Number of neutrons** *Bilangan neutron*	**Number of electrons** *Bilangan elektron*
A	15	17	15
B	17	15	17
C	15	32	15
D	32	15	32

49 The following equation shows the decay of a radon nucleus.

Persamaan berikut menunjukkan pereputan bagi nukleus radon.

$$^{222}_{86}Ra \longrightarrow {}^{214}_{86}Po + x\ {}^{4}_{2}He + y\ {}^{0}_{-1}e$$

What are the values of *x* and *y* ?

Apakah nilai x dan y?

	x	***y***
A	1	1
B	1	4
C	2	1
D	2	4

50 Diagram 37 shows a nuclear reaction.

Diagram 37 menunjukkan tindak balas nucleus.

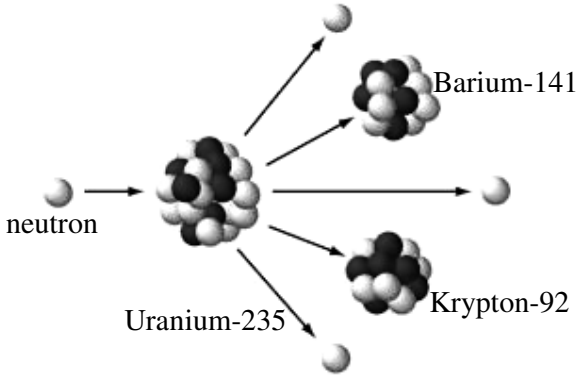


Diagram 37
Rajah 37

The above reaction occurs when

Tindakbalas di atas berlaku apabila

A the pressure is very high
tekanan amat tinggi.

B the temperature is very high
suhu amat tinggi

C the radioactive sample exceeds its critical mass
jisim sampel bahan radioaktif melebihi jisim genting

D the heavy nucleus is knocked by a slow neutron
nukleus berat dihentam oleh neutron yang perlahan

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.

   Gambarajah 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.

4531/2
PHYSICS
Paper 2
September 2010
2 ½ hours

Index Number : .....

Name : .....

Class : .....

MAKTAB RENDAH SAINS MARA

SIJIL PELAJARAN MALAYSIA
TRIAL EXAMINATION 2010

4
5
3
1

2

PHYSICS

Paper 2

Two hours and thirty minutes

DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO

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

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

3 Candidates are required to read the information at the back of the booklet

For Examiner's Use			
Section	Question	Total Marks	Score Obtained
A	**1**	4	
	2	5	
	3	7	
	4	7	
	5	7	
	6	8	
	7	10	
	8	12	
B	**9**	20	
	10	20	
C	**11**	20	
	12	20	
		Total	

This booklet consists of 31 printed pages and 3 blank pages

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

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

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

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

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

5 Momentum = mv

6 $F = ma$

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

8 Gravitational potential energy/
Tenaga keupayaan gravity = mgh

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

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

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

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

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

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

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

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

17 $v = f\lambda$

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

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

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

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

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

23 Refractive index/*Indeks biasan*,
$\eta = \frac{\text{real depth/} dalam\ nyata}{\text{apparent depth/} dalam\ ketara}$

24 $Q = It$

25 $V = IR$

26 $E = VQ$

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

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

29 $E = mc^2$

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

31 g = 10 m s^{-2}

32 c = 3.0 x 10^8 m s^{-1}

BLANK PAGE
HALAMAN KOSONG

For Examiner's use

Section A
Bahagian A

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

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

1 Diagram 1 shows an object placed in front of a mirror.

Rajah 1 menunjukkan satu objek diletakkan di hadapan sebuah cermin..

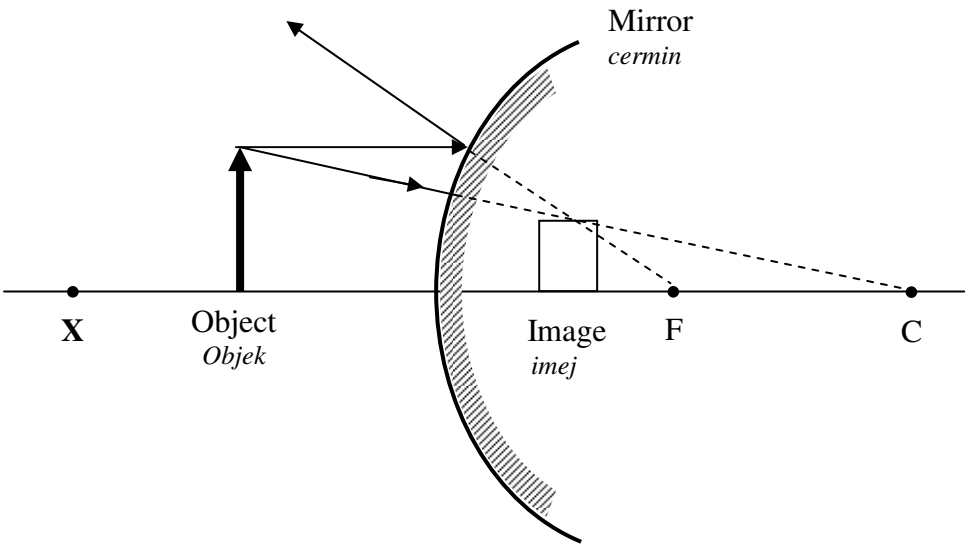


Diagram 1
Rajah 1

(*a*) Name the type of mirror shown in Diagram 1.

Namakan jenis kanta yang digunakan dalam Rajah 1.

1(*a*)

1

.....

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

(*b*) Draw the image in the box given in Diagram 1.

Lukiskan imej dalam petak yang disediakan pada Rajah 1.

1(*b*)

1

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

For Examiner's use

(*c*) Based on Diagram 1, tick ☑ the correct statement about the image formed.

Berdasarkan Rajah 1. tandakan ☑ pada pernyataan yang betul mengenai imej yang terbentuk.

☐ The image can be formed on a screen.

Imej boleh terbentuk pada skrin.

☐ The image cannot be formed on a screen.

Imej tidak boleh terbentuk pada skrin.

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

1(*c*) 1

(*d*) What happens to the size of the image if the object is placed at **X**?

*Apakah yang terjadi pada saiz imej jika objek diletakkan pula di **X** ?*

.....

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

1(*d*) 1

Total A1

4

For Examiner's use

2 Diagram 2 shows a baseball player wearing a soft thick glove to catch a ball during a baseball match.

Rajah 2 menunjukkan seorang pemain bola lisut memakai sarung tangan tebal yang lembut untuk menangkap bola semasa pertandingan bola lisut.

Diagram 2
Rajah 2

(*a*) What is meant by impulsive force?

Apakah maksud daya impuls?

2(*a*)

.....

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

1

(*b*) The ball of mass 0.15 kg moves with a velocity of 20 m s^{-1} when it is hit. Calculate the impulsive force acting on the glove when the time of impact is 8.0 x 10^{-2} s.

Bola berjisim 0.15 kg bergerak dengan kelajuan 20 m s^{-1} apabila dipukul.
Hitungkan daya impuls yang bertindak ke atas sarung tangan jika masa tindakbalas adalah 8.0 x 10^{-2} s.

2(*b*)

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

2

For Examiner's Use

(*c*) Compare the impulsive force if the baseball player wears a hard glove to catch the ball. Explain your answer.

Bandingkan daya impuls yang di hasilkan jika pemain itu menggunakan sarung tangan yang keras untuk menangkap bola. Jelaskan jawapan anda.

.....

.....

.....

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

2(*c*)

2

Total A2

5

For Examiner's use

3

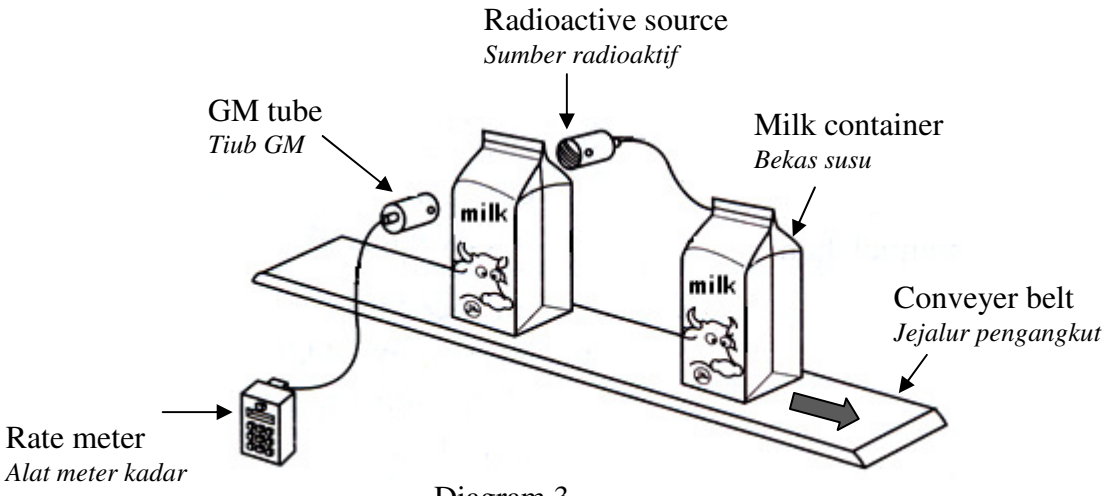


Diagram 3
Rajah 3

Diagram 3 shows a Geiger-Muller tube (GM tube) and a rate meter which are used to detect the level of milk in containers in a factory.

Table 3 shows the readings recorded by the rate meter for four containers P, Q, R and S when a radioactive source is placed near the containers. The rate meter records a reading of 100 counts per minute when there is no radioactive source nearby.

Rajah 3 menunjukkan sebuah tiub GM dan alat meter kadar digunakan untuk mengesan paras susu di dalam bekas di sebuah kilang.

Jadual 3 menunjukkan bacaan meter kadar bagi empat bekas P, Q, R dan S bila suatu sumber radioaktif diletakkan berhampiran bekas. Meter kadar mencatatkan bacaan 100 bilangan per minit jika tiada sumber radioaktif diletakkan berdekatan,

Container *Bekas*	P	Q	R	S
Rate meter reading (counts per minute) *Bacaan meter kadar (bilangan per minit)*	460	466	520	458

Table 3
Jadual 3

(*a*) Name the radiation emitted by the radioactive source.

Namakan sinar radiasi yang dikeluarkan oleh sumber radioaktif itu.

3(*a*)

1

.....

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

For Examiner's use

(*b*) (i) Based on Table 3, which container has the least amount of milk? State **one** reason for your answer.

*Berdasarkan Jadual 3, bekas yang manakah mempunyai kuantiti susu paling kecil? Beri **satu** sebab bagi jawapan anda.*

.....

.....

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

3(*b*)(i) 2

(ii) State the actual rate meter reading for Q.

Nyatakan kadar bacaan sebenar bagi Q

.....

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

3(*b*)(ii) 1

(*c*) The mass of a radioactive source is reduced from 80.0 g to 20.0 g in 30 seconds. Calculate its half-life.

Jisim suatu sumber radioaktif menyusut dari 80.0 g kepada 20.0 g dalam masa 30 saat. Hitungkan setengah hayat bagi bahan radioaktif tersebut.

