



**KEMENTERIAN
PENDIDIKAN
MALAYSIA**

**BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN**

**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2015
PERCUBAAN SIJIL PELAJARAN MALAYSIA**

FIZIK

Kertas 1

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JANGAN BUKA KERTAS SOALANINI SEHINGGA DIBERITAHU

Arahan :

1. *Kertas soalan ini mengandungi 50 soalan.*
2. *Jawab semua soalan.*
3. *Tiap-tiap soalan diikuti oleh sama ada tiga atau empat pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang betul pada kertas jawapan objektif.*
4. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
5. *Anda dibenarkan menggunakan kalkulator saintifik.*
6. *Satu senarai formula disediakan di halaman 2*

Kertas soalan ini mengandungi 35 halaman bercetak.

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

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

1. Which statement is correct about the meaning of vector quantity?

Pernyataan manakah yang betul tentang maksud kuantiti vektor?

A It is a base quantity.

Ia adalah kuantiti asas.

B It can be measured.

Ia boleh diukur.

C It has magnitude and direction.

Ia mempunyai magnitud dan arah.

D It is a product of two or more physical quantities.

Ia adalah hasil darab dua atau lebih kuantiti fizik.

2. Diagram 1 shows a measuring instrument.

Rajah 1 menunjukkan satu alat pengukur.

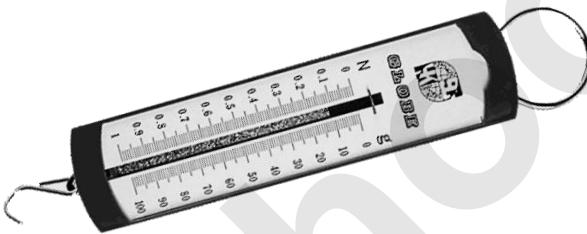


Diagram 1
Rajah 1

The instrument is used to measure

Alat ini digunakan untuk mengukur

A length

panjang

B weight

berat

C density

ketumpatan

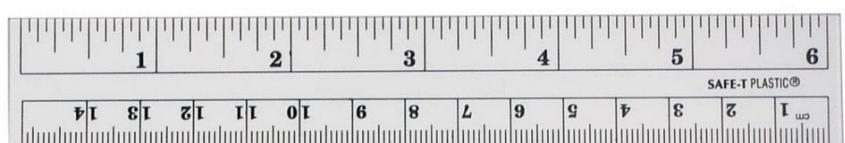
D extension

pemanjangan

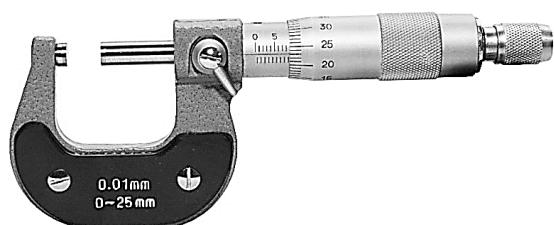
3. Which measuring instruments is the most sensitive?

Alat pengukur manakah adalah paling peka?

A



B



C

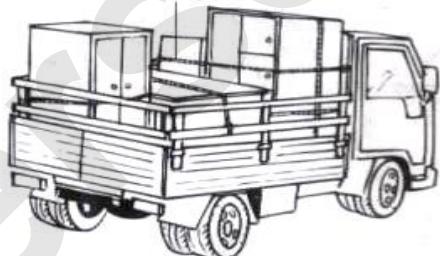


D



4. Which phenomenon shows the effect of impulsive force?

Fenomena manakah yang menunjukkan kesan daya impul?

A**B****C****D**

5. Diagram 2 shows a coconut falling from a tree.

Rajah 2 menunjukkan sebiji kelapa jatuh dari sebatang pokok.

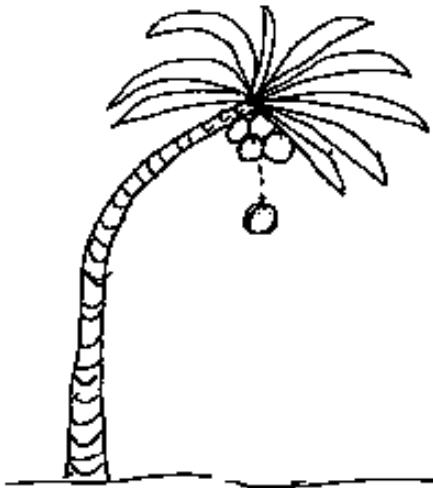


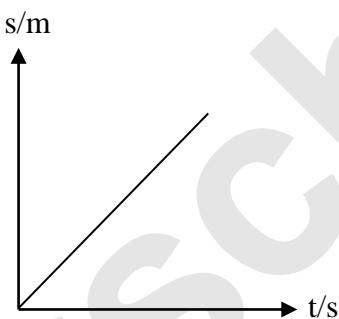
Diagram 2

Rajah 2

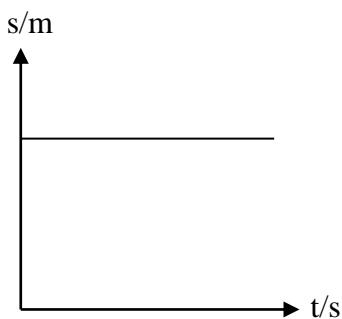
Which displacement-time graph represents the motion of the coconut?

Graf sesaran-masa manakah yang mewakili gerakan buah kelapa itu?

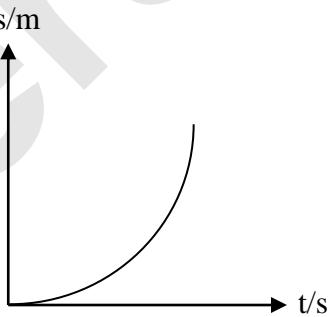
A



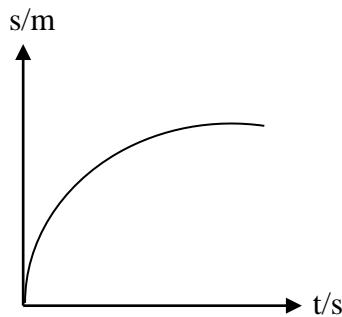
B



C



D



6. Diagram 3 shows two boys pull a boat with force 40 N and 30 N respectively.

Rajah 3 menunjukkan dua budak menarik sebuah bot dengan daya 40 N dan 30 N masing-masing.

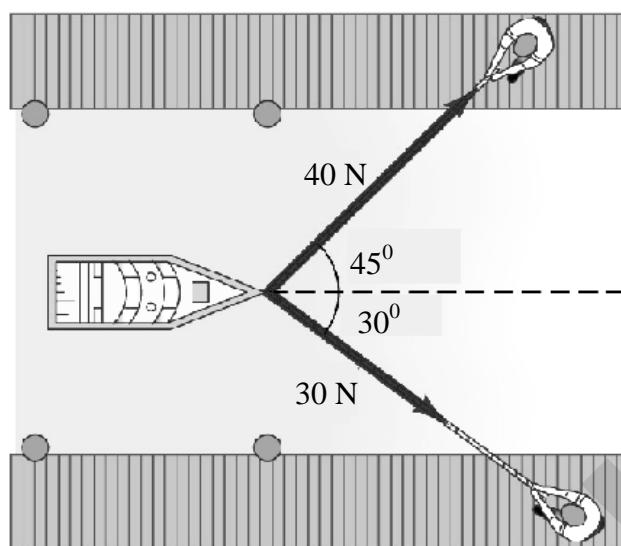


Diagram 3
Rajah 3

What is the magnitude of the resultant force acting on the boat?

Berapakah magnitud daya paduan yang bertindak ke atas bot?

- A 70.0 N
- B 55.9 N
- C 54.3 N
- D 43.3 N

7. Diagram 4 shows a wooden block is placed on the smooth surface of a table.

Rajah 4 menunjukkan sebuah bongkah kayu di letakkan di atas permukaan licin sebuah meja.

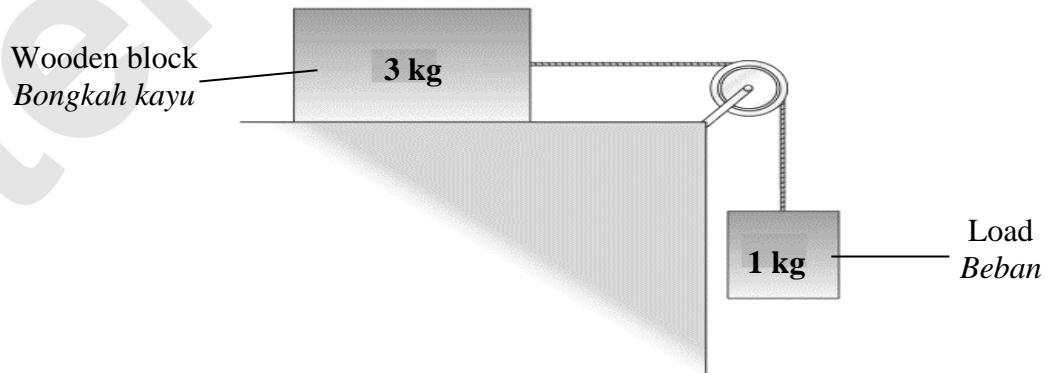


Diagram 4
Rajah 4

Which statement describes the motion of wooden block, when a load of 1 kg is released?

Pernyataan manakah menghuraikan pergerakan blok kayu apabila beban 1 kg dilepaskan?

- A Remains stationary
Kekal pegun
- B Moves with a uniform velocity
Bergerak dengan halaju seragam
- C Moves with a uniform acceleration
Bergerak dengan pecutan seragam
- D Moves with increasing acceleration
Bergerak dengan pecutan bertambah

8. Diagram 5 shows a test of air bags in a car.

Rajah 5 menunjukkan ujian beg udara di dalam sebuah kereta.



Diagram 5
Rajah 5

What is the function of air bag?

Apakah fungsi beg udara?

- A To increase time impact
Untuk menambah masa hentaman
- B To decrease momentum
Untuk mengurangkan momentum
- C To increase impulsive force
Untuk menambah daya impuls
- D To increase friction
Untuk menambah geseran

9. Diagram 6 shows Hazran lifting 60 kg of load.

Rajah 6 menunjukkan Hazran mengangkat beban berjisim 60 kg.

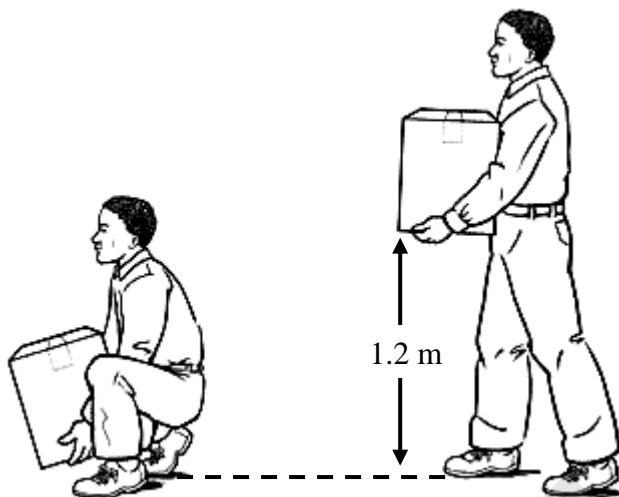


Diagram 6
Rajah 6

What is work done in lifting the load?

Berapakah kerja yang telah dilakukan untuk mengangkat beban tersebut?

- A 50 J
C 500 J

- B 72 J
D 720 J

10. Diagram 7 shows P and Q are two spring arrangements made of identical springs. P and Q are stretched using similar loads.

Rajah 7 menunjukkan P dan Q, adalah dua susunan spring yang dibuat daripada spring yang serupa. P dan Q diregang menggunakan pemberat yang serupa.

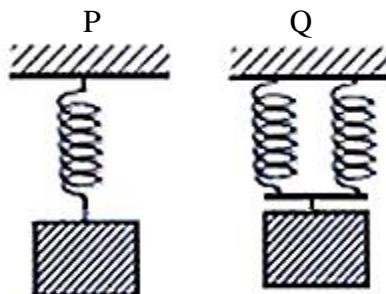
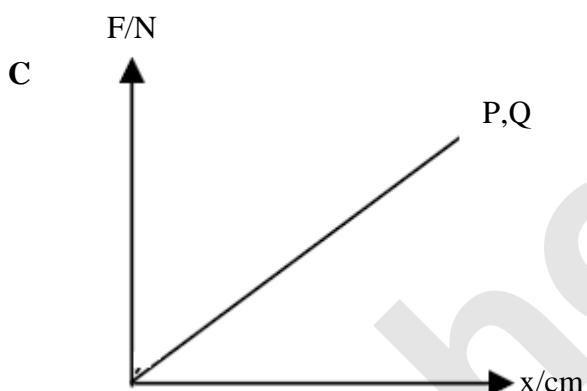
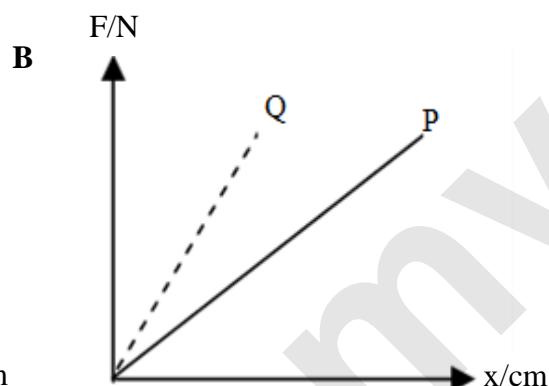
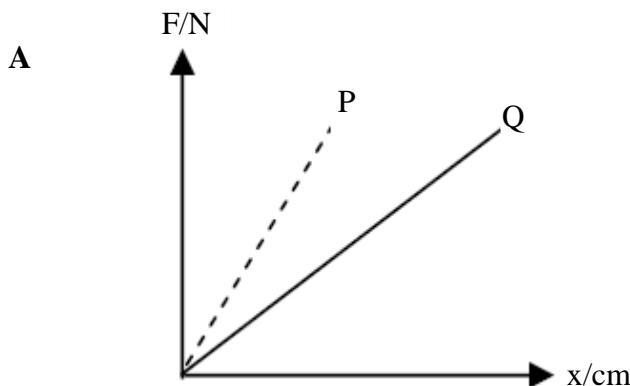


Diagram 7
Rajah 7

Which graph shows the relationship between the load weight, F and the extension of spring, x, for P and Q?

Graf manakah menunjukkan hubungan antara berat pemberat, F dan pemanjangan spring, x, untuk P dan Q?



11. Which factor **does not** affect the pressure at a point in the liquid?

*Faktor manakah yang **tidak** mempengaruhi tekanan pada suatu titik di dalam cecair?*

- A Depth of liquid
Kedalaman cecair
- B The density of liquid
Ketumpatan cecair
- C Surface area of a liquid
Luas permukaan cecair
- D Gravitational acceleration
Pecutan graviti

- 12.** Among these situations, which can damage wooden floor that can withstand only 2×10^5 Pa pressure?

Antara situasi berikut, yang manakah boleh merosakkan lantai kayu yang hanya dapat menampung tekanan 2×10^5 Pa?

- A** A block of cement with a weight of 2×10^5 N and a surface area of 10 m^2 .
Satu bongkah simen dengan berat 2×10^5 N dan luas permukaan 10 m^2 .
- B** An elephant with a weight of 3×10^4 N and total area of footprints are 0.2 m^2 .
Seekor gajah dengan berat 3×10^4 N dan jumlah luas tapak kaki 0.2 m^2 .
- C** Amy with a weight of 500 N wears small heeled shoes that have surface area of 0.0002 m^2 .
Indahsari dengan berat 500 N memakai kasut bertumit kecil yang mempunyai luas permukaan 0.0002 m^2 .
- D** Amir with a weight of 400 N wears sport shoes with surface area of 0.03 m^2 .
Amir dengan berat 400 N memakai kasut sukan yang mempunyai luas permukaan 0.03 m^2 .

- 13.** Diagram 8 shows a manometer connected to a gas tank.

Rajah 8 menunjukkan sebuah manometer yang disambungkan kepada sebuah tangki gas.

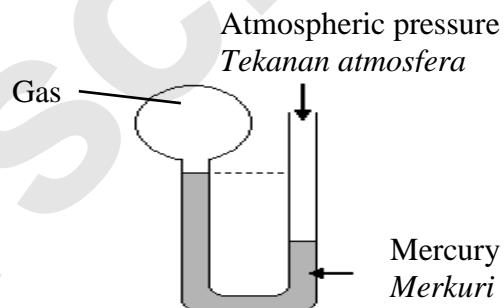


Diagram 8
Rajah 8

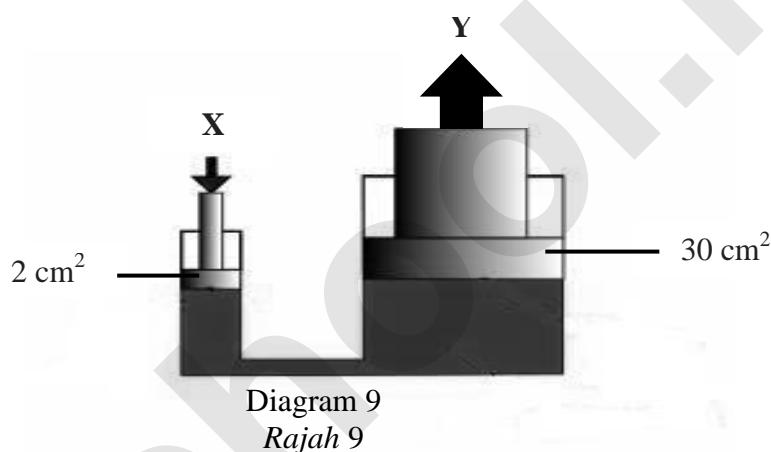
If the atmospheric pressure is 76 cm Hg, which statement is true about the pressure of gas in the tank?

Jika tekanan atmosfera ialah 76 cm Hg, pernyataan yang manakah adalah benar tentang tekanan gas dalam tangki?

- A** Equal to 76 cm Hg
Sama dengan 76 cm Hg
- B** Larger than 76 cm Hg
Lebih besar daripada 76 cm Hg
- C** Smaller than 76 cm Hg
Lebih kecil daripada 76 cm Hg
- D** Equivalent to 0 cm Hg
Sama dengan 0 cm Hg

14. Diagram 9 shows a hydraulic system

Rajah 9 menunjukkan satu sistem hidraulik.



Which pair of forces X and Y is true?

Pasangan daya X dan Y yang manakah adalah benar?

	Force X / N <i>Daya X / N</i>	Force Y / N <i>Daya Y / N</i>
A	20	200
B	60	900
C	80	480
D	100	1000

- 15.** Diagram 10 shows the weight of an object X is measured in the air and then in the water.

Rajah 10 menunjukkan berat suatu objek X diukur di udara dan kemudian di dalam air.

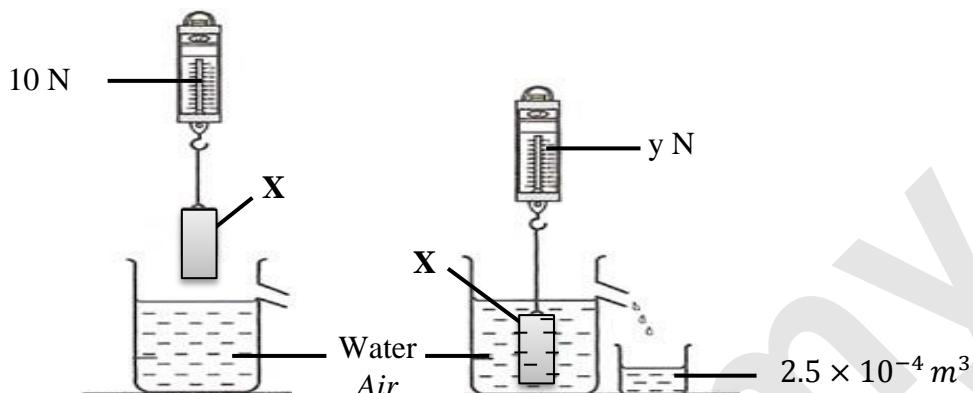


Diagram 10
Rajah 10

What is the reading of y?

(The density of water = 1000 kg m^{-3})

Berapakah bacaan y?

(Ketumpatan air = 1000 kg m^{-3})

A 2.5 N

B 7.5 N

C 10.0 N

D 12.5 N

- 16.** Diagram 11 shows a car.

Rajah 11 menunjukkan sebuah kereta.

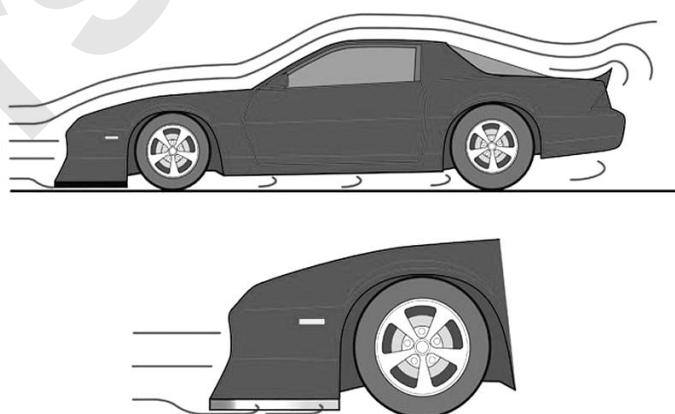


Diagram 11
Rajah 11

Physics principles which contribute to the stability of the car when it accelerates and moves at high speed is

Prinsip fizik yang menyumbang kepada kestabilan kereta itu apabila ia memecut dan bergerak dengan laju tinggi ialah

- A Pascal's principle
Prinsip Pascal
- B Bernoulli's principle
Prinsip Bernoulli
- C Archimedes' principle
Prinsip Archimedes

17. Diagram 12 shows a manometer tube filled with mercury and liquid X.

Rajah 12 menunjukkan satu tiub manometer diisi dengan merkuri dan cecair X.

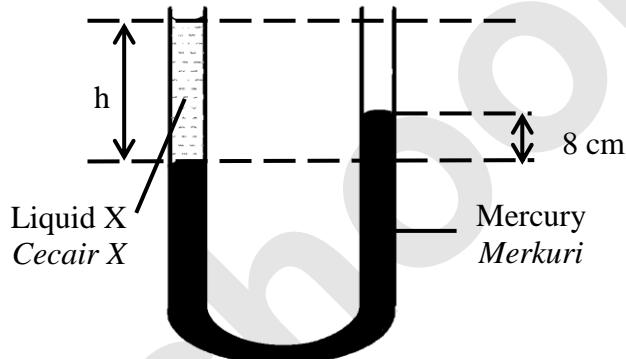


Diagram 12
Rajah 12

What is the height, h of the liquid X ?

(Density of mercury = $13\ 600\ \text{kg m}^{-3}$ and density of liquid X = $3\ 400\ \text{kg m}^{-3}$)

Berapakah ketinggian, h cecair X?

(*Ketumpatan merkuri = $13\ 600\ \text{kg m}^{-3}$ dan ketumpatan cecair X = $3\ 400\ \text{kg m}^{-3}$*)

- | | |
|---------|---------|
| A 8 cm | B 16 cm |
| C 32 cm | D 64 cm |

- 18.** Mercury is used in the liquid-in-glass thermometer because it
Merkuri digunakan di dalam termometer cecair dalam kaca kerana ia

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

- 19.** Diagram 13 shows a stone at 60°C is immersed in a cooler liquid Y.

Rajah 13 menunjukkan seketul batu pada suhu 60°C direndamkan ke dalam satu cecair Y yang lebih sejuk.

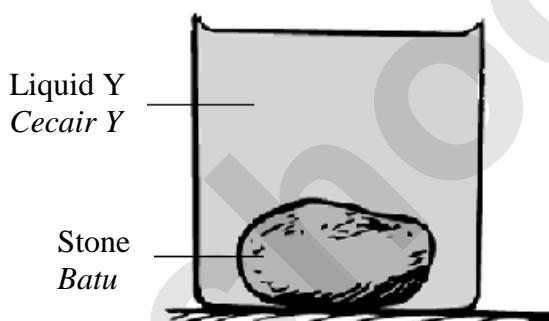


Diagram 13
Rajah 13

Thermal equilibrium is reached when

Keseimbangan terma dicapai apabila

- A** Volume of stone = volume of liquid Y
Isipadu batu = isipadu cecair Y
- B** Mass of stone = mass of liquid Y displaced
Jisim batu = jisim cecair Y yang disesarkan
- C** Temperature of stone = temperature of liquid Y
Suhu batu = suhu cecair Y
- D** Specific heat capacity of stone = specific heat capacity of liquid Y
Muatan haba tentu batu = muatan haba tentu cecair Y

- 20.** Diagram 14 shows a cooling curve of a substance.

Rajah 14 menunjukkan lengkung penyejukan suatu bahan.

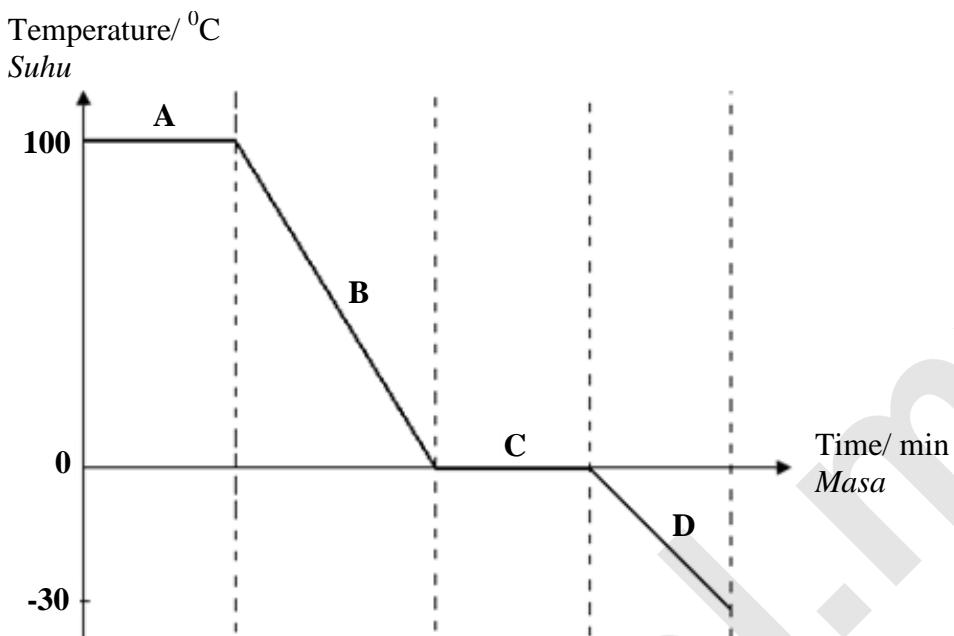


Diagram 14
Rajah 14

Which of the phases **A**, **B**, **C** or **D**, shows the substance is in solid and liquid at the same time?

*Fasa manakah antara **A**, **B**, **C** atau **D**, yang menunjukkan bahan itu dalam keadaan pepejal dan cecair pada masa yang sama?*

- 21.** Diagram 15 shows sea breeze phenomenon.