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

3(*c*) 2

Total A3 **6**

For Examiner's use

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

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

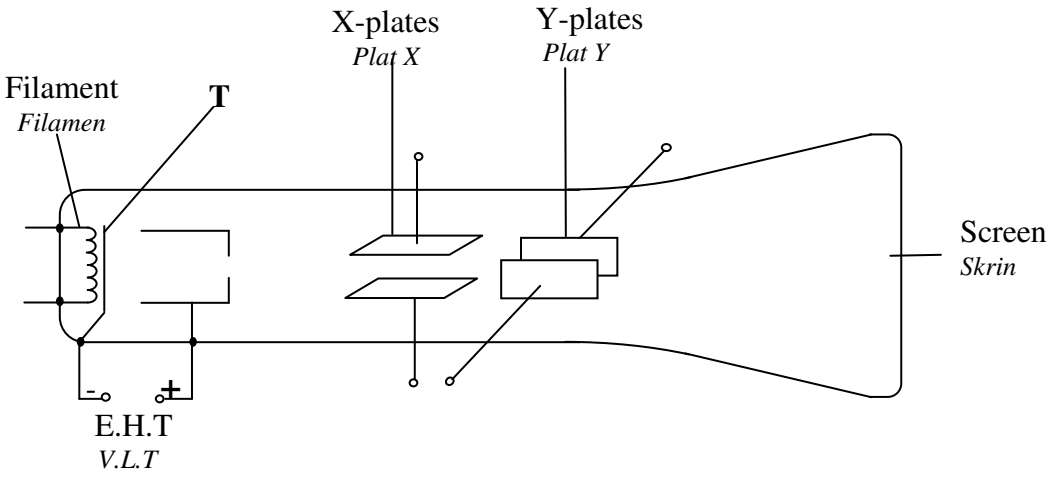


Diagram 4.1
Rajah 4.1

(*a*) (i) Based on Diagram 4.1, name the component **T**.

*Berdasarkan Rajah 4.1, namakan komponen **T**.*

4(*a*)(i) 1

.....

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

(ii) Explain what happens to the electrons on the surface of **T** when **T** is heated.

*Terangkan apa yang berlaku kepada elektron pada permukaan **T** jika **T** dipanaskan.*

4(*a*)(ii) 1

.....

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

(iii) Name the physics process in (*a*)(ii).

Namakan proses fizik yang berlaku dalam (a)(ii).

4(*a*)(iii) 1

.....

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

For Examiner's use

(*b*) A student uses a CRO to study the output voltage of a bicycle dynamo. The time-base is set at 100 ms/division and the Y gain control is set at 0.5 V/division.

Seorang pelajar menggunakan OSK untuk mengkaji voltan output yang dijana oleh sebuah dinamo basikal. Dasar masa telah dilaraskan pada 100 ms/bahagian dan gandaan Y dilaraskan pada 0.5 V /bahagian.

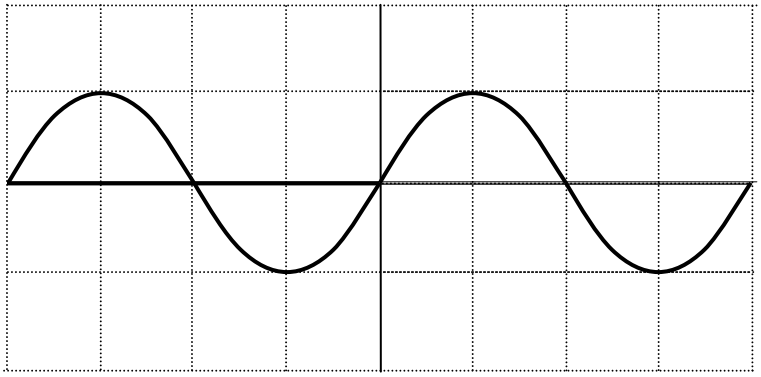


Diagram 4.2
Rajah 4.2

(i) Calculate the frequency of the wave produced by the bicycle dynamo.

Hitungkan frekuensi gelombang yang dihasilkan oleh dinamo basikal.

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

4(*b*)(i) 2

(ii) On Diagram 4.2, draw a new trace to show the voltage output if the frequency of the dynamo is doubled.

Pada Rajah 4.2, lukiskan surihan yang baru untuk menunjukkan voltan output jika frekuensi dinamo digandakan.

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

4(*b*)(ii) 2

Total A4 7

For Examiner's use

5 A student carries out an activity to record the temperature change of oil and water. Both liquids are heated by identical heaters for two minutes. The initial temperature of oil and water are 30°C.

Seorang pelajar membuat aktiviti untuk merekod perubahan suhu minyak dan air. Kedua cecair dipanaskan oleh pemanas yang serupa selama dua minit. Suhu awal minyak dan air adalah 30°C.

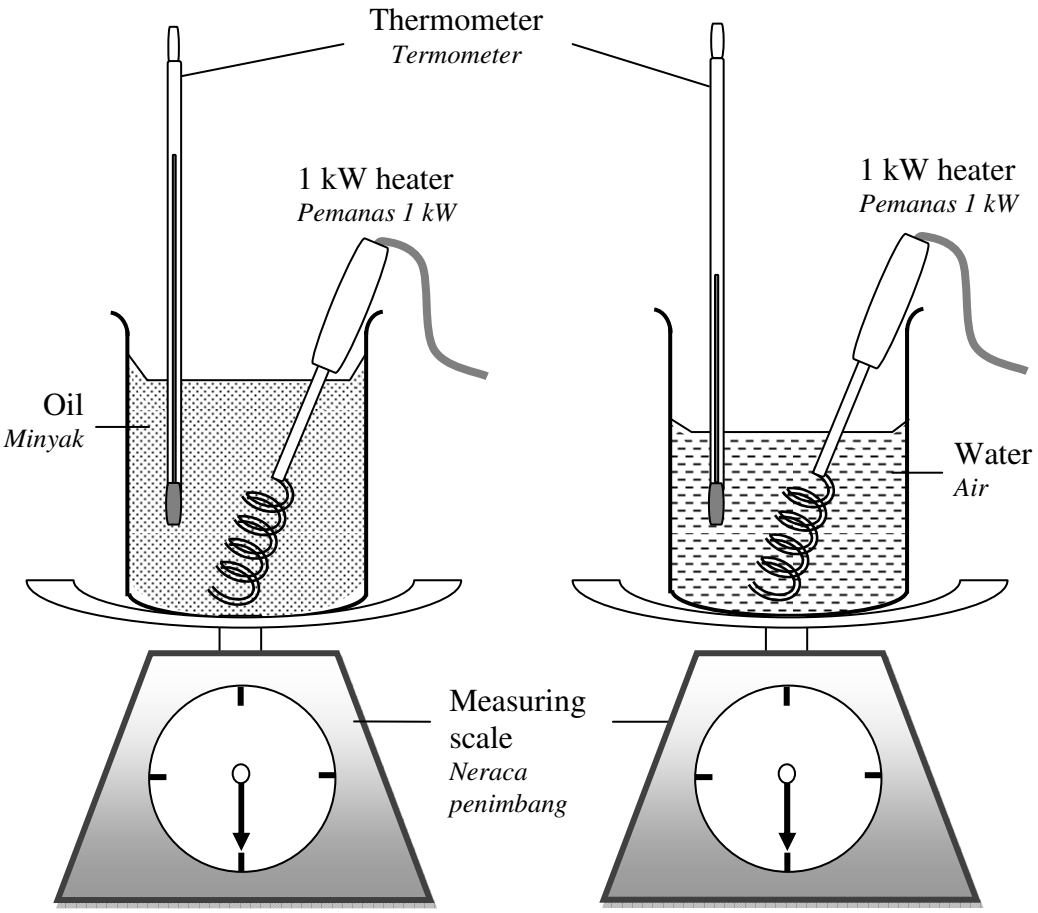


Diagram 5.1
Rajah 5.1

Diagram 5.2
Rajah 5.2

(*a*) Name the condition in which the temperature of the water is equal to the temperature of the thermometer.

Namakan keadaan di mana suhu air adalah sama dengan suhu termometer.

5(*a*)

1

.....

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

For Examiner's Use

(*b*) Observe Diagram 5.1 and Diagram 5.2. Compare,

Perhatikan Rajah 5.1 dan Rajah 5.2. Bandingkan,

(i) the mass of oil and mass of water.

jisim minyak dan jisim air.

.....

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

5(*b*)(i) 1

(ii) the temperature change in oil and also in water.

perubahan suhu minyak dan suhu air.

.....

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

5(*b*)(ii) 1

(*c*) (i) Compare the amount of heat supplied by the heater to the oil and to the water.

Bandingkan jumlah haba yang dibekalkan oleh pemanas kepada minyak dan kepada air.

.....

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

5 (*c*)(i) 1

(ii) Compare the amount of heat absorbed by oil and water.

Bandingkan jumlah tenaga yang diserap oleh minyak dan air.

.....

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

5(*c*)(ii) 1

(iii) Name the physical quantity that will explain the comparison you made in **5**(*b*)(ii).

*Namakan kuantiti fizik yang menerangkan perbandingan yang dibuat dalam **5**(b)(ii).*

.....

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

5(*c*)(iii) 1

(*d*) If the heating time is increased to 5 minutes, will there be any change in the physical quantity in (*c*)(iii)? Explain your answer.

Jika tempoh pemanasan ditambah kepada 5 minit, adakah sebarang perubahan pada kuantiti fizikal pada (c)(iii)? Terangkan jawapan anda.

.....

.....

.....

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

5(*d*) 2

Total A5 8

For Examiner's use

6 Diagram 6.1 and Diagram 6.2 show two electric circuits each consisting of a copper wire.

Rajah 6.1 dan Rajah 6.2 menunjukkan dua litar elektrik masing-masing mengandungi seutas wayar kuprum.

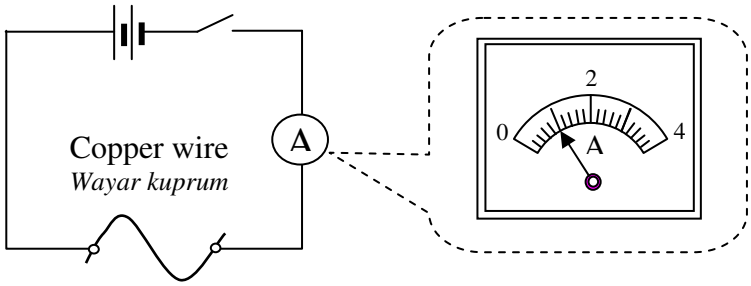


Diagram 6.1
Rajah 6.1

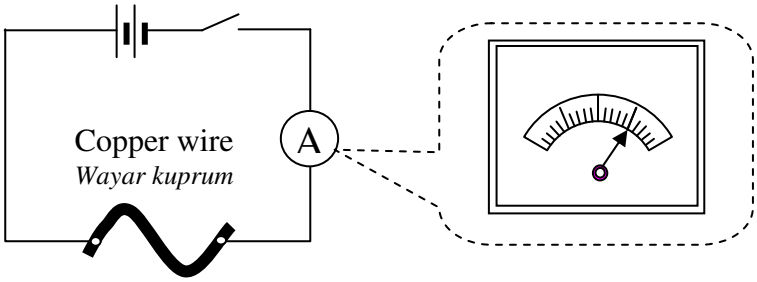


Diagram 6.2
Rajah 6.2

(*a*) Name the quantity measured by the ammeter.

Namakan kuantiti yang diukur oleh ammeter.

6(*a*)

.....

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

(*b*) (i) Compare the thickness of the copper wire in Diagram 6.1 and Diagram 6.2.

Bandingkan ketebalan wayar kuprum dalam Rajah 6.1 dan Rajah 6.2.

6(*b*)(i)

.....

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

(ii) Compare the ammeter reading in Diagram 6.1 and Diagram 6.2.

Bandingkan bacaan ammeter dalam Rajah 6.1 dan Rajah 6.2.

6(*b*)(ii)

.....

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

For Examiner's use

(iii) Relate the thickness of the copper wire to the ammeter reading.

Hubungkaitkan ketebalan wayar kuprum dengan bacaan ammeter.

.....

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

6(*b*)(iii)
1

(iv) Relate the thickness of the copper wire to its resistance.

Hubungkaitkan ketebalan wayar kuprum dengan rintangan.

.....