Rajah 15 menunjukkan fenomena bayu laut.

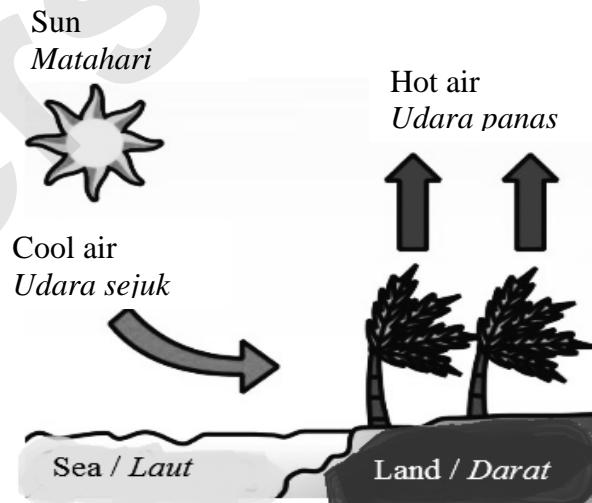


Diagram 15
Rajah 15

Which physics concept explains the phenomenon?

Konsep fizik manakah yang menerangkan fenomena tersebut?

- A Thermal equilibrium
Keseimbangan terma
- B Specific heat capacity
Muatan haba tentu
- C Specific latent heat
Haba pendam tentu
- D Thermal conductivity
Kekonduksian haba

22. Diagram 16 shows the length of an air trapped column at 27°C .

Rajah 16 menunjukkan panjang turus udara terperangkap pada 27°C .

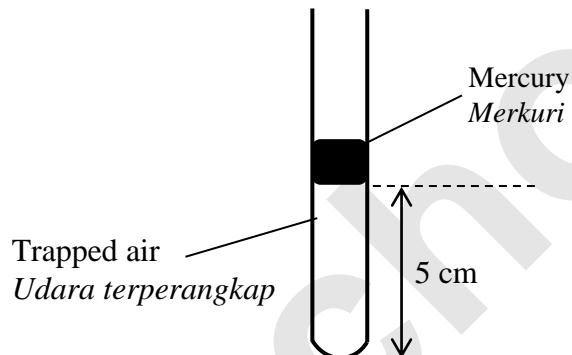


Diagram 16
Rajah 16

What is the length of the air column at 100°C ?

Berapakah panjang turus udara pada 100°C ?

- A 1.35 cm
- B 4.02 cm
- C 6.22 cm
- D 18.52 cm

23. Diagram 17 shows Yusuf is conducting an eye test. The distance between Yusuf and the object is 2.5 m.

Rajah 17 menunjukkan Yusuf sedang menjalani ujian mata. Jarak di antara Yusuf dengan objek adalah 2.5 m.

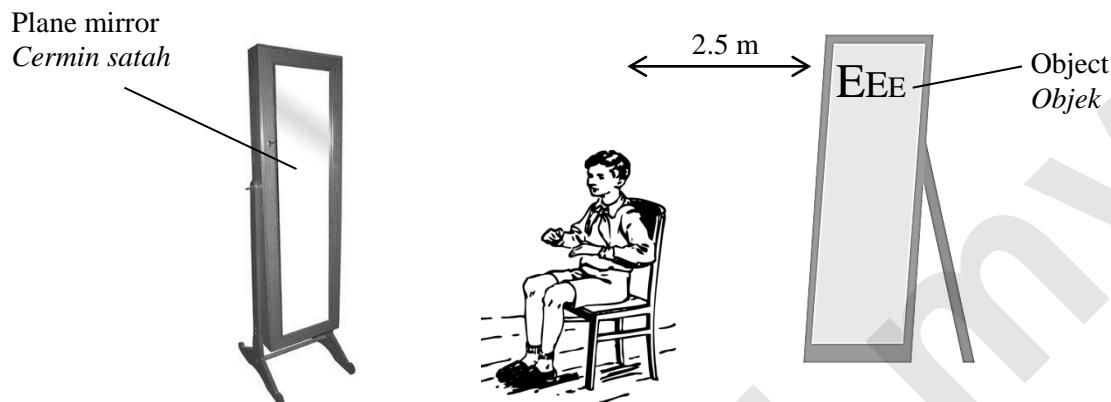


Diagram 17
Rajah 17

If the distance between Yusuf and the image is 7 m, what is the distance between Yusuf and the plane mirror?

Jika jarak di antara Yusuf dengan imej adalah 7 m, berapakah pula jarak di antara Yusuf dengan cermin satah itu?

- | | |
|----------|----------|
| A 2.25 m | B 2.50 m |
| C 3.50 m | D 7.00 m |

24. Diagram 18 shows a vehicle with word **AMBULANCE** in front of it.

*Rajah 18 menunjukkan sebuah kenderaan dengan perkataan **AMBULANCE** di hadapannya.*



Diagram 18
Rajah 18

What is the characteristic of image from a plane mirror to explain the situation?

Apakah ciri imej daripada cermin satah untuk menerangkan situasi tersebut?

- | | |
|-------------------------------|--|
| A Real
<i>Nyata</i> | B Virtual
<i>Maya</i> |
| C Inverted
<i>Songsang</i> | D Laterally inverted
<i>Songsang sisi</i> |

25. Diagram 19 shows a light ray enters the glass block with an angle.

Rajah 19 menunjukkan satu alur cahaya memasuki satu blok kaca dengan suatu sudut.

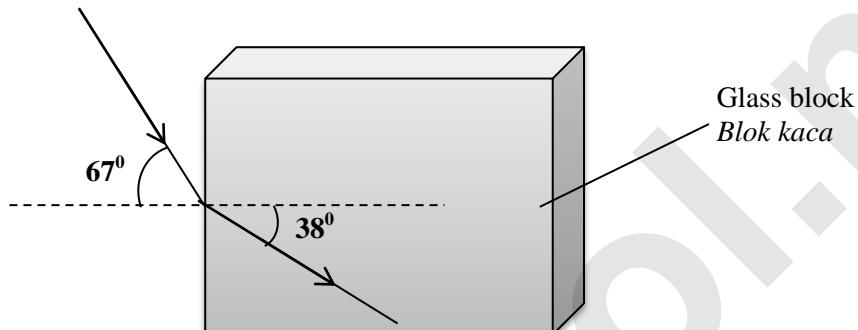


Diagram 19
Rajah 19

What is the critical angle of the glass block?

Berapakah nilai sudut genting bagi blok kaca tersebut?

- | | |
|----------|----------|
| A 39^0 | B 42^0 |
| C 50^0 | D 69^0 |

26. Which characteristics of image formed by a magnifying glass?

Ciri-ciri imej yang manakah terbentuk oleh sebuah kanta pembesar?

- | | |
|--|--|
| A Real and upright
<i>Nyata dan tegak</i> | B Virtual and upright
<i>Maya dan tegak</i> |
| C Real and inverted
<i>Nyata dan songsang</i> | D Virtual and inverted
<i>Maya dan songsang</i> |

27. Diagram 20 shows the apparatus used to determine the relationship between the object distance, u , the image distance, v and the focal length, f , of a convex lens.

Rajah 20 menunjukkan radas eksperimen untuk menentukan hubungan di antara jarak objek, u , jarak imej, v dan jarak fokus, f , bagi sebuah kanta cembung.

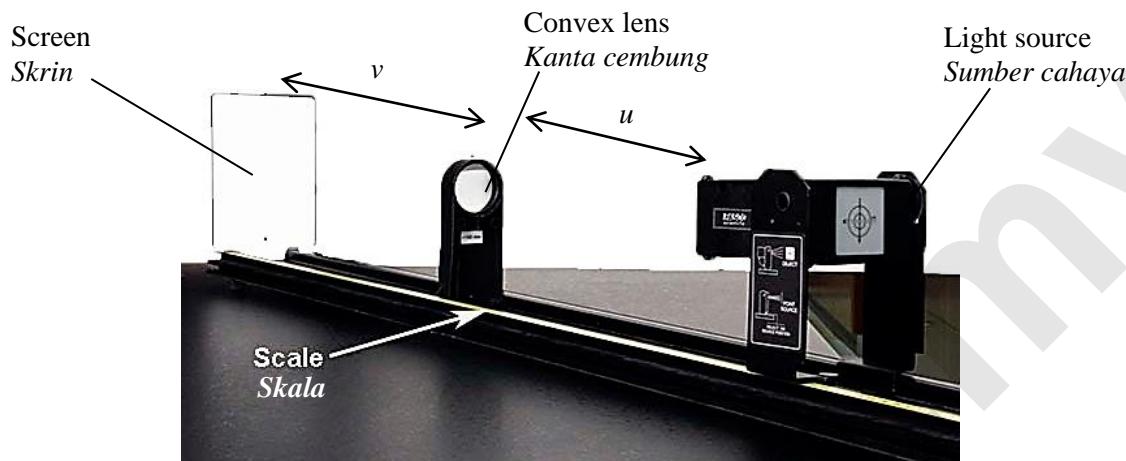
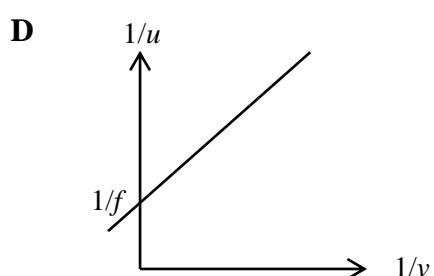
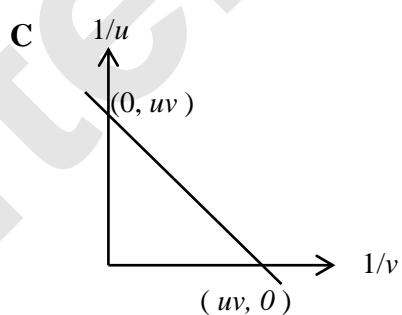
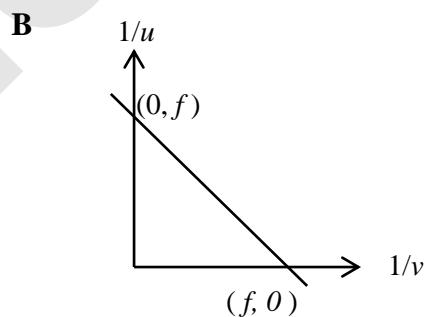
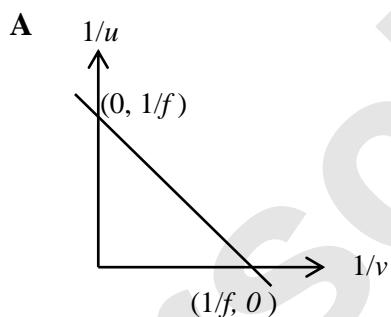


Diagram 20
Rajah 20

Which graph shows the correct result?

Graf yang manakah menunjukkan keputusan yang betul?



- 28.** Diagram 21 shows a graph of velocity against wavelength for three experiments X, Y and Z.

Rajah 21 menunjukkan graf halaju melawan panjang gelombang bagi tiga eksperimen X, Y dan Z.

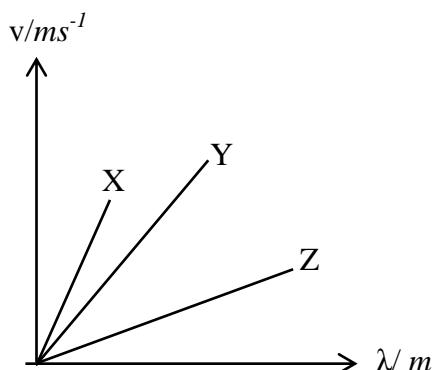


Diagram 21
Rajah 21

Which experiment shows the highest frequency?

Eksperimen manakah menunjukkan frekuensi tertinggi?

- A** X
- B** Y
- C** Z

- 29.** Diffraction of waves is

Pembelauan gelombang adalah

- A** superposition effect of two waves from two coherent sources.
kesan superposisi dua gelombang daripada dua sumber koheren.
- B** when the waves are deflected after it encounters an obstacle.
apabila gelombang dipesongkan selepas bertemu halangan.
- C** the spreading of waves when it moves through a gap or around an obstacle.
penyebaran gelombang apabila ia bergerak melalui celah atau mengelilingi halangan.
- D** change of direction of propagation of waves when travelling from a medium to another medium due to a change of speed
perubahan arah perambatan gelombang apabila bergerak dari satu medium kepada medium yang lain disebabkan oleh perubahan laju.

30. Diagram 22 shows a poster about the tsunami.

Rajah 22 menunjukkan poster tentang tsunami.

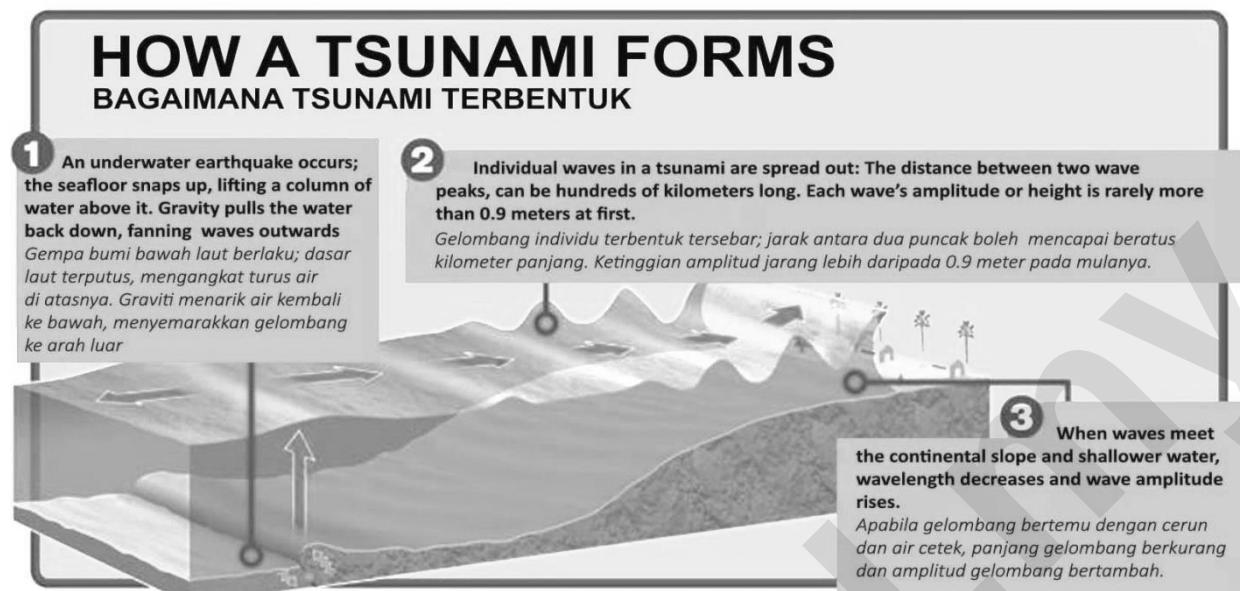


Diagram 22
Rajah 22

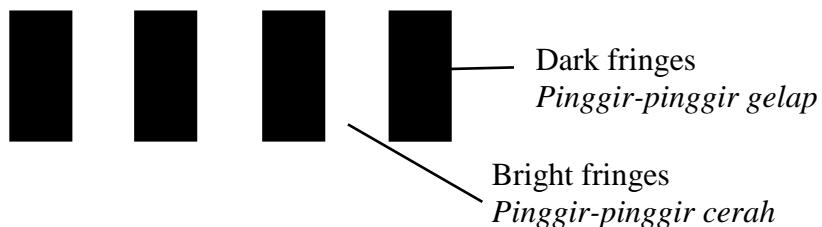
Which statement is correct about the tsunami?

Pernyataan manakah yang betul tentang tsunami?

- A The energy decreases as the amplitude of the wave increases
Tenaga berkurang apabila amplitud gelombang bertambah.
- B The energy and wave amplitude increases due to the effect of superposition between the waves.
Tenaga dan amplitud gelombang bertambah disebabkan oleh kesan superposisi antara gelombang.
- C The energy produced by the earthquake at sea moving along the water particle to the shore.
Tenaga yang terhasil akibat gempa bumi di tengah laut bergerak bersama-sama zarah-zarah air ke pantai.
- D The energy produced by the earthquake at sea is transferred by water particle to the shore.
Tenaga yang terhasil akibat gempa bumi di tengah laut di pindahkan oleh zarah air ke pantai.

31. Diagram 23 shows the fringes obtained when red light is used in a Young's double slit experiment.

Rajah 23 menunjukkan pinggir-pinggir yang diperoleh apabila cahaya merah digunakan dalam eksperimen dwicelah Young.



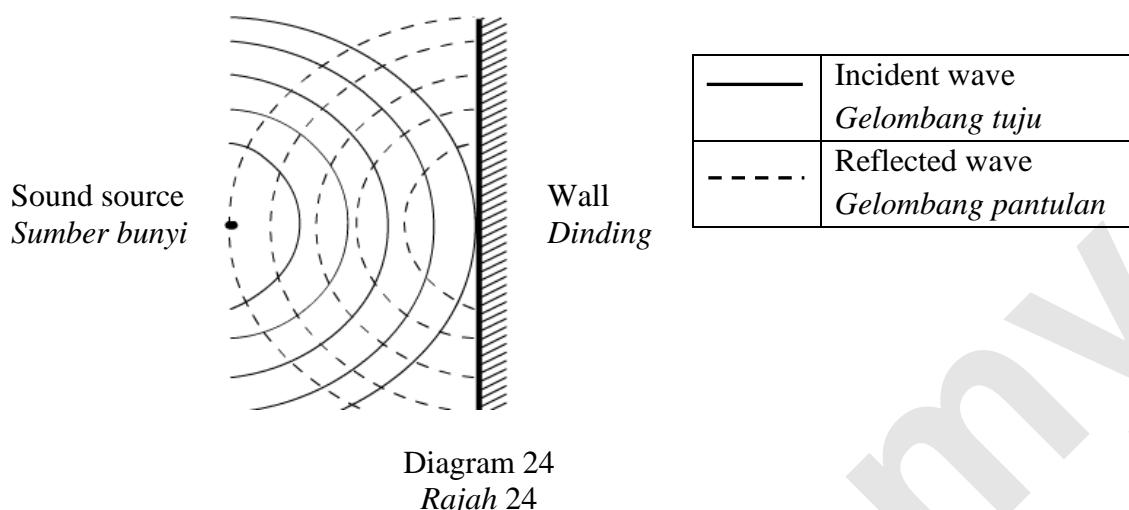
Which fringes are observed when the red light is replaced by blue light?

Pinggir-pinggir manakah yang diperhatikan jika cahaya merah digantikan dengan cahaya biru?

- A
- B
- C
- D

32. Diagram 24 shows sound waves propagating towards a wall.

Rajah 24 menunjukkan gelombang bunyi merambat ke arah sebuah dinding.



Which of the characteristics changes after reflection occurs?

Ciri manakah yang berubah selepas pantulan berlaku?

- | | |
|---------------|--------------------------|
| A Speed | B Direction |
| <i>Laju</i> | <i>Arah</i> |
| C Period | D Wavelength |
| <i>Tempoh</i> | <i>Panjang gelombang</i> |

33. Mammography is a process to examine the human breast which able to detect breast cancer earlier.

Mamografi adalah satu proses untuk memeriksa payu dara manusia yang boleh mengesan kanser payu dara lebih awal.

Which electromagnetic wave is used for this purpose?

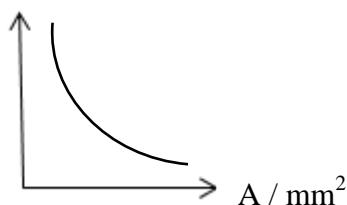
Gelombang elektromagnet manakah digunakan untuk tujuan ini?

- | | |
|--------------------|------------------------|
| A X-ray | B Microwave |
| <i>Sinar-X</i> | <i>Gelombang mikro</i> |
| C Infrared | D Radio wave |
| <i>Infra merah</i> | <i>Gelombang radio</i> |

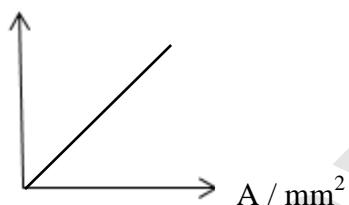
34. Which graph shows the correct relationship between the resistance, R and its cross-sectional area, A for a conductor?

Graf manakah yang menunjukkan hubungan yang betul antara rintangan, R dengan luas keratan rentas, A bagi konduktor?

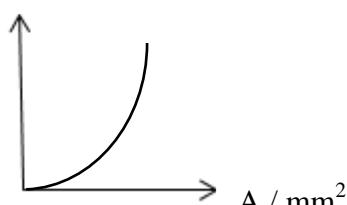
A R / Ω



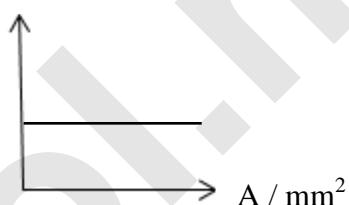
B R / Ω



C R / Ω



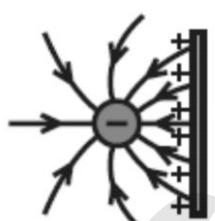
D R / Ω



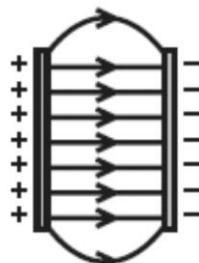
35. Which diagram does **not** show the pattern of an electric field correctly?

Rajah manakah yang *tidak* menunjukkan corak medan magnet yang betul?

A



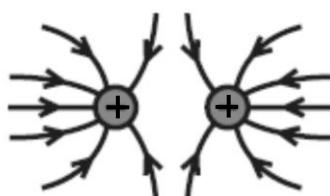
B



C



D



36. Diagram 25 shows a rheostat X and resistor Y are connected in series to two batteries.

Voltmeter V_1 and V_2 are connected across the rheostat and resistor respectively.

Rajah 25 menunjukkan reostat X dan perintang Y yang disambung secara sesiri dengan dua bateri. Voltmeter V_1 dan V_2 masing-masing disambung merentasi reostat X dan perintang Y.

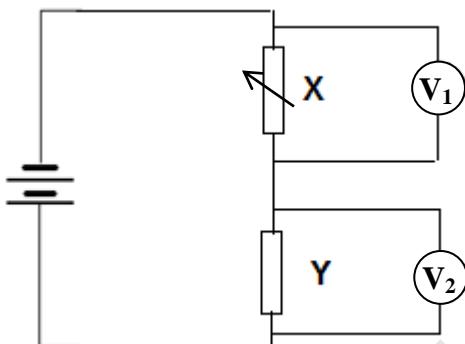


Diagram 25
Rajah 25

Which pair of the voltmeters' reading is correct when the resistance of the rheostat X is reduced?

Pasangan bacaan voltmeter yang manakah betul apabila rintangan pada reostat X dikurangkan?

	Voltmeter V_1	Voltmeter V_2
A	Decreases <i>Berkurang</i>	Decreases <i>Berkurang</i>
B	Decreases <i>Berkurang</i>	Increases <i>Bertambah</i>
C	Increases <i>Bertambah</i>	Increases <i>Bertambah</i>
D	Increases <i>Bertambah</i>	Decreases <i>Berkurang</i>

37. Diagram 26 shows an electric kettle labeled ‘240 V, 2200 W’.

Rajah 26 menunjukkan sebuah cerek elektrik berlabel ‘240 V, 2200 W’.



Diagram 26
Rajah 26

What is the current that flow in wires?

Berapakah arus yang mengalir melalui dawai?

- A 4.80
- B 8.80
- C 9.17
- D 10.00

- 38.** Diagram 27 shows a plotting compass placed beside a current-carrying wire.

Rajah 27 menunjukkan sebuah kompas diletakkan di sebelah suatu dawai yang mengalirkan arus elektrik.

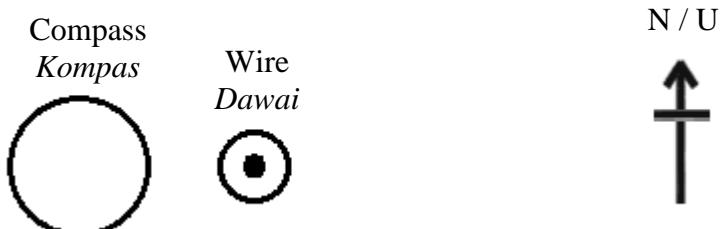
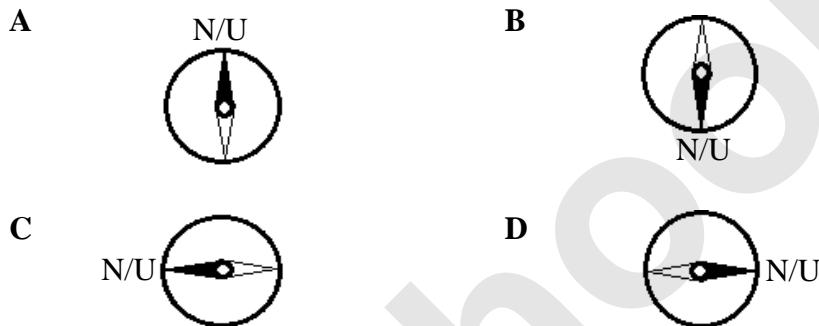


Diagram 27
Rajah 27

Which compass pointer shows the correct direction?

Jarum kompas yang manakah menunjukkan arah yang betul?



- 39.** Diagram 28 shows wire X and wire Y connected in a circuit.

Rajah 28 menunjukkan dawai X dan dawai Y disambung dalam satu litar.

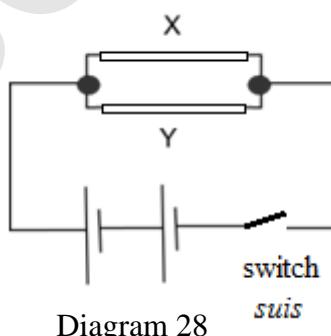


Diagram 28
Rajah 28

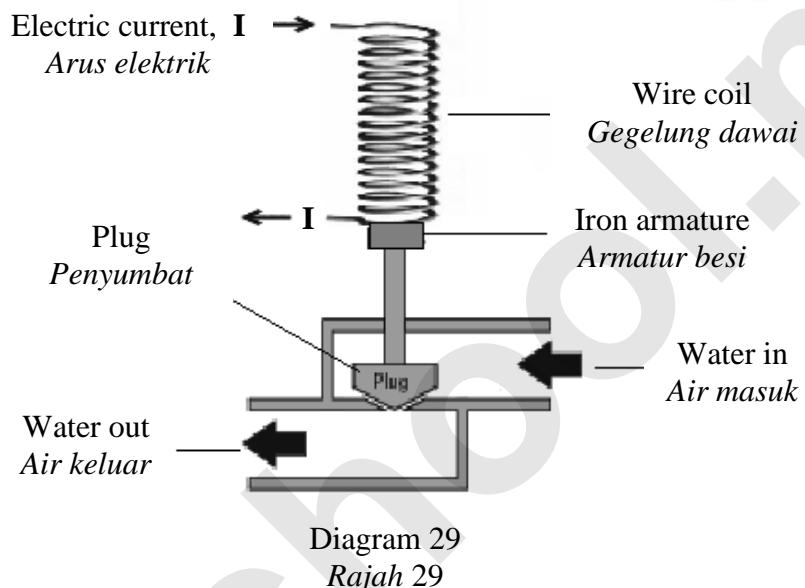
Which direction of the electromagnetic forces acting on wire X and wire Y is correct when the switch is closed?