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

6(*b*)(iv)
1

(*c*) You are provided with three light bulbs labelled A, B and C as shown in Diagram 6.3.
Anda dibekalkan dengan tiga mentol berlabel A, B dan C seperti dalam Rajah 6.3.

A
120 V, 60 W

B
120 V, 120 W

C
240 V, 120 W

Diagram 6.3
Rajah 6.3

Draw and label an electric circuit connecting all the three bulbs in which all the bulbs should light up with normal brightness when connected to a power supply of 240 V alternating current. Add switches to the circuit.

Lukis dan label satu litar elektrik yang menyambungkan ketiga- tiga mentol di mana semua mentol seharusnya menyala dengan kecerahan normal apabila disambungkan kepada bekalan kuasa 240 V arus ulang-alik. Tambahkan suis pada litar anda.

6(*c*)
3

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

Total A6
8

For Examiner's Use

7 Diagram 7 shows a public water tank which supplies water for domestic use to a residential area.

Rajah 7 menunjukkan sebuah tangki air awam yang membekalkan air untuk kegunaan domestik di satu kawasan perumahan.

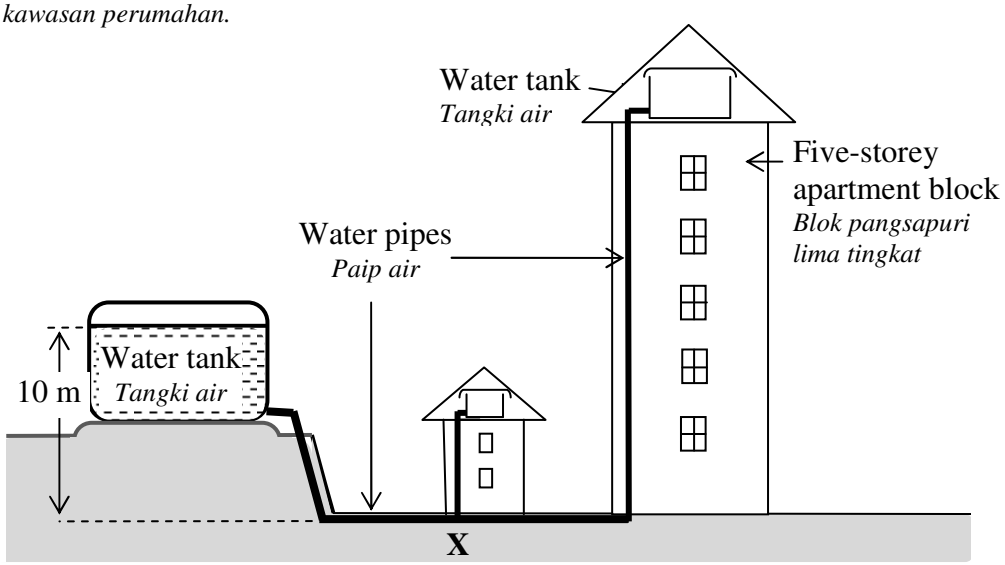


Diagram 7
Rajah 7

(*a*) State **one** factor which affects pressure in a liquid.

*Nyatakan **satu** faktor yang mempengaruhi tekanan dalam cecair.*

7(*a*)

1

.....

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

(*b*) Based on Diagram 7, calculate the water pressure at **X.**
(Density of water = 10^3 kg m^{-3}).

*Berdasarkan Rajah 7, hitungkan tekanan air di **X.***
(Ketumpatan air =10^3 kg m^{-3}).

7(*b*)

2

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

(*c*) Tenants on the fifth floor of the apartment block are unable to obtain tap water. Why?

Penghuni di tingkat lima blok pangsapuri tidak menerima bekalan air paip. Mengapa?

7(*c*)

1

.....

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

For Examiner's Use

(*d*) Suggest and explain modifications to the water distribution system shown in Diagram 7, to ensure the following :

Tangki air itu tidak dapat memenuhi keperluan semua penghuni di blok pangsapuri lima tingkat. Cadang dan terangkan pengubahsuaian yang perlu dilakukan untuk setiap yang berikut:

(i) Sufficient water supply for all area residents.

Bekalan air yang mencukupi untuk semua penghuni kawasan.

.....

.....

.....

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

7(*d*)(i) 2

(ii) Water supply reaches the fifth floor of the apartment building.

Bekalan air boleh sampai ke tingkat lima blok pangsapuri.

.....

.....

.....

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

7(*d*)(ii) 2

(e) The public water supply system often faces a problem in delivering water to water tanks located on tall buildings. Suggest and explain **one** other way to overcome this problem.

*Sistem bekalan air awam kerapkali menghadapi masalah untuk menyalurkan air ke tangki air yang berada di bahagian atas bangunan tinggi. Cadangkan dan jelaskan **satu** cara lain untuk mengatasi masalah ini.*

.....

.....

.....

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

7(*e*) 2

Total A7 **10**

For Examiner's use

8 Diagram 8.1 shows Aini trying to open the house's front gate using a remote control. Even though Amin is blocking her, the gate can still be opened.

Rajah 8.1 menunjukkan Aini cuba membuka pintu pagar rumah dengan menggunakan alat kawalan jauh. Walaupun Amin menghalangnya, pintu pagar masih boleh dibuka.

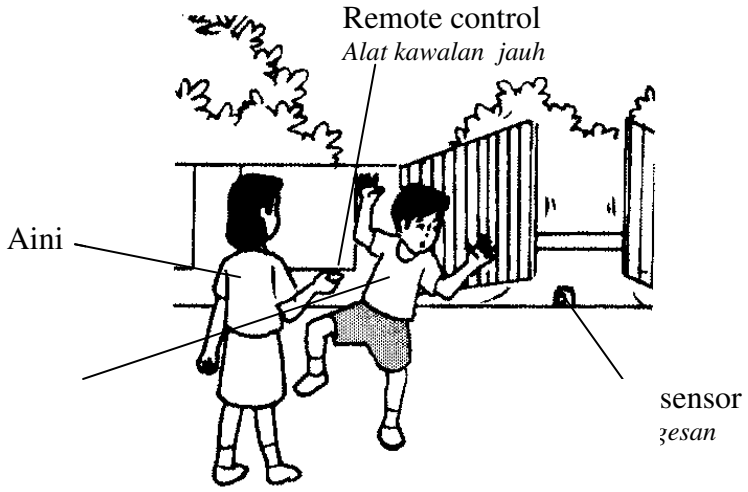


Diagram 8.1
Rajah 8.1

(*a*) (i) Name the wave phenomenon involved.

Namakan fenomena gelombang yang terlibat.

8(*a*)(i)

1

.....

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

(ii) On Diagram 8.2, draw the wave pattern based on the situation in Diagram 8.1.

Pada Rajah 8.2, lukiskan corak gelombang yang terlibat berdasarkan situasi dalam Rajah 8.1.

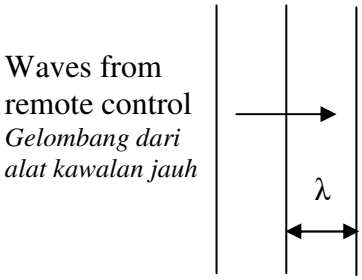


Diagram 8.2
Rajah 8.2

8(*a*)(ii)

3

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

For Examiner's use

(*b*)

Wave ***Gelombang***	**Suggested frequency** ***Frekuensi yang dicadangkan***	**Speed in air** ***Laju dalam udara***
X	4.0×10^4 Hz	3.3×10^2 m s^{-1}
Y	4.0×10^8 Hz	3.0×10^8 m s^{-1}
Z	4.0×10^{14} Hz	3.0×10^8 m s^{-1}

Table 8.1
Jadual 8.1

Table 8.1 shows the characteristics of three waves, X, Y and Z to be used in the remote control for the gate. Calculate the wavelength of each wave.

Jadual 8.1 menunjukkan ciri-ciri untuk tiga gelombang, X, Y dan Z yang akan digunakan dalam alat kawalan jauh bagi pintu pagar. Hitungkan panjang gelombang bagi setiap gelombang.

(i) Wave X

Gelombang X

(ii) Wave Y

Gelombang Y

(iii) Wave Z

Gelombang Z

8(*b*)

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

4

For Examiner's use

(*c*) (i) Based on your answers in **8**(*b*), which wave is the most suitable to be used in the remote control for the gate?

*Berdasarkan jawapan anda di **8**(b), gelombang manakah yang paling sesuai digunakan untuk alat kawalan jauh bagi pintu pagar itu?*

8(*c*)(i) 1

.....

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

(ii) State **one** reason for the answer in **8**(*c*)(i).

*Nyatakan **satu** sebab bagi jawapan **8**(c)(i).*

8(*c*)(ii) 1

.....

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

(*d*) Based on the values of the wave speed shown in Table 8.1,

Berdasarkan nilai laju gelombang dalam udara yang ditunjukkan dalam Jadual 8.1,

(i) Predict what wave X is.

Ramalkan gelombang X.

8(*d*)(i) 1

.....

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

(ii) State **one** application for wave X.

*Nyatakan **satu** kegunaan gelombang X.*

8(*d*)(ii) 1

.....

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

Total A8

12

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HALAMAN KOSONG

Section B
Bahagian B

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

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

9 Diagram 9.1 and Diagram 9.2 show light rays from two identical objects passing through two identical convex lenses. Both lenses produce real images. F is the focal point for the lens.

Rajah 9.1 dan Rajah 9.2 menunjukkan sinar cahaya dari dua objek yang serupa melalui dua kanta yang serupa. Kedua-dua kanta tersebut menghasilkan imej nyata. F adalah titik fokus untuk kanta tersebut.

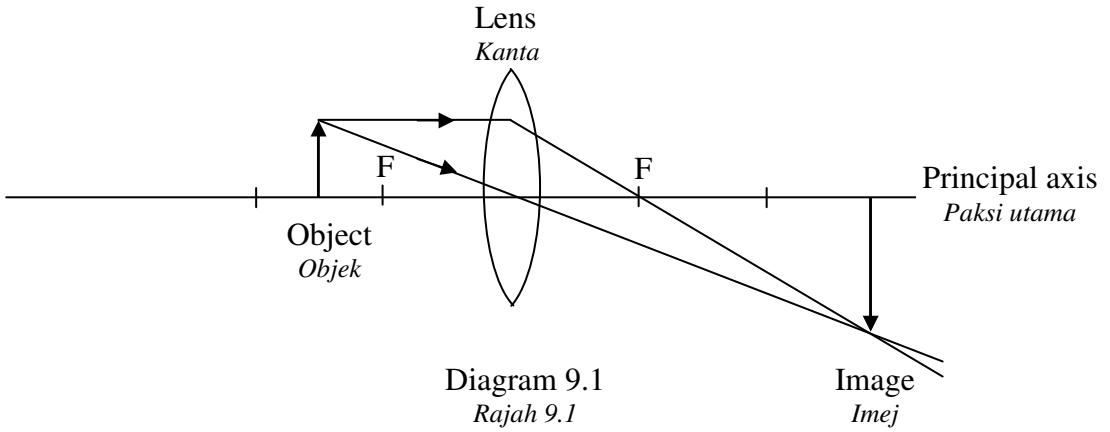


Diagram 9.1
Rajah 9.1

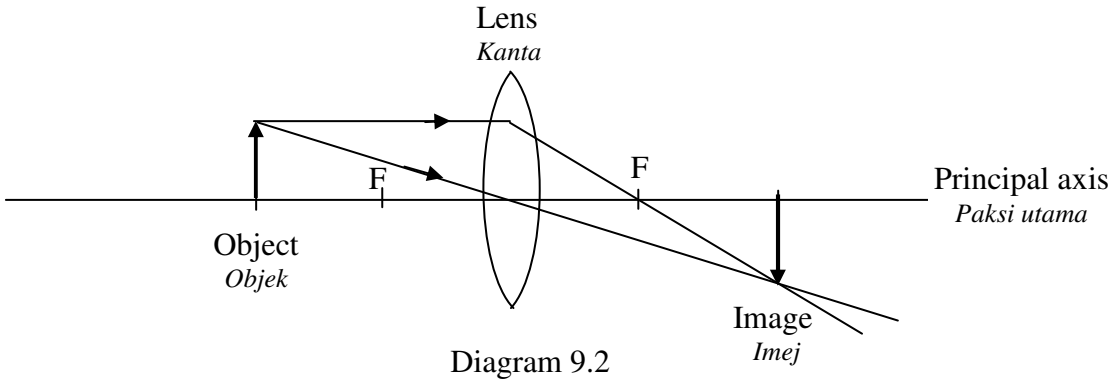


Diagram 9.2
Rajah 9.2

(*a*) (i) Name the phenomenon involved. [1 *mark*]

Namakan fenomena yang terlibat. [1 *markah*]

(ii) Observe Diagram 9.1 and Diagram 9.2. Compare the object distance, the image distance, the size of the image and the power of the lens. Relate the size of the image with the object distance. [5 *marks*]

Perhatikan Rajah 9.1 dan Rajah 9.2. Bandingkan jarak objek, jarak imej, saiz imej dan kuasa kanta. Hubungkaitkan saiz imej dengan jarak objek. [5 *markah*]

(*b*) Diagram 9.3 shows the structure of a simple camera.