Apakah arah daya elektromagnet yang bertindak ke atas dawai X dan dawai Y adalah betul apabila suis ditutup?

	Wire X Dawai X	Wire Y Dawai Y
A	↑	↑
B	↑	↓
C	↓	↓
D	↓	↑

40. Diagram 29 shows an electrically-controlled water valve.

Rajah 29 menunjukkan suatu injap pengawal air elektrik.



The design engineer discovers that the valve did not function like it was supposed to.

What is possible reason for this type of failure?

Jurutera rekabentuk mendapati injap tidak berfungsi seperti yang sepatutnya. Apakah sebab yang mungkin bagi kegagalan tersebut?

- A The diameter of the coil is small

Diameter gegelung adalah kecil

- B The coil wire has low resistivity

Gegelung dawai mempunyai kerintangan rendah

- C The electric current flows is small

Arus elektrik yang mengalir adalah kecil

- D The number of iron armatures is less

Bilangan armatur besi adalah kurang

41. Diagram 30 shows the deflection of galvanometer pointer when a bar magnet is dropped vertically through the coil linked to the center-zero galvanometer.

Rajah 30 menunjukkan pesongan jarum galvanometer apabila sebatang magnet bar dijatuhkan secara menegak menerusi satu gegelung yang disambungkan kepada galvanometer sifar tengah.

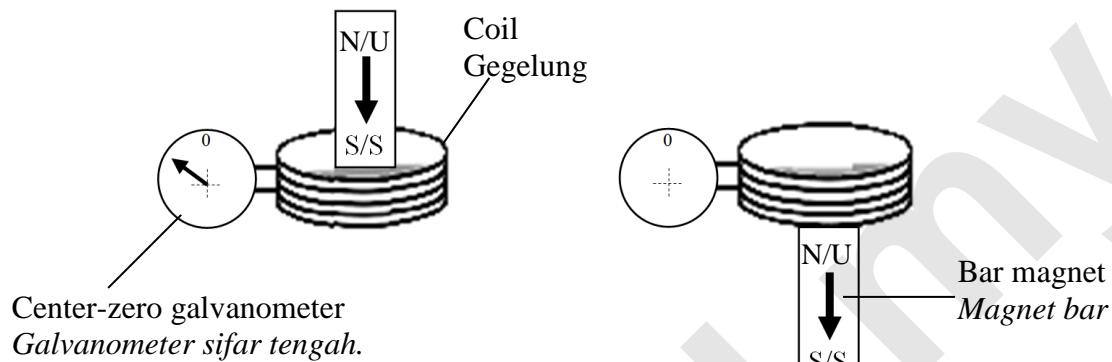
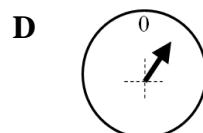
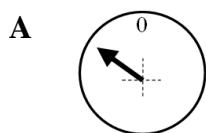


Diagram 31
Rajah 31

Which compass pointer shows the correct deflection for Diagram 31?

Jarum kompas yang manakah menunjukkan pesongan arah yang betul untuk Rajah 31?



- 42.** Transformers are used in transmission of electricity to reduce energy loss by
Transformer digunakan dalam penghantaran kuasa elektrik untuk mengurangkan kehilangan tenaga melalui

- A** providing better insulator
menyediakan penebat yang lebih baik
- B** reducing the resistance of the cable
mengurangkan rintangan kabel
- C** increasing the thickness of the cable
menambahkan ketebalan kabel
- D** reducing current by increasing voltage
mengurangkan arus dengan meningkatkan beza keupayaan

- 43.** Diagram 32 shows trace on a Cathode Ray Oscilloscope (CRO) screen.

The Y-gain and the time-base are set at 3 volt / division and 5 ms / division respectively.

Rajah 32 menunjukkan surih di atas skrin Osiloskop Sinar Katod (OSK).

Gandaan-Y dan dasar masa telah disetkan pada 3 volt / bahagian dan 5 ms / bahagian masing-masing.

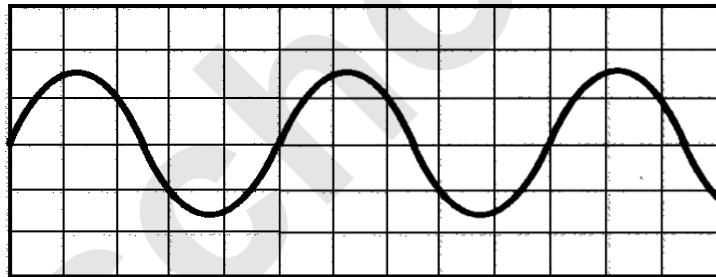


Diagram 32
Rajah 32

What are the peak voltage and the frequency of the alternating current supply that connected to the C.R.O?

Apakah voltan puncak dan frekuensi arus ulang alik yang disambungkan ke OSK?

Peak voltage / V <i>Voltan puncak / V</i>	Frequency / Hz <i>Frekuensi / Hz</i>
A 4.5	20
B 4.5	25
C 4.5	40
D 9.0	25

44. Diagram 33 shows a circuit that has five identical bulbs P, Q, R, S and T.

Rajah 33 menunjukkan suatu litar yang mempunyai lima mentol serupa P, Q, R, S dan T.

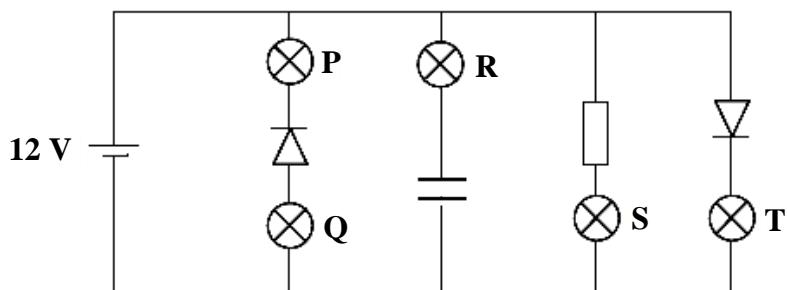


Diagram 33
Rajah 33

Which of the bulbs will light up?

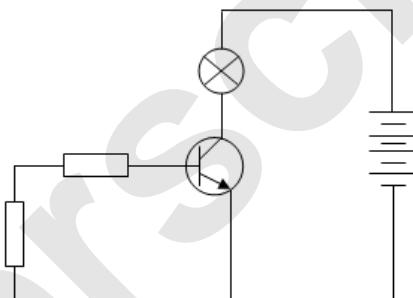
Mentol-mentol yang manakah akan menyala?

- | | |
|--------------|--------------|
| A P and Q | B S and T |
| P dan Q | S dan T |
| C P, S and T | D R, S and T |
| P, S dan T | R, S dan T |

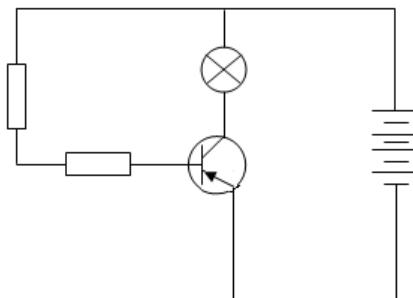
45. Which transistor circuits will lights up the bulb?

Litar bertransistor yang manakah akan menyalakan mentol?

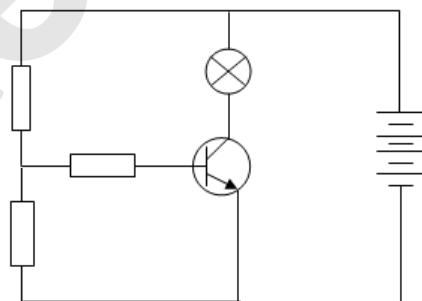
A



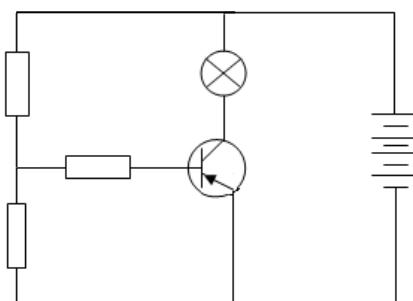
B



C



D



- 46.** Diagram 34 shows a logic gate circuit which has two inputs, X and Y.

Rajah 34 menunjukkan satu litar get logik yang mempunyai dua input, X dan Y.

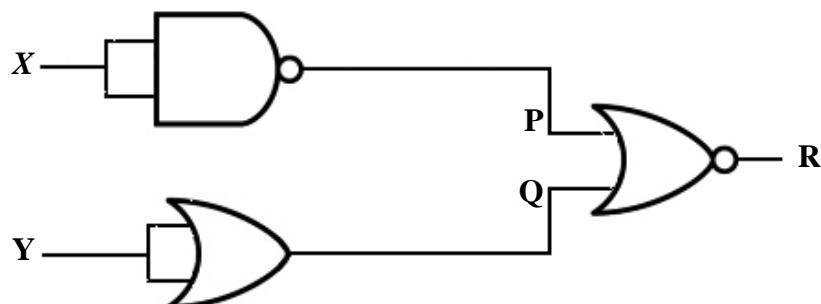


Diagram 34
Rajah 34

If the logic state of X is 0 and the logic state of Y is 1, what are the logic states at P, Q and R?

Jika keadaan logik X ialah 0 dan keadaan logik Y ialah 1, apakah keadaan logik bagi P, Q dan R ?

	P	Q	R
A	1	1	0
B	1	1	1
C	0	1	0
D	0	1	1

- 47.** Diagram 35 shows three types of radioactive rays, P, Q and R, directed towards a sheet of paper, a sheet of aluminium and a sheet of lead.

Rajah 35 menunjukkan tiga jenis sinaran radioaktif, P, Q dan R, dihalakan kepada kepingan kertas, kepingan aluminium dan kepingan plumbum.

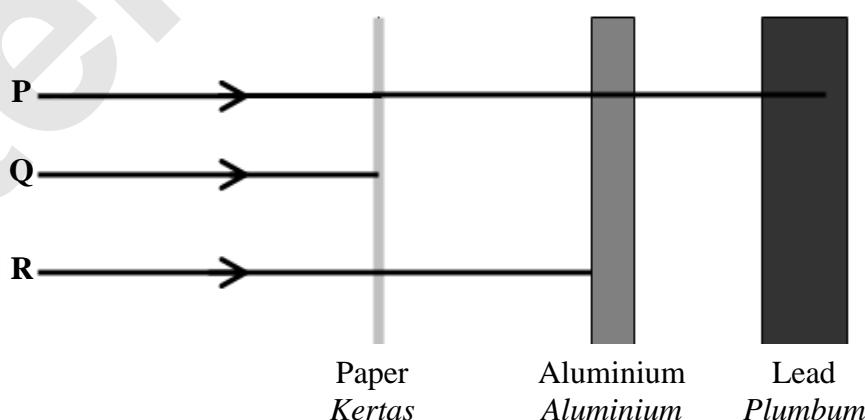


Diagram 35
Rajah 35

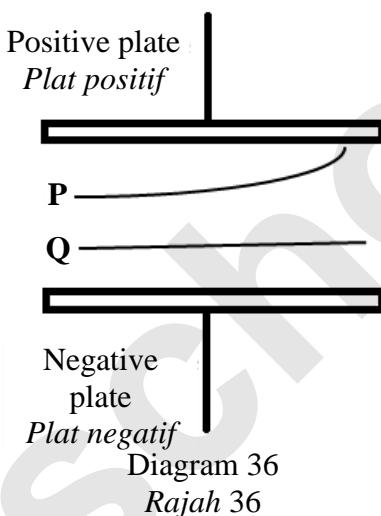
Which rays are represented by P, Q and R?

Sinaran yang manakah diwakili oleh P, Q dan R?

	P	Q	R
A	Beta <i>Beta</i>	Gamma <i>Gama</i>	Alpha <i>Alfa</i>
B	Beta <i>Beta</i>	Alpha <i>Alfa</i>	Gamma <i>Gama</i>
C	Gamma <i>Gama</i>	Alpha <i>Alfa</i>	Beta <i>Beta</i>
D	Gamma <i>Gama</i>	Beta <i>Beta</i>	Alpha <i>Alfa</i>

48. Diagram 36 shows the deflection of two types of radioactive emission in an electric field.

Rajah 36 menunjukkan pesongan dua jenis pancaran radioaktif di dalam medan elektrik.



What are the type of emissions P and Q?

Apakah jenis pancaran P dan Q?

	Emission P <i>Pancaran P</i>	Emission Q <i>Pancaran Q</i>
A	Alpha particles <i>Zarah alfa</i>	Gamma rays <i>Sinaran gama</i>
B	Beta particles <i>Zarah beta</i>	Gamma rays <i>Sinaran gama</i>
C	Gamma rays <i>Sinaran gama</i>	Alpha particles <i>Zarah alfa</i>
D	Gamma rays <i>Sinaran gama</i>	Beta particles <i>Zarah beta</i>

- 49.** Diagram 37 shows a series of radioactive decays for the nucleus of uranium-238 to nucleus of radium-226.

Rajah 37 menunjukkan siri pereputan radioaktif bagi nukles uranium-238 kepada nukleus radium-226.

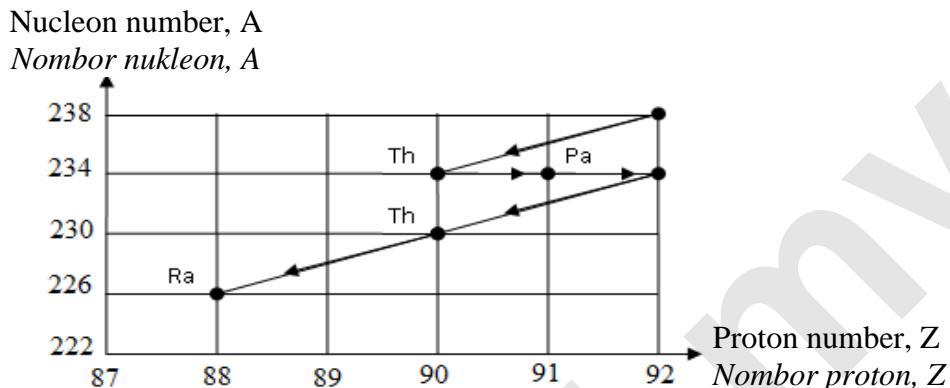


Diagram 37

Rajah 37

What is the number of the alpha particles and beta particles emitted during this process?

Berapakah bilangan zarah alfa dan zarah beta yang dipancarkan dalam proses ini?

	The number of alpha particles Bilangan zarah alfa	The number of beta particles Bilangan zarah beta
A	2	3
B	3	2
C	3	1
D	1	3

- 50.** The half-life of a phosphorus-32 is 15 days. A sample is tested and found to contain 45.0 g of the phosphorus-32.

How much of the phosphorus-32 was present in the sample 45 days before the sample was tested?

Separuh hayat fosforus-32 ialah 15 hari. Satu sampel diuji dan ia mengandungi 45.0 g bahan tersebut.

Berapa banyak fosforus-32 dalam sampel tersebut ketika 45 hari sebelum sampel itu diuji?

- A 5.62 g
C 180.00 g

- B 11.25 g
D 360.00 g

END OF QUESTION PAPER

KERTAS SOALAN TAMAT

NAMA:..... Tingkatan :



KEMENTERIAN
PENDIDIKAN
MALAYSIA

BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN

PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2015
PERCUBAAN SIJIL PELAJARAN MALAYSIA

FIZIK
Kertas 2
Dua Jam Tiga Puluh Minit

JANGAN BUKA KERTAS SOALANINI SEHINGGA DIBERITAHU

Arahan:

1. Tulis **nama** dan **tingkatan** anda pada ruang yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
4. Jawapan kepada **Bahagian A** hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.
5. Rajah tidak dilukis mengikut skala kecuali dinyatakan.
6. Markah maksimum yang diperuntukkan ditunjukkan dalam kurungan pada hujung tiap-tiap soalan.
7. Penggunaan kalkulator saintifik yang **tidak boleh** diprogramkan adalah dibenarkan.

Untuk Kegunaan Pemeriksa		
Bahagian	Soalan	Markah
A	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
B	9	
	10	
C	11	
	12	
Jumlah Besar		

Kertas soalan ini mengandungi 31 halaman bercetak.

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

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

Section A**Bahagian A**

[60 marks]

[60 markah]

Answer all questions in this section.

Jawab semua soalan dalam bahagian ini.

- 1 Diagram 1 shows a measuring instrument to measure mass of a cup.

Rajah 1 menunjukkan satu alat pengukur untuk menyukat jisim sebiji cawan.

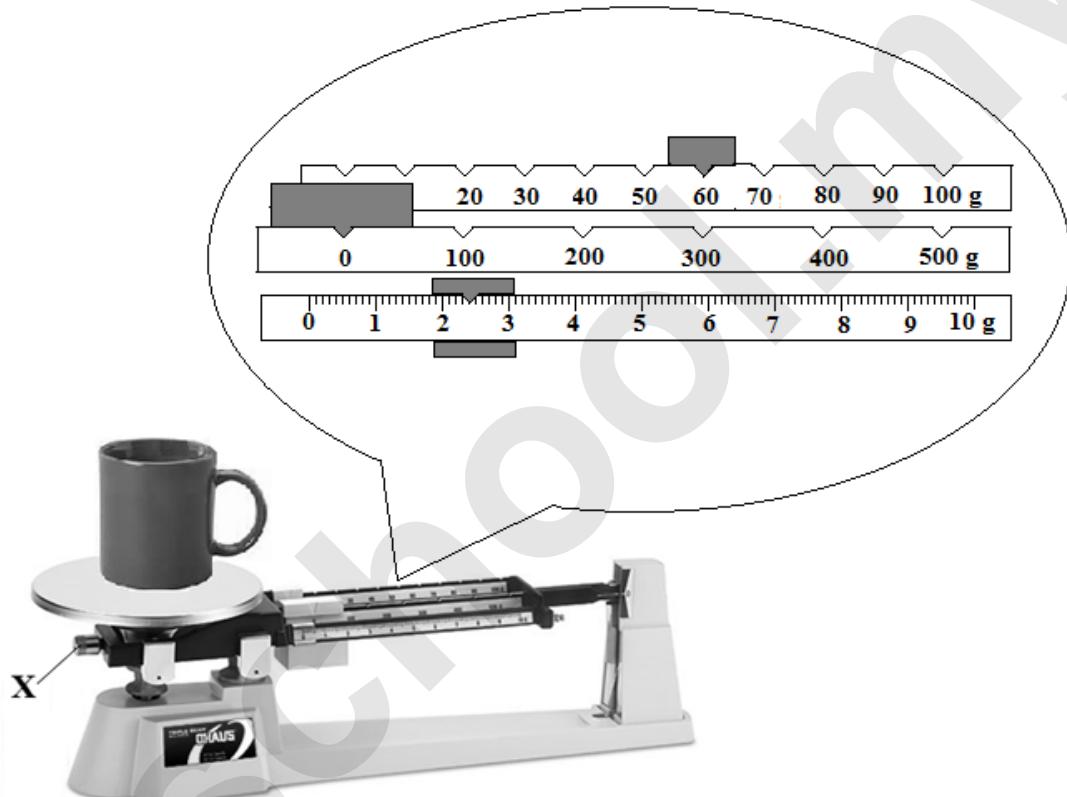


Diagram 1
Rajah 1

- (a) Name the measuring instrument shown in Diagram 1.

Namakan alat pengukur dalam Rajah 1.

..... [1 mark]

..... [1 markah]

- (b) (i) Name the part labelled X

Namakan bahagian berlabel X.

..... [1 mark]

..... [1 markah]

- (ii) What is the function of X?
Apakah fungsi X?

.....

[1 mark]

[1 markah]

- (c) What is the mass of the cup?
Berapakah jisim cawan itu?

.....

[1 mark]

[1 markah]

- 2 Diagram 2.1 shows a spring mattress which has elasticity properties.

Rajah 2.1 menunjukkan satu tilam spring yang mempunyai sifat-sifat kekenyalan.

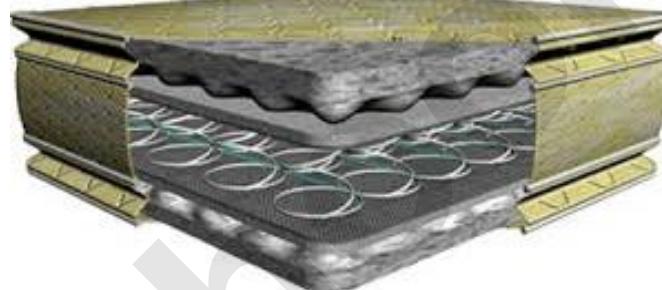


Diagram 2.1
Rajah 2.1

- (a) (i) What is the meaning of elasticity?
Apakah yang dimaksudkan dengan kekenyalan?

.....

[1 mark]

[1 markah]

- (ii) Give **one** reason why a spring will not return to its original length when extended to a certain length.

Beri satu sebab mengapa spring tidak akan kembali kepada panjang asalnya apabila direngangkan pada suatu panjang yang tertentu.

.....

[1 mark]

[1 markah]

- (b) Diagram 2.2 shows a spring with original length of 10 cm extended to 15 cm when 100 g load is attached to the spring.

Rajah 2.2 menunjukkan satu spring dengan panjang asal 10 cm direngangkan kepada 15 cm apabila beban 100g diletakkan pada spring itu.

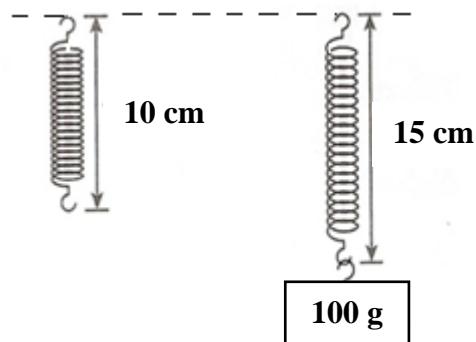


Diagram 2.2
Rajah 2.2

- (i) What is the extension of the spring?

Berapakah pemanjangan spring itu?

[1 mark]
[1 markah]

- (ii) Diagram 2.3 shows a spring system which consists of three identical springs and 100 g load attached.

Rajah 2.3 menunjukkan satu sistem spring yang terdiri daripada spring yang serupa dan diletakkan beban 100g.

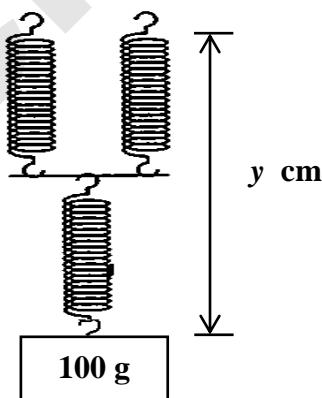


Diagram 2.3
Rajah 2.3

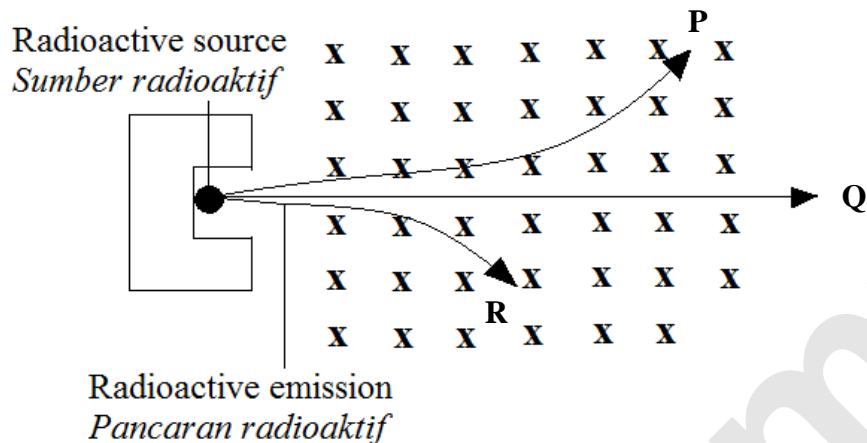
Calculate the value of y

Kirakan nilai y

[2 marks]

[2 markah]

- 3 Diagram 3 shows paths of three types of radioactive emission in a magnetic field.
Rajah 3 menunjukkan lintasan bagi tiga jenis pancaran radioaktif dalam suatu medan magnet

Diagram 3
Rajah 3

- (a) Name the radioactive emission Q.

Namakan pancaran radioaktif Q.

[1 mark]
[1 markah]

- (b) Give reason why the path of radioactive emission

Beri sebab mengapa lintasan pancaran radioaktif

- (i) Q is straight

Q adalah lurus

[1 mark]
[1 markah]

- (ii) P and R is curve

P dan R adalah melengkung

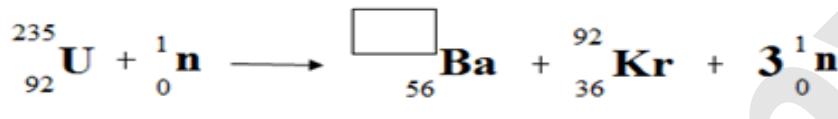
[1 mark]
[1 markah]

- (c) In a nuclear reactor, Uranium-235 is bombarded by a neutron produces Barium-141 and Kripton-92 and released three neutrons.

Dalam suatu reaktor nuklear, Uranium-235 ditembak dengan satu neutron menghasilkan Barium-141 dan Kripton-92 dan membebaskan tiga neutron.

- (i) Complete the equation of the reaction by writing the appropriate number in the boxes provided.

Lengkapkan persamaan tindak balas dengan menulis nombor yang sesuai dalam kotak yang disediakan.



[1 mark]

[1 markah]

- (ii) The nuclear reaction of one nucleus of Uranium-235 experiences a mass defect of 2.988×10^{-28} kg.

Calculate the energy released in the nuclear reaction.

The velocity of light, $c = 3 \times 10^8 \text{ ms}^{-1}$.

Tindak balas nuklear bagi satu nukleus Uranium-235 mengalami kecacatan jisim sebanyak 2.988×10^{-28} kg.

Hitungkan tenaga yang dibebaskan dalam tindak balas nuklear itu.

Halaju cahaya adalah, $c = 3 \times 10^8 \text{ ms}^{-1}$.

[2 marks]

[2 markah]

- 4 Diagram 4.1 shows a process to prepare half boiled egg of mass 50 g with initial temperature of 27°C .

Diagram 4.2 shows 600 g of hot water of temperature 95°C being poured from a kettle into a plastic container containing the egg.

Diagram 4.3 shows that the plastic container was covered with plastic cap to complete the process. After a while, a thermal equilibrium has achieved.

Rajah 4.1 menunjukkan proses penyediaan telur separuh masak berjisim 50 g dengan suhu awal 27°C .

Rajah 4.2 menunjukkan 600 g air panas pada suhu 95°C dituang daripada cerek ke dalam bekas plastik yang berisi telur itu.