Rajah 9.3 menunjukkan struktur sebuah kamera ringkas.

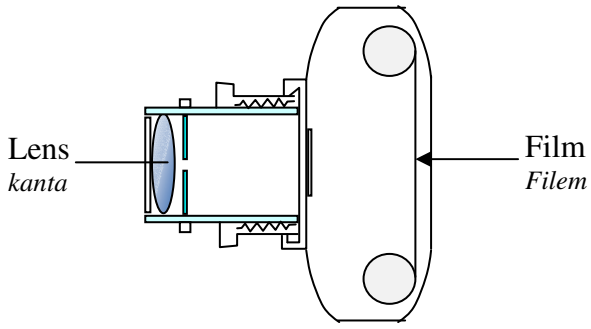


Diagram 9.3
Rajah 9.3

(i) Explain how the camera is able to capture the image of a distant object.
[3 *marks*]
Terangkan bagaimana kamera boleh merakam imej suatu objek jauh. [3 *markah*]

(ii) State the range of the object distance where the image formed is sharp.
[1 *mark*]
Nyatakan julat jarak objek bagi kedudukan imej yang tajam. [1*markah*]

(*c*) A student is given two convex lenses, R and S. The focal length for R and S are 20 cm and 5 cm respectively. Suggest and explain how to build a microscope which produces a sharp and magnified image based on the following aspects:

Seorang pelajar diberi dua kanta cembung R dan S. Panjang fokus untuk R dan S adalah 20 cm dan 5 cm masing-masing. Cadang dan terangkan bagaimana anda membina sebuah mikroskop yang menghasilkan imej yang tajam dan dibesarkan berdasarkan aspek-aspek berikut:

(i) Arrangement of lenses
Susunan kanta

(ii) Position of object
Kedudukan objek

(iii) Position of the first image
Kedudukan imej pertama

(iv) Distance between the two lenses
Jarak antara kedua-dua kanta

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

(*d*) Suggest **two** modifications that need to be done to the microscope to produce a bigger final image. [2 *marks*]

*Cadangkan **dua** ubahsuaian yang perlu dibuat pada mikroskop untuk menghasilkan imej akhir yang lebih besar.* [2 *marks*]

[Turn page over

10 Diagram 10.1 shows one insulated conductor which is moved downwards in a magnetic field. Diagram 10.2 shows three insulated conductors which are moved downwards in the magnetic field.

Rajah 10.1 menunjukkan satu konduktor bertebat digerakkan ke bawah dalam medan magnet. Rajah 10.2 menunjukkan tiga konduktor bertebat digerakkan ke bawah dalam medan magnet.

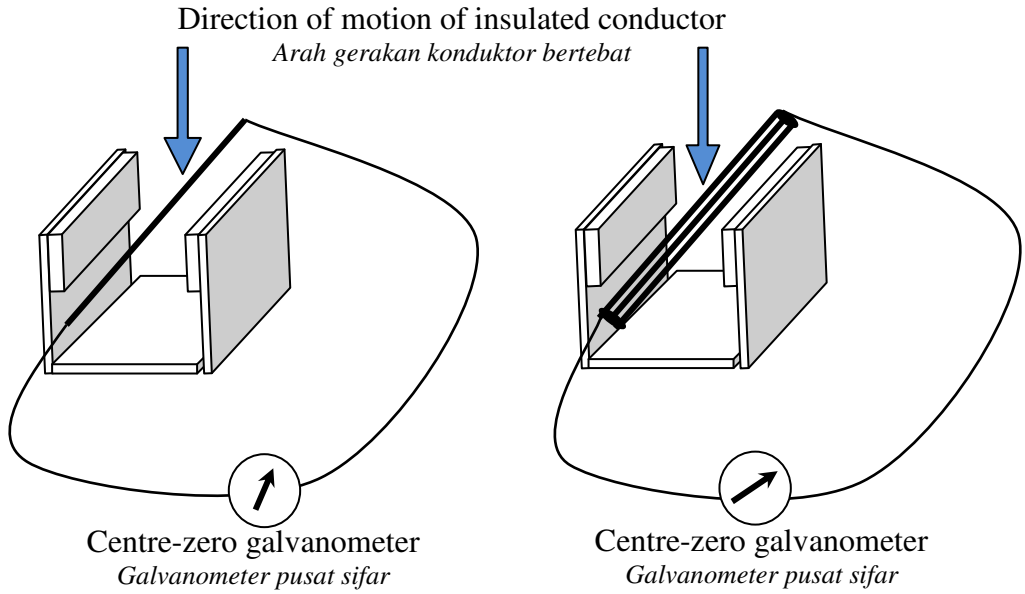


Diagram 10.1
Rajah 10.1

Diagram 10.2
Rajah 10.2

(*a*) What is meant by electromagnetic induction? [1 *mark*]

Apakah yang dimaksudkan dengan aruhan elektromagnet? [1 *markah*]

(*b*) Using Diagram 10.1 and Diagram 10.2, compare,

Menggunakan Rajah 10.1 dan Rajah 10.2, bandingkan,

(i) The number of conductor wires [1 *mark*]

Bilangan wayar konduktor [1 *markah*]

(ii) The deflection of the galvanometer pointer [1 mark]

Pesongan penunjuk galvanometer [1 *markah*]

(iii) Relate the number of conductor and the rate of cutting of magnetic flux.
[1 mark]

Hubungkaitkan bilangan konduktor dan kadar pemotongan fluks medan magnet.

[1 *markah*]

(iv) Relate the rate of cutting of magnetic flux and the induced current.
[1 *mark*]

Hubungkaitkan kadar pemotongan fluks medan magnet dengan arus aruhan.

[1 *markah*]

(v) Name the physics law involved. [1 *mark*]

Namakan hukum fizik yang terlibat. [1 *markah*]

(c) Diagram 10.3 shows the structure of a generator. Explain how the generator can be used to produce electricity.

Rajah 10.3 menunjukkan struktur sebuah penjana. Terangkan bagaimana penjana itu digunakan untuk menghasilkan arus elektrik.

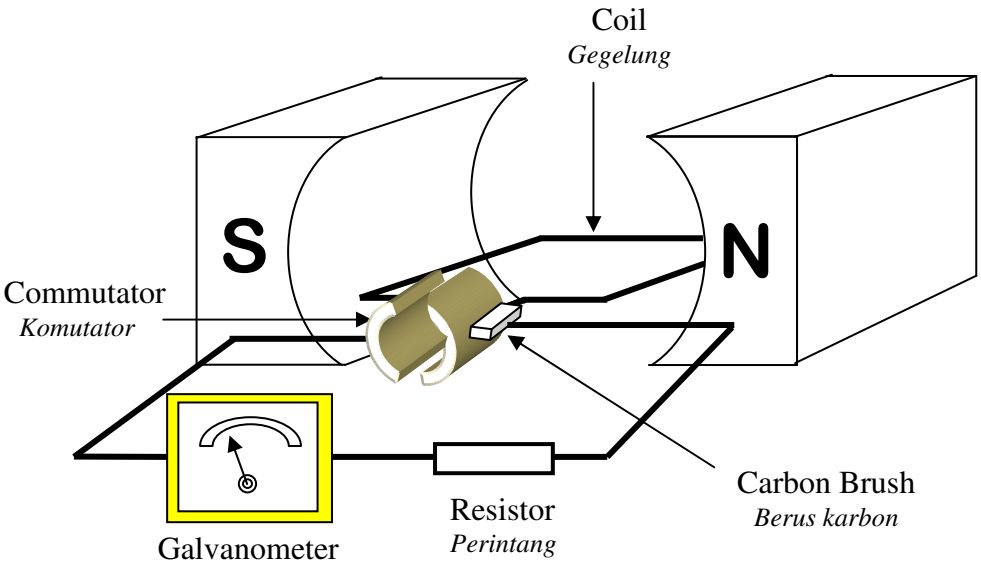


Diagram 10.3
Rajah 10.3

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

(d) Diagram 10.4 shows the cross section of a moving coil microphone which converts one form of energy into another.

Rajah 10.4 menunjukkan keratan rentas sebuah mikrofon gegelung bergerak yang menukarkan satu bentuk tenaga ke bentuk yang lain.

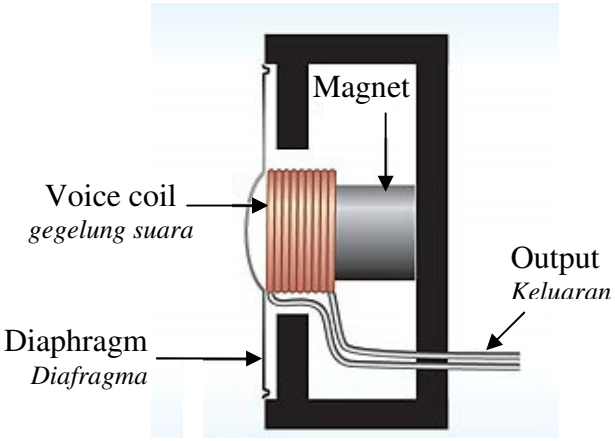


Diagram 10.4
Rajah 10.4

When sound vibrates the diaphragm, the attached voice coil moves in and out the magnetic field and generates a small electric current in the coil.

Using the appropriate concepts in physics, suggest and explain suitable modifications or ways to enable the microphone to detect sound effectively and generate bigger current based on the following aspects :

Apabila bunyi menggetarkan diafragma, gegelung suara yang bersentuhan dengannya bergerak ke dalam dan ke luar medan magnet dan menghasilkan arus elektrik yang kecil di dalam gegelung.

Menggunakan konsep fizik yang sesuai , cadang dan terangkan pengubahsuaian atau cara yang boleh dilakukan untuk membolehkan mikrofon mengesan gelombang bunyi secara berkesan dan menghasilkan arus yang lebih besar berdasarkan aspek-aspek berikut :

(i) The thickness of the diaphragm
Ketebalan diafragma

(ii) The strength of the material for the diaphragm
Kekuatan bahan untuk diafragma

(iii) The number of turns of the coil
Bilangan lilitan gegelung

(iv) The diameter of the coil wire
Diameter dawai gegelung

(v) The strength of the magnet
Kekuatan magnet

[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 a balloon taped to a straw.

Rajah 11.1 menunjukkan sebiji belon yang dilekatkan pada penyedut minuman .