Rajah 4.3 pula menunjukkan penutup plastik digunakan untuk menutup bekas plastik bagi melengkapkan proses tersebut. Selepas beberapa ketika, keseimbangan terma telah dicapai.



Diagram 4.1
Rajah 4.1

Diagram 4.2
Rajah 4.2

Diagram 4.3
Rajah 4.3

- (a) (i) What is the meaning of thermal equilibrium?

Apakah yang dimaksudkan dengan keseimbangan terma?

[1 mark]

[1 markah]

- (ii) In the process of preparing a half boiled egg, explain how thermal equilibrium occurs.

Dalam proses penyediaan telur separuh masak, terangkan bagaimana keseimbangan terma berlaku.

[2 marks]

[2 markah]

- (b) (i) Calculate the final temperature of the water in the plastic container.

[Specific heat capacity of egg = $3\ 320\ \text{J kg}^{-1}\ \text{C}^{-1}$]

[Specific heat capacity of water = $4\ 200\ \text{J kg}^{-1}\ \text{C}^{-1}$]

Hitung suhu akhir bagi air di dalam bekas plastik itu.

[Muatan haba tentu telur = $3\ 320\ \text{J kg}^{-1}\ \text{C}^{-1}$]

[Muatan haba tentu air = $4\ 200\ \text{J kg}^{-1}\ \text{C}^{-1}$]

[3 marks]

[3 markah]

- (ii) State **one** assumption that you have made in 4(b)(i).

*Nyatakan **satu** andaian yang anda buat dalam 4(b)(i)*

[1 mark]

[1 markah]

- 5 Diagram 5.1 and Diagram 5.2 show how parallel light rays pass through two different types of lens. F is the focal point of the lenses.

Rajah 5.1 dan Rajah 5.2 menunjukkan bagaimana sinar cahaya yang selari melalui dua jenis kanta yang berbeza. F adalah titik fokus kanta tersebut.

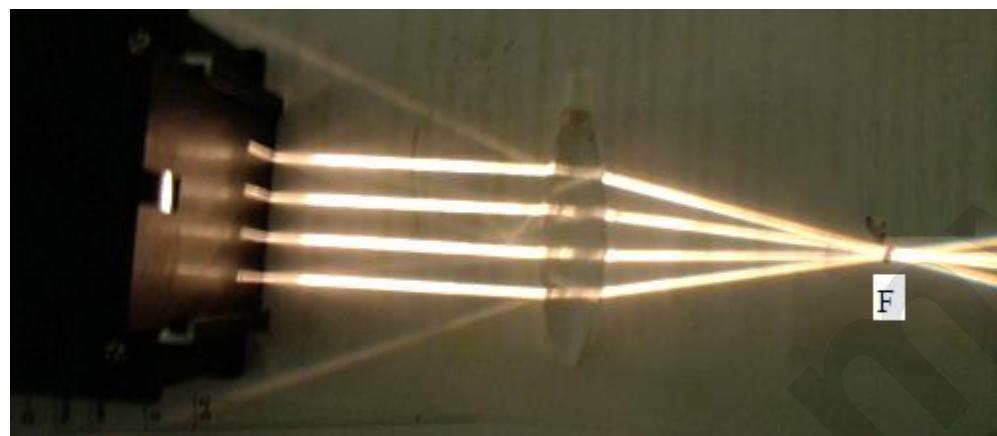


Diagram 5.1
Rajah 5.1

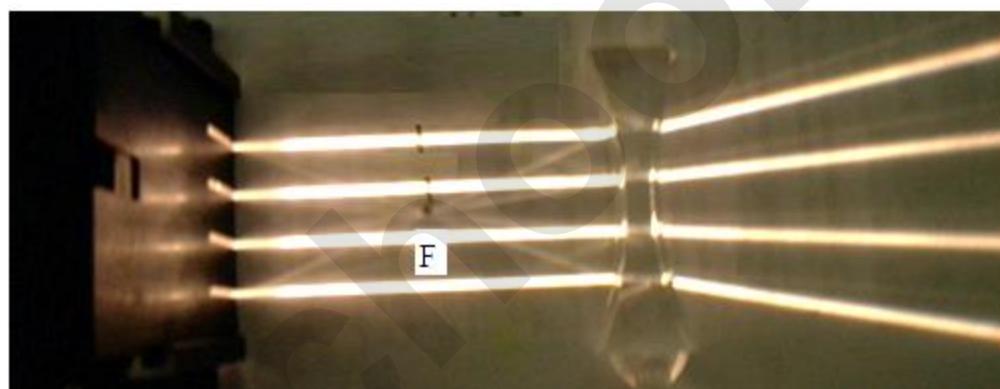


Diagram 5.2
Rajah 5.1

Based on Diagram 5.1 and Diagram 5.2

Berdasarkan Rajah 5.1 dan Rajah 5.2

- (a) (i) Compare the type of lens used
Bandingkan jenis kanta yang digunakan

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

- (ii) Compare how parallel rays of light propagate after pass through the lenses
Bandingkan bagaimana sinar cahaya yang selari itu merambat selepas melalui kanta

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

(iii) Compare of the position of focal point of the lenses

Bandingkan kedudukan titik fokus kanta-kanta

..... [1 mark]

[1 markah]

(b) Based on your answer in (a) (i), (a) (ii) and (a) (iii), state a conclusion regarding

Berdasarkan jawapan anda dalam (a) (i), (a) (ii) dan (a) (iii), nyatakan satu kesimpulan berkaitan

(i) the type of lens and the propagation of light after passing through the lens

jenis kanta dengan perambatan cahaya selepas melalui kanta

.....

.....

.....

[1 mark]

[1 markah]

(ii) the type of lens and position of focal point of the lens

jenis kanta dengan kedudukan titik fokus kanta

.....

.....

.....

[1 mark]

[1 markah]

(c) Diagram 5.3 shows a movie showing at Invictus Cinema. A projector with the lens in Diagram 5.1 is used to produce real image in the cinema.

Rajah 5.3 menunjukkan satu filem sedang ditayangkan di Pawagam Invictus. Satu projektor dengan kanta dalam Rajah 5.1 digunakan dalam pawagam itu untuk menghasilkan imej nyata.

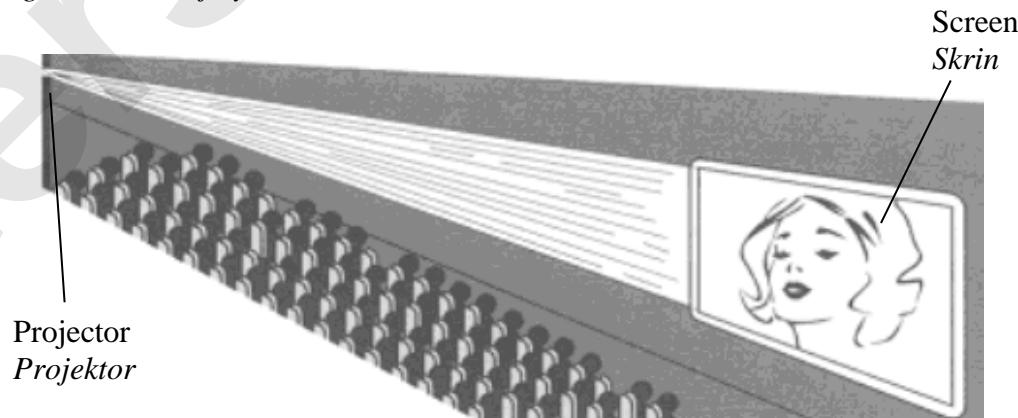


Diagram 5.3

Rajah 5.3

(i) What is the meaning of real image?

Apakah yang dimaksudkan dengan imej nyata?

..... [1 mark]

[1 markah]

(ii) State two other characteristics of image produced by the cinema projector.

Nyatakan dua lagi ciri-ciri imej yang dihasilkan oleh projektor pawagam itu.

..... [2 marks]

[2 markah]

- 6 Diagram 6.1 and Diagram 6.2 show two identical uncharged polystyrene balls coated with metallic paint are suspended between metal plates, P and Q. The metal plates are connected to an Extra High Tension, E.H.T. supply which produces an electric field between the plates when the switch is on.

Rajah 6.1 dan Rajah 6.2 menunjukkan dua bola polistirena serupa yang tidak berasas bersalut dengan cat logam digantung antara dua plat logam, P dan Q. Plat logam itu disambung kepada bekalan Voltan Lampau Tinggi, V.L.T. yang menghasilkan medan elektrik di antara kedua-dua plat apabila suis dihidupkan.

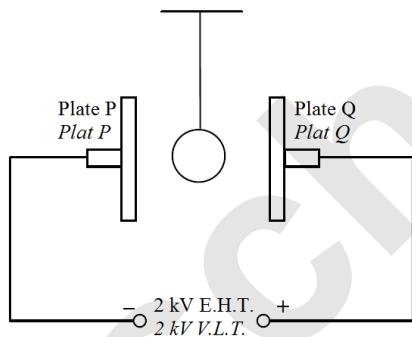


Diagram 6.1
Rajah 6.1

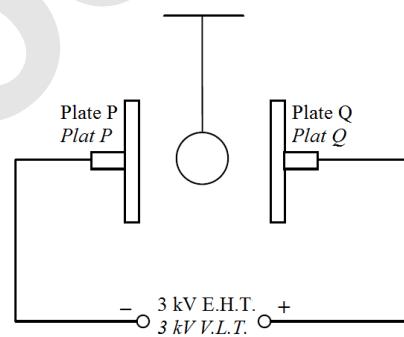


Diagram 6.2
Rajah 6.2

When the switch is on, the electric field is produced.

Apabila suis dihidupkan, medan elektrik dihasilkan.

(a) What is the meaning of electric field?

Apakah yang dimaksudkan dengan medan elektrik?

..... [1 mark]

[1 markah]

- (b) Based on Diagram 6.1, complete the sentences below to explain what happens to the polystyrene ball when it is brought to touch plate P.

Berdasarkan Rajah 6.1, lengkapkan ayat di bawah untuk menerangkan apa yang berlaku kepada bola polistirena itu apabila ia di bawa untuk bersentuh dengan plat P.

When the polystyrene ball is brought to touch plate P, the polystyrene ball receives charges. It is and moves to plate Q. When it touches plate Q, it is charged and to plate P. It happens continuously, causing the ball to oscillate between the plates.

Apabila bola polistirena dibawa untuk bersentuh dengan plat P, bola polistirena itu menerima cas Ia dan bergerak ke plat Q. Apabila ia bersentuh dengan plat Q, ia dicaskan dan ke plat P. Ia berlaku secara berterusan, menyebabkan bola itu berayun antara plat-plat itu.

[2 marks]
[2 markah]

- (c) Using Diagram 6.1 and Diagram 6.2, compare
Menggunakan Rajah 6.1 dan Rajah 6.2, bandingkan

- (i) The potential difference across plate P and Q.
Beza keupayaan merentasi plat P dan Q.

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

- (ii) The distance between metal plate P and metal plate Q.
Jarak antara plat logam P dan plat logam Q.

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

- (iii) The strength of electric field between metal plate P and metal plate Q.
Kekuatan medan elektrik antara plat logam P dan plat logam Q.

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

- (d) Relate the strength of electric field with
Hubungkaitkan kekuatan medan elektrik dengan

- (i) The potential difference across plate P and plate Q.
Beza keupayaan merentasi plat P dan plat Q.

..... [1 mark]

[1 markah]

- (ii) The speed of oscillation of the polystyrene ball.
Laju ayunan bagi bola polisterina itu.

..... [1 mark]

[1 markah]

- 7 Diagram 7.1 shows the arrangement of apparatus used to investigate a Gas Law.
Rajah 7.1 menunjukkan susunan radas yang digunakan untuk menyiasat suatu Hukum Gas.

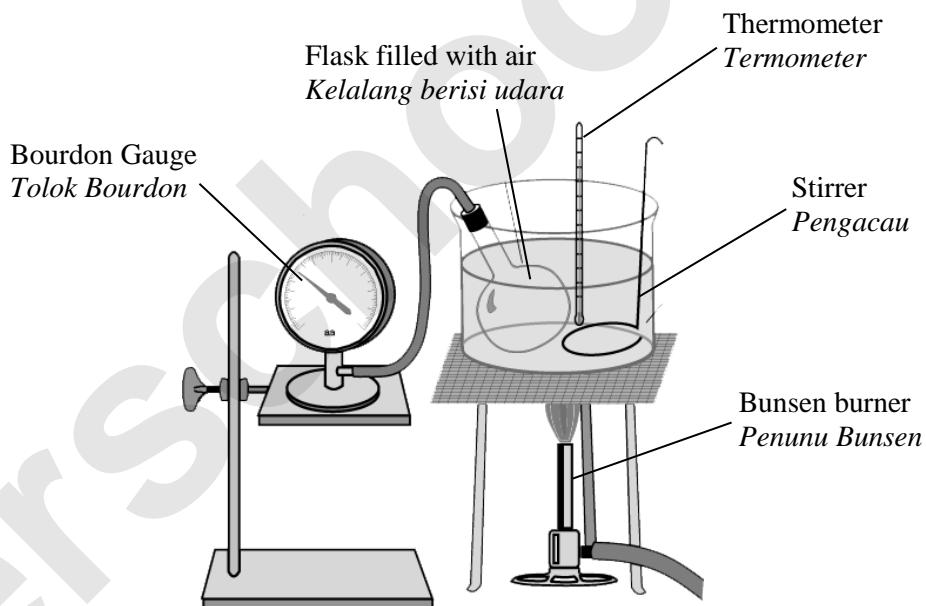


Diagram 7.1
Rajah 7.1

- (a) Name the gas law involved in this experiment.
Namakan hukum gas yang terlibat dalam eksperimen ini.