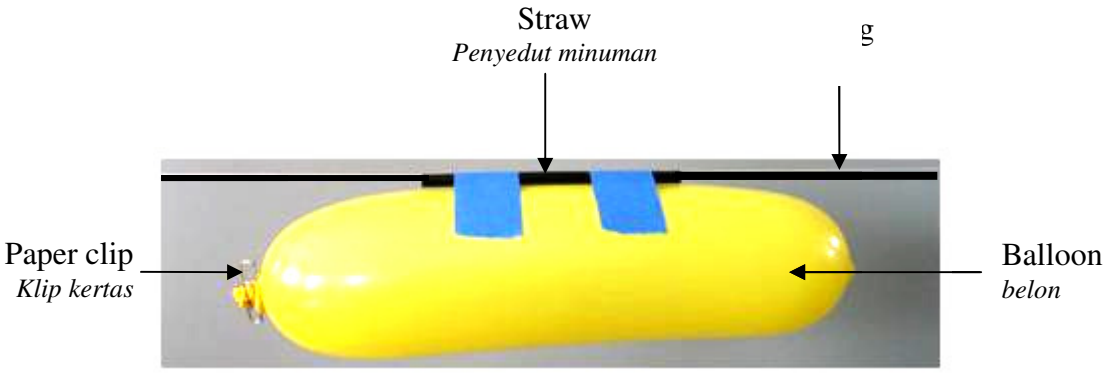


Diagram 11.1
Rajah 11.1

(*a*) When the paper clip is removed, the balloon propels forward.
Bila klip kertas dialihkan , belon bergerak ke depan.

(i) Name the principle used in the propulsion of the balloon. [1 *mark*]
Namakan prinsip yang digunakan dalan terjahan belon tersebut. [1*markah*]

(ii) Explain what makes the balloon propel forward. [4 *marks*]
Terangkan apa yang menyebabkan belon bergerak ke depan . [4 *markah*]

(*b*) The balloon moves with an initial velocity of 4 m s^{-1}. Then, it decelerates for 2 seconds and finally stops.
Belon itu bergerak dengan halaju awal 4 m s^{-1}. Kemudian, ia mengalami nyahpecutan selama 2 saat dan akhirnya berhenti.

(i) Sketch a velocity-time graph for the motion of the balloon.
Lakarkan graf halaju-masa bagi gerakan belon tersebut.

(ii) Calculate the deceleration of the balloon.
Kirakan nyahpecutan belon tersebut.

(iii) Calculate the distance travelled. [5 *marks*]
Hitungkan jarak yang dilalui. [5 *markah*]

(c) Diagram 11.2 shows four racing cars, **P**, **Q**, **R** and **S**, with different specifications. You are required to determine the most suitable car to compete in the Formula 1 Summer Race.
*Rajah menunjukkan empat kereta lumba, **P**, **Q**, **R** dan **S**, dengan spesifikasi yang berbeza. Anda dikehendaki menentukan kereta lumba yang paling sesuai untuk bertanding dalam Perlumbaan Formula 1 musim panas.*

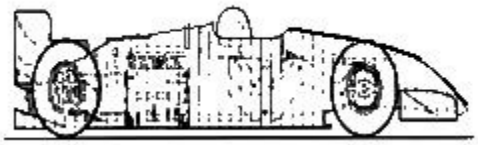
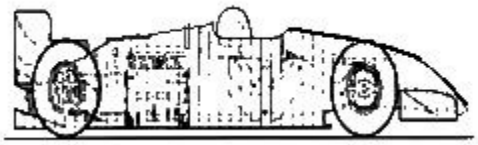
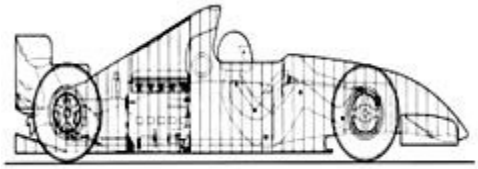
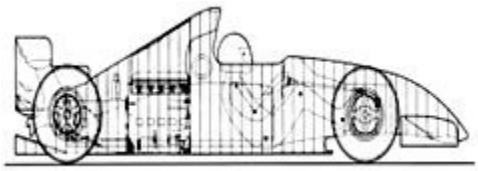
Car ***Kereta***	**Shape** ***Bentuk***	**Ridges on tyres** ***Bunga pada tayar***	**Engine power** ***Kuasa engin***	**Material for the car body** ***Bahan untuk badan kereta***
P	 Aerodynamic *Aerodinamik*	Horizontal and vertical *Melintang dan menegak*	518 kW	Light and elastic *Ringan dan kenyal*
Q	 Aerodynamic *Aerodinamik*	None *Tiada*	745 kW	Heavy and stiff *Berat dan keras*
R	 Inverted Aerofoil *Aerofoil Songsang*	Horizontal and vertical *Melintang dan menegak*	518 kW	Heavy and elastic *Berat dan kenyal*
S	 Inverted Aerofoil *Aerofoil Songsang*	None *Tiada*	745 kW	Light and stiff *Ringan dan keras*

Diagram 11.2
Rajah 11.2

Study the specifications of all racing cars from the following aspects:
Kaji spesifikasi semua kereta lumba dari aspek-aspek berikut:

(i) The shape of the car
Bentuk kereta

(ii) The ridges on the tyres
Bunga pada tayar

(iii) The engine power
Kuasa enjin

(iv) The material for the body of the car
Bahan untuk badan kereta

Explain the suitability of the aspects. Justify your choices.
Terangkan kesesuaian aspek- aspek itu. Beri sebab bagi pilihan anda

[10 *mark*s]
[10 markah]

12 Diagram 12.1 shows a Geiger Muller tube (GM tube) and a rate meter which are used to detect radioactive radiation.

Rajah 12.1 menunjukkan tiub Geiger Muller (Tiub GM) dan alat meter kadar yang digunakan untuk mengesan sinaran radioaktif.

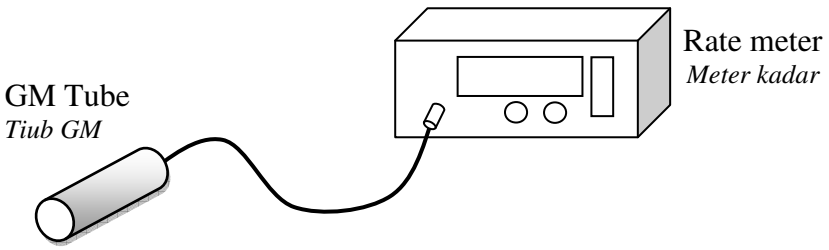


Diagram 12.1
Rajah 12.1

(*a*) What is meant by radioactivity? [1 *mark*]
Apakah yang dimaksudkan dengan keradioaktifan? [1 *markah*]

(*b*) Explain how the GM tube is able to detect the radioactive radiation. [4 *marks*]
Terangkan bagaimana tiub GM boleh mengesan sinaran radioaktif.
[4 *markah*]

(*c*) Radioactive material is also used in smoke detectors. You are assigned to study the characteristics of some radioactive materials and the type of logic gates used in the smoke detector shown in Table 12.1.

Explain the suitability of each characteristic of the radioactive materials and the type of logic gates used and determine the most suitable smoke detector.

Give reasons for your choices. [10 *marks*]

Bahan radioaktif juga digunakan dalam alat pengesan asap. Anda ditugaskan untuk mengkaji ciri-ciri bahan radioaktif dan jenis get logik yang digunakan di dalam alat pengesan asap seperti ditunjukkan dalam Jadual 12.1.

Terangkan kesesuaian setiap ciri bahan radioaktif dan jenis get logik dan seterusnya tentukan alat pengesan asap yang paling sesuai.

Berikan sebab untuk pilihan-pilihan anda [10 *markah*]

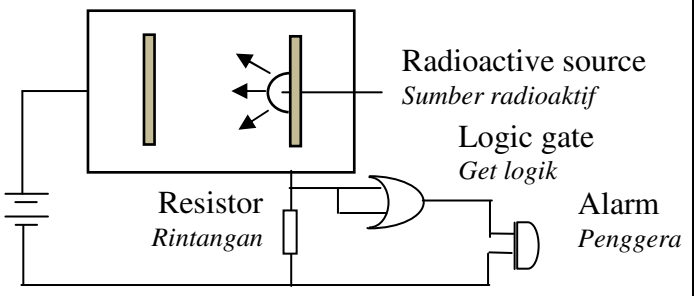
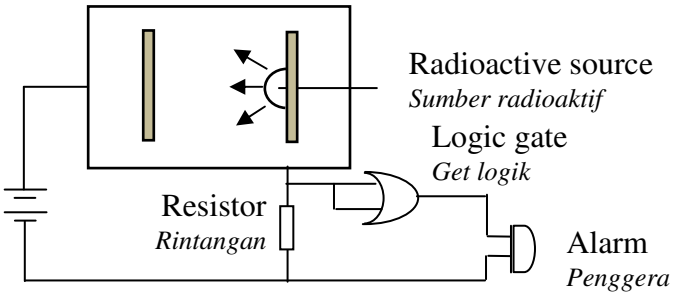
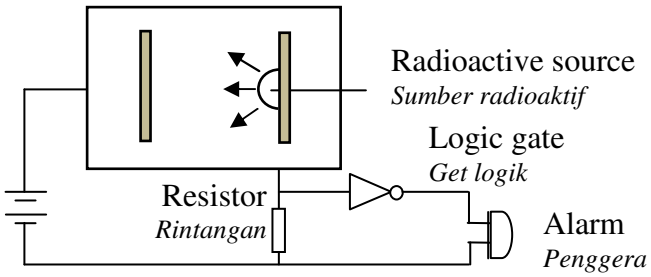
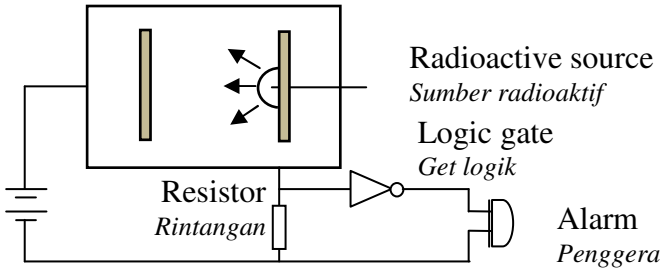
J		Half-life : 460 years *Separuh hayat : 460 tahun* Type of radiation : Alpha *Jenis sinaran : Alfa* State of matter : Gas *Keadaan jirim : Gas*
K		Half-life : 15 days *Separuh hayat : 15 hari* Type of radiation : Beta *Jenis sinaran : Beta* State of matter : Solid *Keadaan jirim : Pepejal*
L		Half-life : 460 years *Separuh hayat : 460 tahun* Type of radiation : Alpha *Jenis sinaran : Alfa* State of matter : Solid *Keadaan jirim : Pepejal*
M		Half-life : 15 days *Separuh hayat : 15 hari* Type of radiation : Beta *Jenis sinaran : Beta* State of matter : Gas *Keadaan jirim : Gas*

Table 12.1
Jadual 12.1

(*d*) (i) Copy and complete the equation for the radioactive decay shown below by writing the appropriate numbers in the boxes provided.

Salin dan lengkapkan persamaan bagi pereputan radioaktif di bawah dengan menulis nombor yang sesuai dalam kotak yang disediakan

$$^{230}_{90}Th \rightarrow {}^{226}_{\square}Ra + {}^{\square}_{2}He + \text{Energy}$$
Tenaga

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

Mass of Th-230 = 230.0331 u
Mass of Ra-226 = 226.0254 u
Mass of He-4 = 4.0026 u
[1 u = 1.66 x 10^{-27} kg]
[speed of light, c = 3 x 10^{8} m s^{-1}]

Jisim Th-230 = 230.0331 *u*
Jisim Ra-226 = 226.0254 *u*
Jisim He-4 = 4.0026 *u*
[*1 u = 1.66 x* 10^{-27} *kg*]
[*Halaju cahaya, c = 3 x* 10^{8} *m* s^{-1}]

(ii) Calculate the mass defect in kg. [2 *marks*]
Hitungkan cacat jisim dalam kg. [*2 markah*]

(iii) Calculate the energy released. [2 *marks*]
Hitungkan tenaga yang dibebaskan. [2 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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HALAMAN KOSONG

INFORMATION TO CANDIDATES
MAKLUMAT UNTUK CALON

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

2. Answer **all** questions in **Section A**. Write your answers for **Section A** in the spaces provided in the question paper.
Jawab **semua** *soalan daripada* **Bahagian A**. *Jawapan kepada* **Bahagian A** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*

3. Answer **one** question from **Section B** and **one** question from **Section C**. Write your answers for **Section B** and **Section C** on the paper provided by the invigilators. Answer questions in **Section B** and **Section C** in detail. Answers should be clear and logical. Equations, diagrams, tables, graphs and other suitable methods can be used to explain your answer.

4. *Jawab* **satu** *soalan daripada* **Bahagian B** *dan* **satu** *soalan daripada* **Bahagian C**. *Jawapan kepada* **Bahagian B** *dan* **Bahagian C** *hendaklah ditulis dalam kertas yang disediakan oleh pengawas peperiksaani. Anda diminta menjawab dengan lebih terperinci untuk* **Bahagian B** dan **Bahagian C**. *Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

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

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

8. If you wish to cancel any answer, neatly cross out the answer. Then write down the new answer.
Jika anda anda hendak menukar sesuatu jawapan,,batalkan jawapan yang telah dibuat . Kemudian tulis jawapan yang baru.

9. A list of formulae is provided on pages 2 and 3.
Satu senarai rumus disediakan di halaman 2 dan 3.

10. You may use non-programmable scientific calculator. However, steps in calculation must be shown.
Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan.)

11. The time suggested to complete **Section A** is 90 minutes, **Section B** is 30 minutes and **Section C** is 30 minutes.
Masa yang dicadangkan untuk menjawab **Bahagian A** *ialah* 90 *minit*, **Bahagian B** *ialah* 30 *minit dan* **Bahagian C** *ialah* 30 *minit*.

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

4531/3
Physics
Paper 3
Sept 2010
1 ½ hours

NAME:…….....

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

MAKTAB RENDAH SAINS MARA

SIJIL PELAJARAN MALAYSIA
TRIAL EXAMINATION 2010

PHYSICS

Paper 3

One hour and thirty minutes

4 5 3 1 3

DO NOT OPEN THIS QUESTION BOOKLET UNTIL TOLD TO DO SO

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

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

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

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

This booklet consists of 18 printed pages and 2 blank pages

Section A
Bahagian A

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

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

1 A student carries out an experiment to investigate the relationship between the wavelength of light, λ and the distance, *x* between two consecutive bright fringes of an interference pattern which is formed on a white screen. The separation between the double slits is fixed at 0.3 mm. The arrangement of the apparatus for this experiment is shown in Diagram 1.1.

Seorang murid menjalankan satu eksperimen untuk mengkaji hubungan antara panjang gelombang cahaya, λ dan jarak, x antara dua pinggir cerah berturutan untuk satu corak interferens yang terbentuk di atas skrin putih. Jarak di antara dwicelah ditetapkan pada 0.3 mm. Susunan radas bagi eksperimen ini ditunjukkan pada Rajah 1.1.

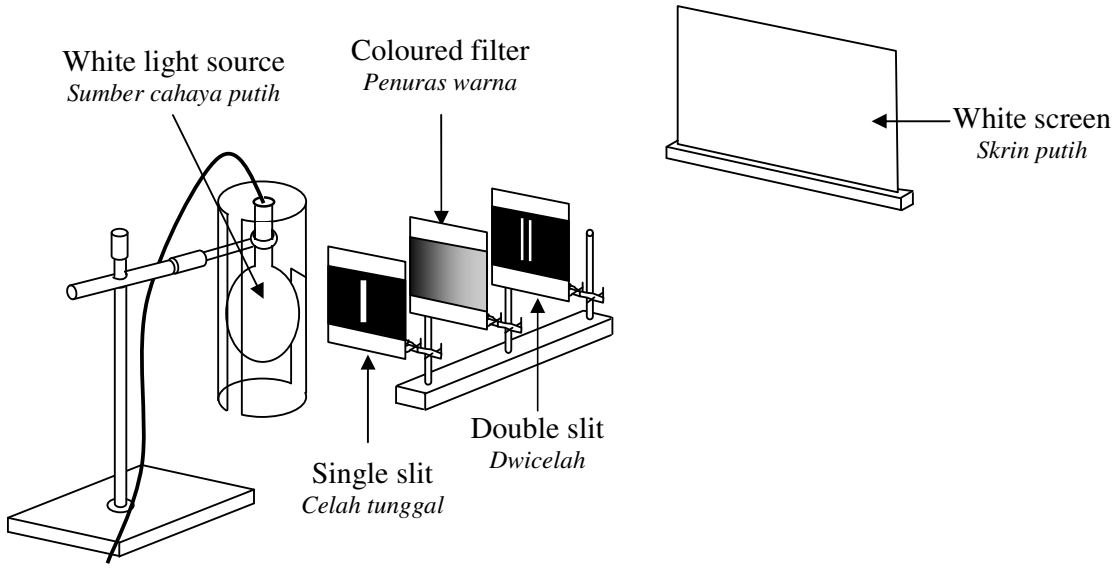


Diagram 1.1
Rajah 1.1

The student starts the experiment using a white light source and a red filter. The red light has a wavelength of 750 nm. The interference pattern formed on the screen is shown in Diagram 1.2.

Pelajar itu memulakan eksperimen menggunakan satu sumber cahaya putih dan penuras merah. Panjang gelombang cahaya merah ialah 750 nm. Corak interferens yang terbentuk pada skrin ditunjukkan pada Rajah 1.2.

The distance, d, for **ten** consecutive bright fringes is measured and recorded. Then, the distance, x, between **two** consecutive bright fringes is determined by using the following formula:

$$x = \frac{d}{10}$$

*Jarak, d, untuk **sepuluh** pinggir cerah diukur dan dicatatkan. Seterusnya, jarak, x di antara **dua** pinggir cerah yang berturutan ditentukan dengan menggunakan rumus berikut:*

$$x = \frac{d}{10}$$

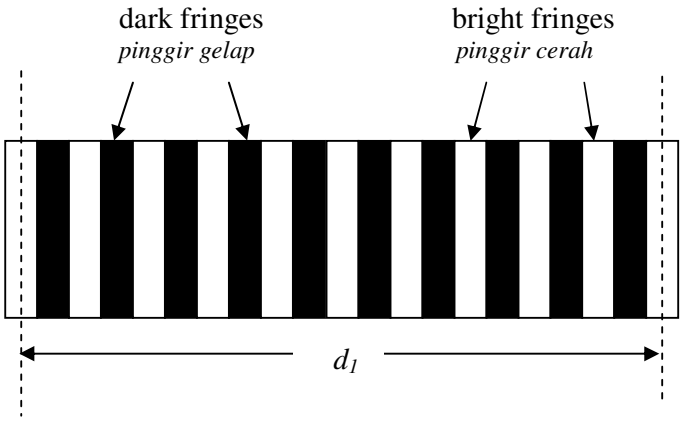


Diagram 1.2
Rajah 1.2

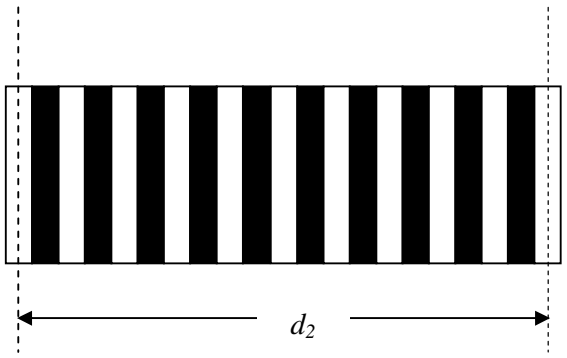
λ = 750 nm
d_1 = …….. cm
x_1 = …….. cm

The experiment is repeated with different coloured filters to produce light with wavelengths of 625 nm, 542 nm, 417 nm and 317 nm.

Eksperimen di ulang dengan menggunakan penuras berlainan warna untuk menghasilkan cahaya yang mempunyai panjang gelombang 625 nm, 542 nm, 417 nm dan 317 nm.

The corresponding distances for ten consecutive bright fringes are shown in Diagrams 1.3, 1.4, 1.5 and 1.6.

Jarak sepadan untuk sepuluh pinggir cerah berturutan ditunjukkan pada Rajah 1.3, 1.4, 1.5 dan 1.6.

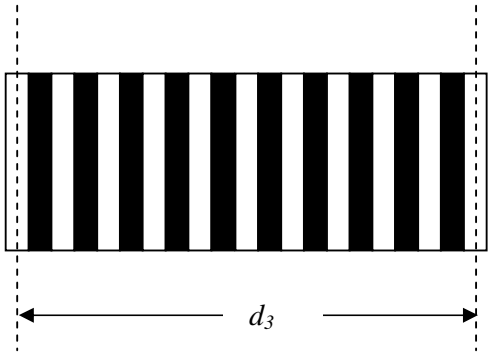


λ = 625 nm

d_2 = …….. cm

x_2 = …….. cm

Diagram 1.3
Rajah 1.3

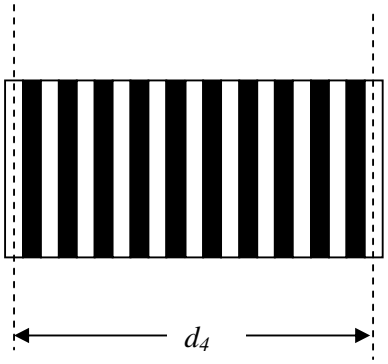


λ = 542 nm

d_3 = …….. cm

x_3 = …….. cm

Diagram 1.4
Rajah 1.4

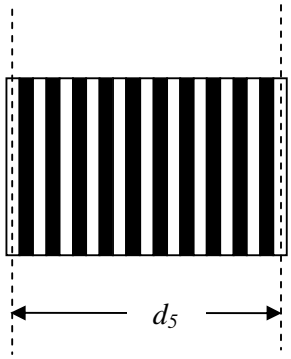


λ = 417 nm

d_4 = …….. cm

x_4 = …….. cm

Diagram 1.5
Rajah 1.5



λ = 317 nm

d_5 = …….. cm

x_5 = …….. cm

Diagram 1.6
Rajah 1.6

For Examiner's Use

(*a*) For the experiment described on pages 2, 3, 4, and 5, identify:

Bagi eksperimen yang diterangkan di halaman 2, 3, 4, dan 5, kenal pasti:

1(*a*)(i) 1

(i) The manipulated variable

Pembolehubah dimanipulasikan

.....

[1 mark]
[1 *markah*]

1(*a*)(ii) 1

(ii) The responding variable

Pembolehubah bergerak balas

.....

[1 mark]
[1 *markah*]

1(*a*)(iii) 1

(iii) The constant variable

Pembolehubah dimalarkan

.....

[1 mark]
[1 *markah*]

(*b*) For this part of the question, write your answers in the spaces provided in the corresponding diagrams.

Untuk bahagian soalan ini, tulis jawapan anda dalam ruang yang disediakan pada rajah-rajah yang sepadan.

Based on Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6 on pages 3, 4 and 5 :

Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 pada halaman 3, 4 dan 5:

1(*b*)(i) 2

(i) Record the distance, *d*, for ten consecutive bright fringes.

Catatkan jarak, d, untuk sepuluh pinggir cerah berturutan.

1(*b*)(ii) 2

(ii) Calculate and record the distance, *x*, for two consecutive bright fringes.

Kira dan catatkan jarak, x, untuk dua pinggir cerah berturutan.

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HALAMAN KOSONG

For Examiner's Use

(*c*) Tabulate your results for all values of λ , d and x in the space below.

Jadualkan keputusan anda bagi semua nilai λ *,* d *dan* x *dalam ruang di bawah.*

1(*c*)

3

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

(*d*) On the graph paper on page 9, plot a graph of x against λ.

Pada kertas graf di halaman 9, lukiskan graf x *melawan* λ.

1(*d*)

5

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

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

Berdasarkan graf anda di **1**(*d*) *, nyatakan hubungan antara* x *dan* λ.

1(*e*)

1

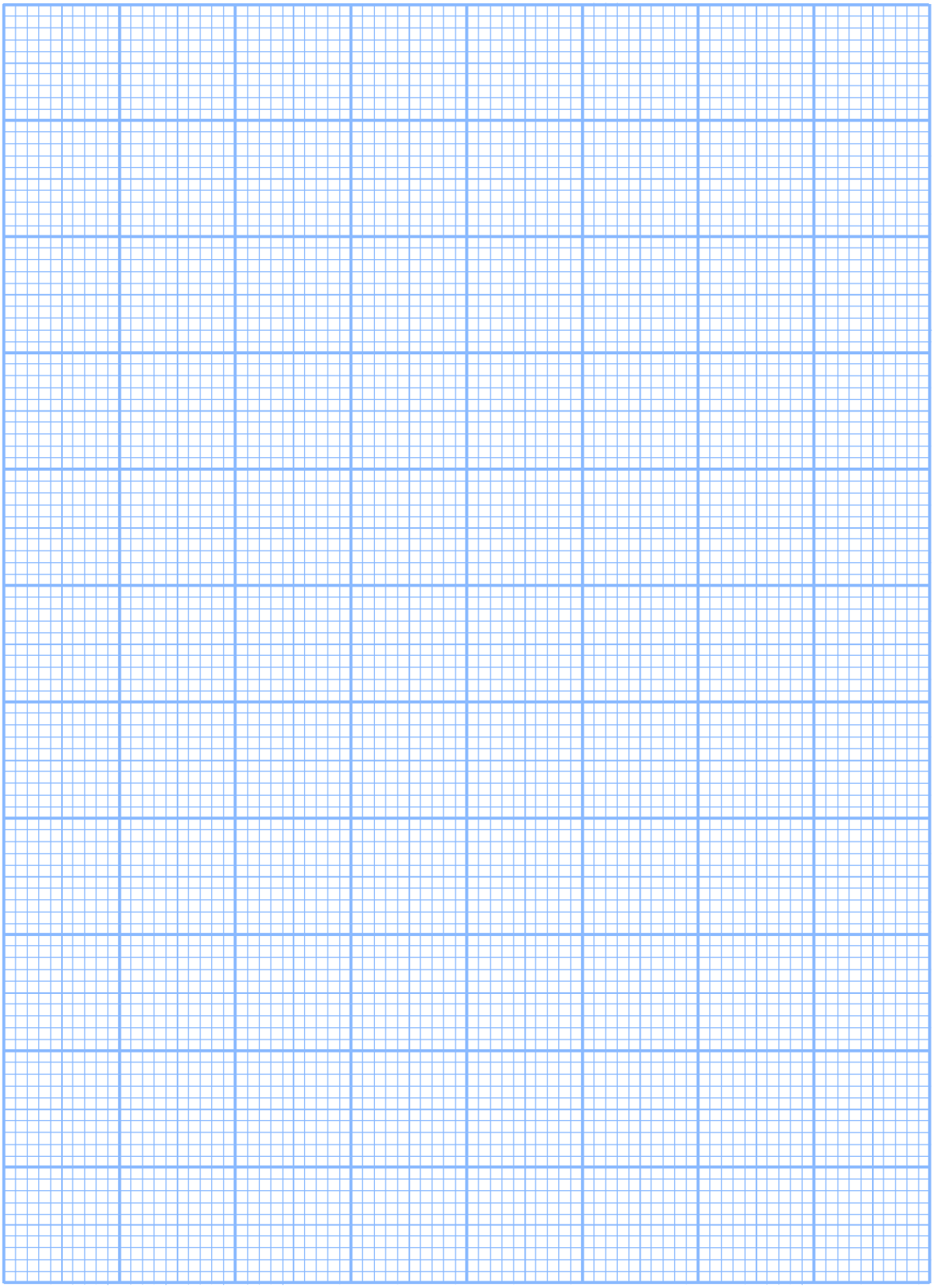
.....

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

TOTAL A1

16

Graph of x against λ.
Graf x *melawan* λ.



2 A student carries out an experiment to investigate the relationship between the depth, *h*, of a wooden block immersed in a liquid and the mass, *m,* of a slotted weight placed on the wooden block. Diagram 2.1 shows the apparatus used in the experiment.

The results of this experiment are shown in the graph of *h* against *m* in Diagram 2.2 on page 11.

Seorang pelajar menjalankan eksperimen untuk menyiasat hubungan antara kedalaman bongkah kayu, h, yang tenggelam dalam cecair dan jisim berslot, m, yang diletakkan di atas bongkah kayu.

Keputusan eksperimen ditunjukkan dalam graf h lawan m dalam Rajah 2.2 *di halaman 11 .*

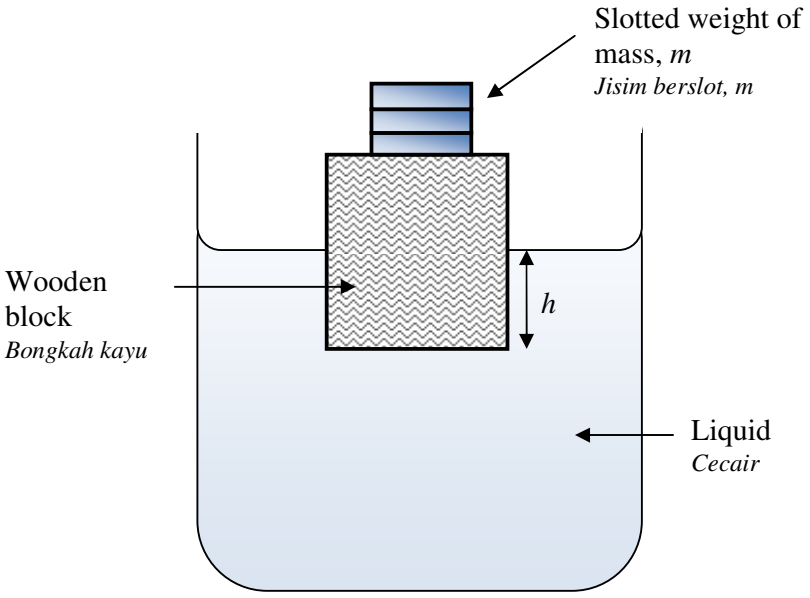


Diagram 2.1
Rajah 2.1

Graph of *h* against *m*

Graf h melawan m

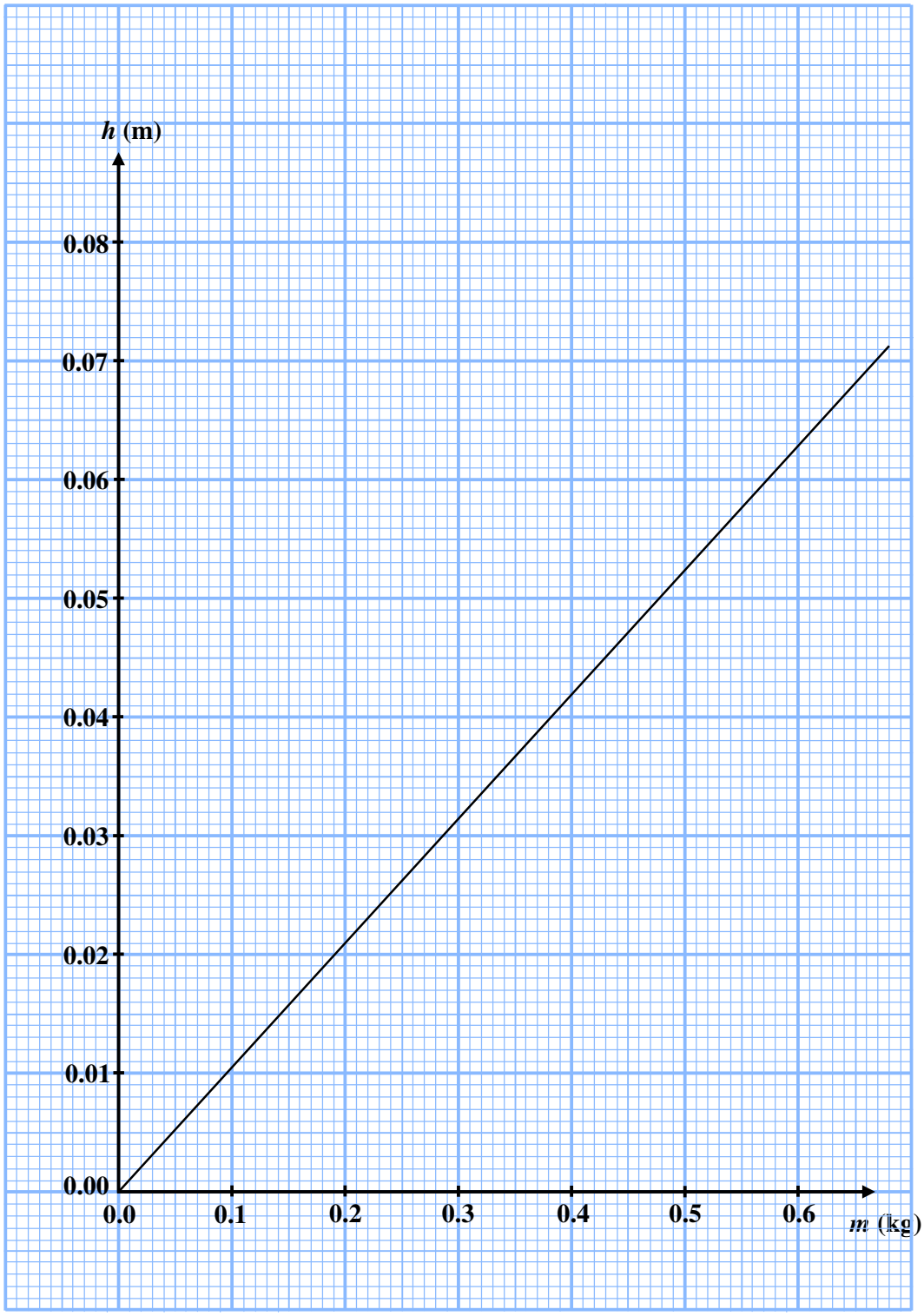


Diagram 2.2

Rajah 2.2

For Examiner's Use

(a) Based on the graph in Diagram 2.2 :

Berdasarkan graf pada Rajah 2.2:

(i) State the relationship between h and m.

Nyatakan hubungan antara h dan m.

2(*a*)(i) 1

.....

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

(ii) Determine the value of h when m = 0.20 kg.
Show on the graph how you determine the value of h.

Tentukan nilai h apabila m = 0.20 kg.
Tunjukkan pada graf bagaimana anda menentukan nilai h

2(*a*)(ii) 2

h = ……..... m

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

(iii) Calculate the gradient, k of the graph.
Show on the graph how you calculate k.

Hitungkan kecerunan, k bagi graf itu.
Tunjukkan pada graf itu bagaimana anda menghitung k.

2(*a*)(iii) 3

k = ……

[3 marks]
[3 *markah*]

For Examiner's Use

(*b*) The density of the liquid, ρ is given by the formula,

$$k\rho = \frac{1}{A}$$

where *k* is the gradient of the graph and *A* is the cross sectional area of the wooden block.

Given that the cross sectional area of the wooden block, $A = 4.0 \times 10^{-3}$ m^2, calculate the value of ρ.

Ketumpatan cecair, ρ *diberikan oleh formula,*

$$k\rho = \frac{1}{A}$$

di mana k ialah kecerunan graf dan A ialah luas keratan rentas bongkah kayu.

Diberi luas keratan rentas bongkah kayu, $A = 4.0 \times 10^{-3}$ m^2, *hitungkan nilai* ρ.

2(*b*)

3

ρ = ... kg m^{-3}

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

For Examiner's Use

(c) The relationship between the buoyant force, F_b and the density of the liquid, ρ is given by

$$F_b = \rho g V$$

Using the answer in **2***(b),* calculate the buoyant force, F_b when the volume of liquid displaced, $V = 5.0 \times 10^{-4}\ m^3$.
($g = 10\ N\ kg^{-1}$)

Hubungan antara daya julangan, F_b dan ketumpatan cecair, ρ, diberikan oleh

$$F_b = \rho g V$$

Menggunakan jawapan dalam bahagian **2***(b), hitungkan daya julangan F_b apabila isipadu cecair yang disesarkan, $V = 5.0 \times 10^{-4}\ m^3$.*
($g = 10\ N\ kg^{-1}$)

2(*c*)

2

F_b = …….....……..

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

(*d*) State **one** precaution that should be taken to improve the results of this experiment.

*Nyatakan **satu** langkah berjaga-jaga yang perlu diambil untuk memperbaiki keputusan eksperimen ini.*

2(*d*)

1

.....

.....

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

TOTAL A2

12

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HALAMAN KOSONG

Section B
Bahagian B

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

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

3 Diagram 3.1 shows a worker pushing down on the piston of a clogged bicycle pump.
Diagram 3.2 shows the same worker finding it harder to push the piston further down.

Rajah 3.1 *menunjukkan seorang pekerja menolak omboh pam basikal yang tersumbat.*
Rajah 3.2 *menunjukkan pekerja yang sama mendapati semakin sukar untuk menekan omboh itu apabila semakin ditolak ke bawah.*

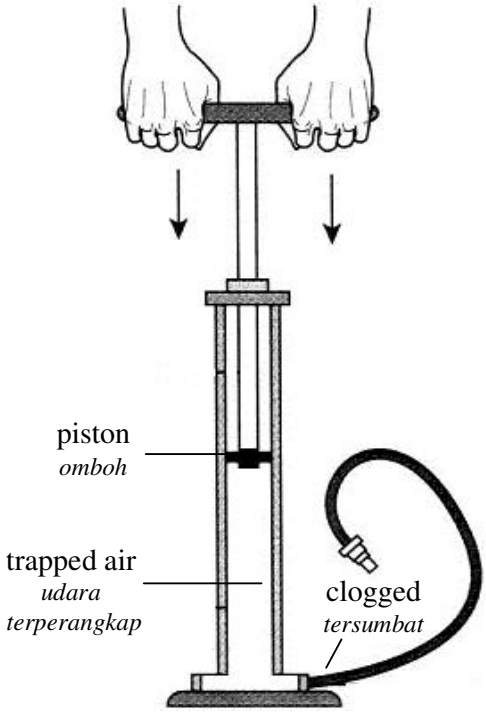

Diagram 3.1
Rajah 3.1

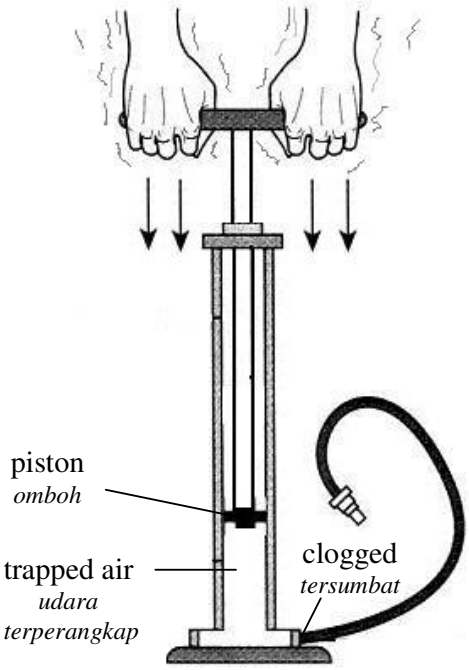

Diagram 3.2
Rajah 3.2

Based on the information and observation :

Berdasarkan maklumat dan pemerhatian tersebut :

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

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

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

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

(c) With the use of apparatus such as a Bourdon gauge and other apparatus, describe an experiment to investigate the hypothesis stated in **3***(b).*

*Dengan menggunakan radas seperti tolok Bourdon dan lain-lain radas , terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di **3**(b).*

In your description, state clearly the following:

Dalam penerangan anda , nyatakan dengan jelas perkara berikut:

(i) The aim of the experiment.

Tujuan eksperimen.

(ii) The variables in the experiment.

Pembolehubah dalam eksperimen.

(iii) The list of apparatus and materials.

Senarai radas dan bahan.

(iv) The arrangement of the apparatus.

Susunan radas.

(v) The procedure used in the experiment.
Describe how to control the manipulated variable and how to measure the responding variable.

Prosedur yang digunakan dalam eksperimen.
Terangkan bagaimana mengawal pembolehubah dimanipulasikan dan bagaimana mengukur pembolehubah bergerak balas.

(vi) The way to tabulate the data.

Cara untuk menjadualkan data.

(vii) The way to analyse the data.

Cara menganalisis data.

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

[Turn over

4 Diagram 4.1 shows a lamp which lights up with normal brightness when the dimmer knob is set at its minimum value.
Diagram 4.2 shows the lamp dimmer when the dimmer knob is set at its maximum value.

Rajah 4.1 menunjukkan sebuah lampu menyala dengan kecerahan normal apabila tombol kawalan kecerahan ditetapkan pada nilai minimum.
Rajah 4.2 menunjukkan lampu tersebut menjadi malap apabila tombol kawalan kecerahan ditetapkan pada nilai maksimum.

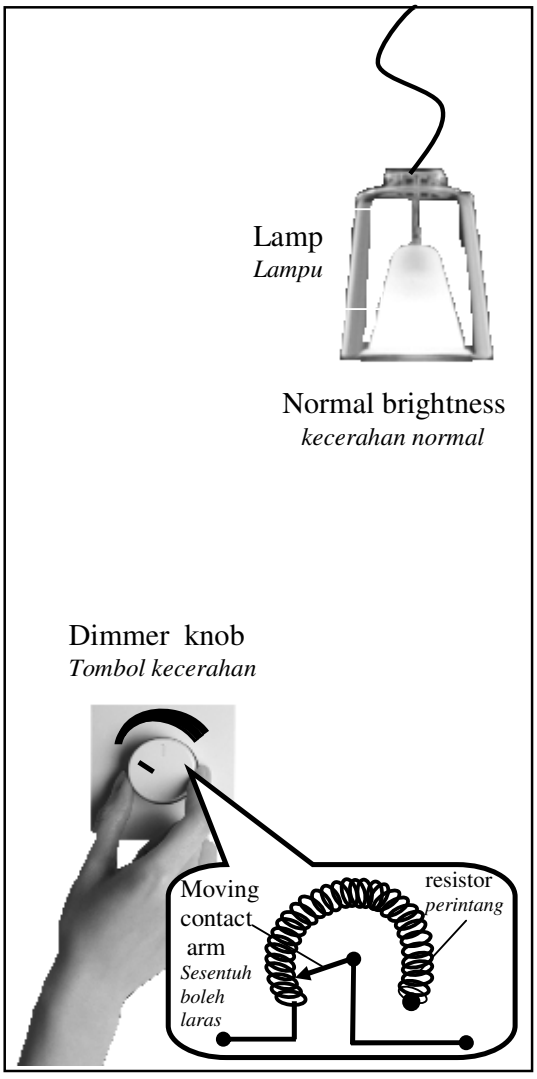

Diagram 4.1
Rajah 4.1

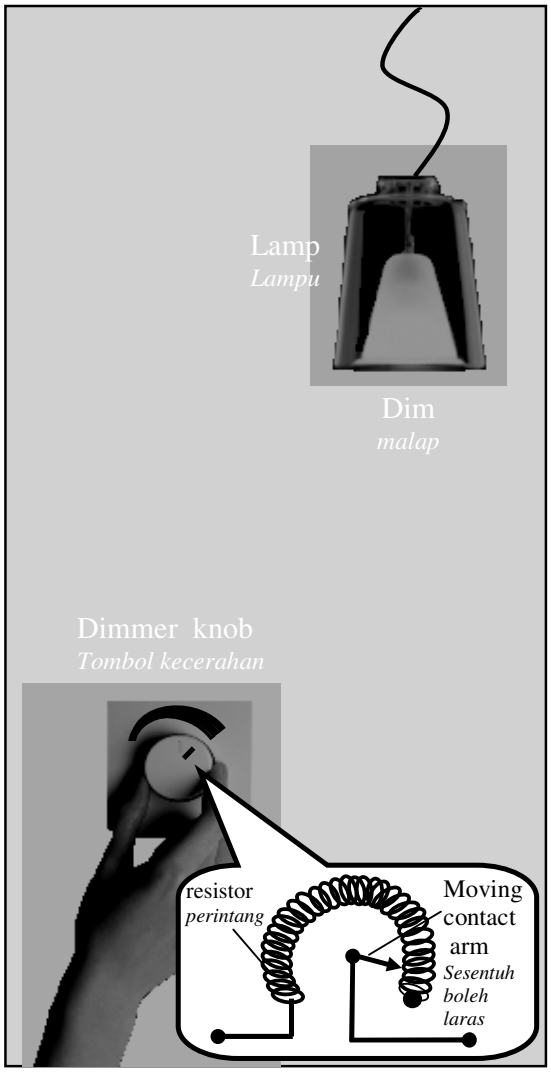

Diagram 4.2
Rajah 4.2

Based on the observation:

Berdasarkan pemerhatian tersebut :

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

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

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

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

(c) With the use use of apparatus such as constantan wire, voltmeter and other apparatus, describe an experiment to investigate the hypothesis stated in **4**(*b*).

*Dengan menggunakan radas seperti dawai constantan, voltmeter dan lain-lain radas, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di **4**(b).*

In your description, state clearly the following:

Dalam penerangan anda , nyatakan dengan jelas perkara berikut :

(i) The aim of the experiment.

Tujuan eksperimen.

(ii) The variables in the experiment.

Pembolehubah dalam eksperimen.

(iii) The list of apparatus and materials.

Senarai radas dan bahan.

(iv) The arrangement of the apparatus.

Susunan radas.

(v) The procedure used in the experiment.
Describe how to control the manipulated variable and how to measure the responding variable.

Prosedur eksperimen yang digunakan dalam eksperimen.
Terangkan bagaimana mengawal pembolehubah dimanipulasikan dan bagaimana mengukur pembolehubah bergerak balas.

(vi) The way to tabulate the data.

Cara untuk menjadualkan data.

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

Cara untuk menganalisis data. [10 *markah*]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1. This question paper consists of two sections: **Section A** and **Section B.**

   *Kertas soalan ini mengandungi **dua b**ahagian: **Bahagian A** dan **Bahagian B.***

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

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

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

   *Jawab **satu** soalan daripada Bahagian B. Jawapan bagi **Bahagian B** hendaklah ditulis pada helaian tambahan yang dibekalkan oleh pengawas peperiksaan. Anda diminta menjawab dengan lebih terperinci. Jawapan mestilah jelas dan logik. Persamaan,gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

4. Show your working, it may help you to get marks.

   Tunjukkan kerja mengira, ini membantu anda mendapatkan markah.

5. 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 dipogram.

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

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

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

    Serahkan kertas jawapan anda di akhir peperiksaan.