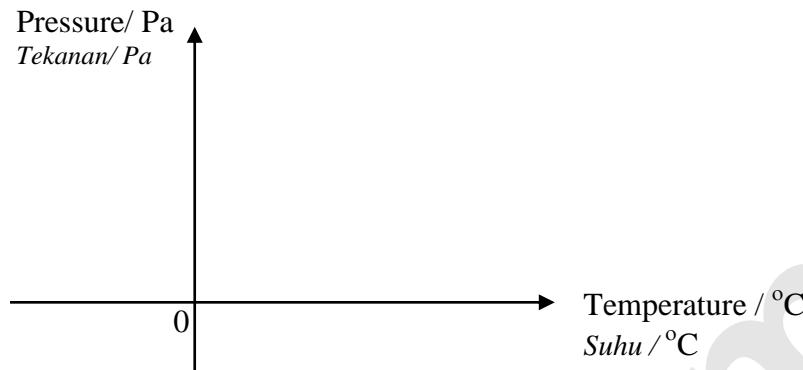
..... [1 mark]

[1 markah]

- (b) Based on the experiment in Diagram 7.1,

Berdasarkan eksperimen dalam Rajah 7.1,

- (i) Sketch a graph of gas pressure, P against temperature, T.
Lakarkan graf tekanan gas, P melawan suhu, T.



[1 mark]
[1 markah]

- (ii) State the value of temperature of gas in the unit of Celsius when its pressure is zero.

Nyatakan nilai suhu gas dalam unit Celsius bila tekanannya adalah sifar.

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

- (c) The pressure of gas in a container is 1.55×10^5 Pa and its temperature is 12°C . Calculate the pressure of the gas if the temperature is increased to 37°C .

Tekanan gas dalam satu bekas adalah 1.55×10^5 Pa dan suhunya adalah 12°C . Hitung tekanan gas apabila suhunya bertambah kepada 37°C .

[2 marks]
[2 markah]

- (d) Diagram 7.2 shows a pressure cooker.

Rajah 7.2 menunjukkan sebuah periuk tekanan.



Diagram 7.2
Rajah 7.2

Using kinetic theory of gas, why the pressure of air in the pressure cooker is increased when the temperature is increased.

Dengan menggunakan teori kinetik gas, mengapa tekanan udara dalam periuk tekanan bertambah apabila suhu bertambah.

[1 mark]
[1 markah]

- (e) Suggest modifications that can be made to the pressure cooker that enables it to function safely.

Cadangkan pengubahsuaian yang boleh dibuat kepada periuk tekanan itu untuk membolehkannya berfungsi dengan selamat.

- (i) Thickness of the wall

Ketebalan dinding

Reason

Sebab

[2 marks]
[2 markah]

- (ii) Number of lock

Bilangan kunci

Reason

Sebab

[2 marks]
[2 markah]

- 8** Diagram 8 shows a simple wireless electrical circuit. The electric current flows from dry cell to coil P.

Rajah 8 menunjukkan satu litar elektrik tanpa wayar yang ringkas. Arus elektrik mengalir dari sel kering ke gegelung P.

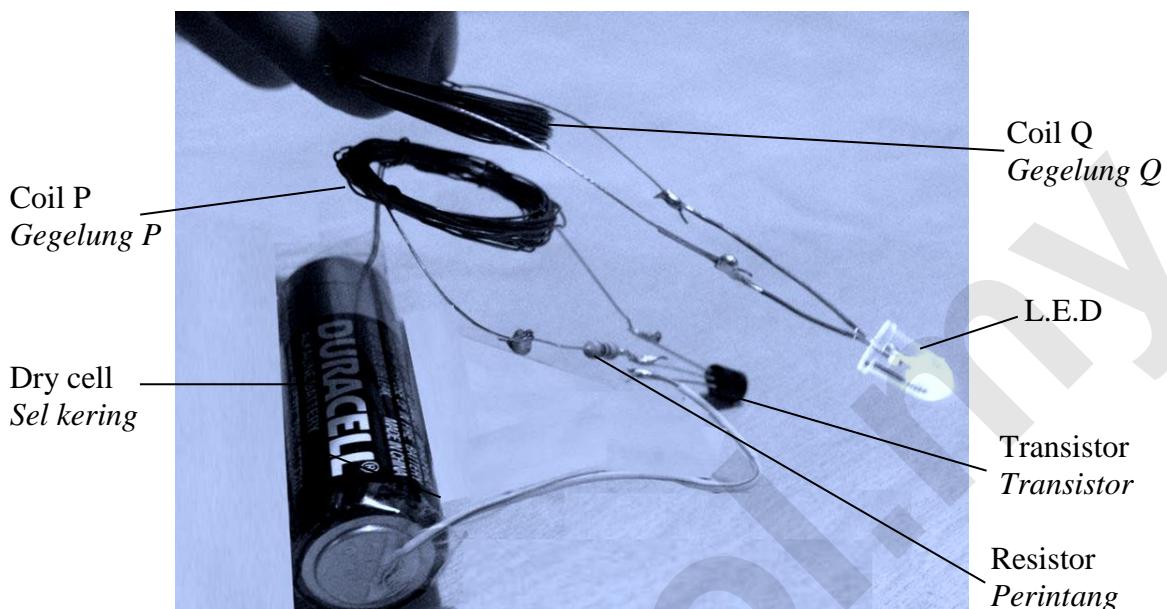


Diagram 8
Rajah 8

- (a) What is the meaning of electric current?

Apakah yang dimaksudkan dengan arus elektrik?

[1 mark]
[1 markah]

- (b) When the coil Q is brought closer to the coil P, the light emitting diode (L.E.D.) will lights up.

Apabila gegelung Q di bawa menghampiri gegelung P, diod pemancar cahaya (L.E.D.) akan bernyala.

What is the function of coil Q?

Apakah fungsi gegelung Q?

[1 mark]
[1 markah]

- (c) Explain how the L.E.D lights up?
Terangkan bagaimana L.E.D menyala?

.....

[3 marks]
 [3 markah]

- (d) Table 8 shows four types of wire P, Q, R and S to be used to build a coil for wireless electrical circuit.
Jadual 8 menunjukkan empat jenis dawai P, Q, R and S yang akan digunakan untuk membina gegelung litar elektrik tanpa wayar itu.

Type of wire <i>Jenis dawai</i>	Diameter / mm <i>Diameter / mm</i>	Number of turns <i>Bilangan lilitan</i>	Type of material <i>Jenis bahan</i>
P	0.30	50	Copper <i>Kuprum</i>
Q	0.10	50	Copper <i>Kuprum</i>
R	0.10	50	Nichrome <i>Nikrom</i>
S	0.30	40	Nichrome <i>Nikrom</i>

Table 8
Jadual 8

Based on Table 8, state the suitable characteristics of the wire used to build the coil.
 Give reasons for the suitability of the characteristics.

Berdasarkan Jadual 8, nyatakan ciri-ciri yang sesuai bagi dawai untuk membina gegelung itu. Beri sebab bagi kesesuaian ciri-ciri itu.

- (i) Diameter wire
Diameter dawai

.....
 Reason
Sebab

[2 marks]
 [2 markah]

(ii) Number of turn

Bilangan lilitan

.....
Reason

Sebab

[2 marks]
[2 markah]

(iii) Type of material

Jenis bahan

.....
Reason

Sebab

[2 marks]
[2 markah]

(e) Based on the answers in 8 (d), choose the most suitable wire to build a coil.

Berdasarkan jawapan anda dalam 8 (d), tentukan wayar yang paling sesuai untuk membina gegelung.

[1 mark]
[1 markah]

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 ray is passing through a water prism and a glass prism. The refractive index of water is 1.33 and the refractive index of glass is 1.51.

Rajah 9.1 dan Rajah 9.2 menunjukkan sinar cahaya melalui prisma air dan prisma kaca. Indeks biasan air adalah 1.33 dan indeks biasan kaca adalah 1.51.

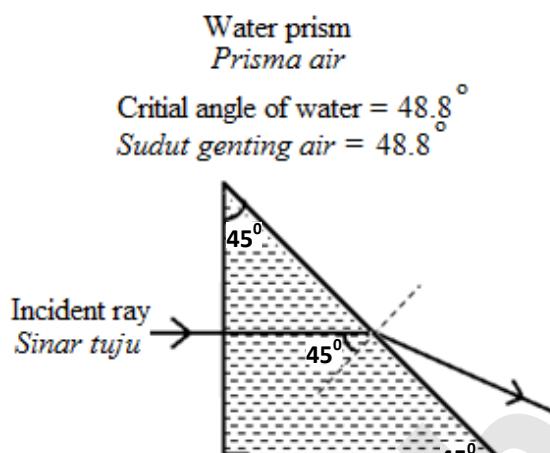


Diagram 9.1
Rajah 9.1

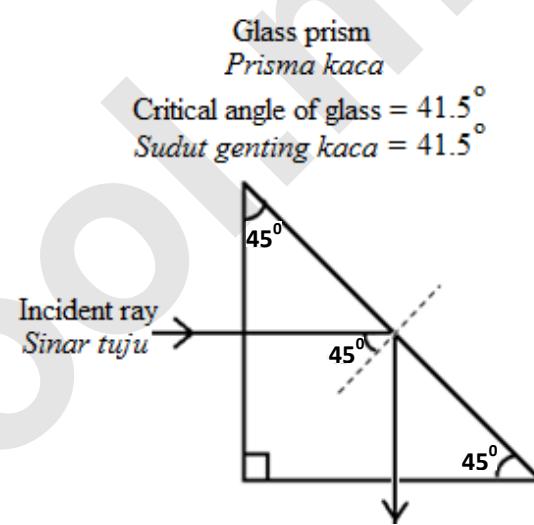


Diagram 9.2
Rajah 9.2

- (a) What is the meaning of the refractive index? [1 mark]
Apakah yang dimaksudkan dengan indeks biasan? [1 markah]
- (b) Using Diagram 9.1 and Diagram 9.2, compare the incident angle, the refractive index and the critical angle of the water prism and the glass prism.
Relate the refractive index with the critical angle. Regarding to the comparison between the incident angle and the critical angle, deduce the light phenomena involved.
Menggunakan Rajah 9.1 dan Rajah 9.2, bandingkan sudut tuju, indeks biasan dan sudut genting bagi prisma air dan prisma kaca.
Hubungkaitkan indeks biasan dengan sudut genting. Merujuk kepada perbandingan antara sudut tuju dan sudut genting, buat satu kesimpulan tentang fenomena cahaya yang terlibat.
- [5 marks]
[5 markah]

- (c) Diagram 9.3 shows a diamond ring and a glass ring.

Rajah 9.3 menunjukkan sebentuk cincin berlian dan cincin kaca.

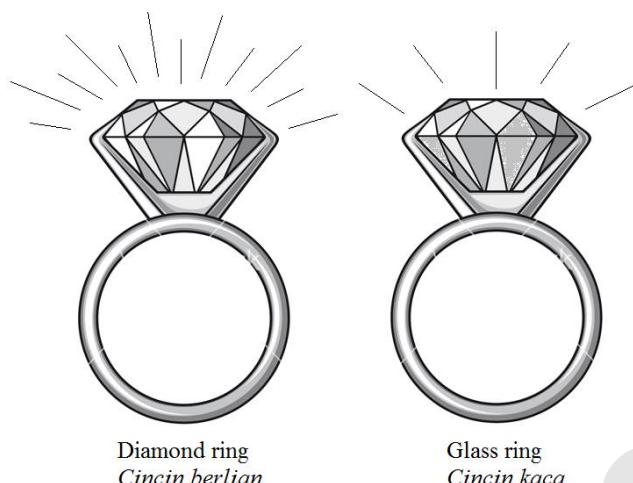


Diagram 9.3

Rajah 9.3

Explain why the diamond ring sparkles more than the glass ring when light passes through them.

Terangkan mengapa cincin berlian lebih berkilaunya daripada cincin kaca apabila cahaya melaluinya.

[4 marks]

[4 markah]

- (d) Diagram 9.4 shows a simple telescope constructed in a laboratory that can be used to see distant object. However the disadvantages of using this simple telescope are it is not portable and the image formed is not clear and inverted.

Rajah 9.4 menunjukkan sebuah teleskop ringkas yang dibina dalam makmal digunakan untuk melihat objek yang jauh. Walau bagaimanapun kelemahan teleskop ini adalah, ia sukar dibawa dan imej yang dihasilkan adalah tidak jelas dan songsang.



Cross section

Keratan rentas

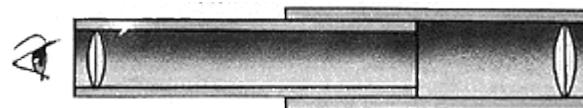


Diagram 9.4

Rajah 9.4

You are required to design a new optical instrument which use prisms. The instrument is portable and can produce brighter and upright image.

State and explain the modifications based on the following aspects:

Anda dikehendaki untuk mereka bentuk satu alat optik yang baharu yang menggunakan prisma. Alat ini adalah mudah dibawa dan boleh menghasilkan imej terang dan tegak.

Nyata dan terangkan pengubahsuaian berdasarkan aspek-aspek berikut:

- (i) Type of prisms used.
Jenis prisma yang digunakan.
- (ii) Arrangement of prisms.
Susunan prisma.
- (iii) The focal length of the lenses used.
Panjang fokus kanta-kanta yang digunakan..
- (iv) Diameter of the lenses
Diameter kanta
- (v) Additional features that is required.
Sifat tambahan yang diperlukan.

[10 marks]
[10 markah]

- 10** Diagram 10.1 and Diagram 10.2 show two identical cathode ray tubes.

Rajah 10.1 dan Rajah 10.2 menunjukkan dua tiub sinar katod yang serupa.

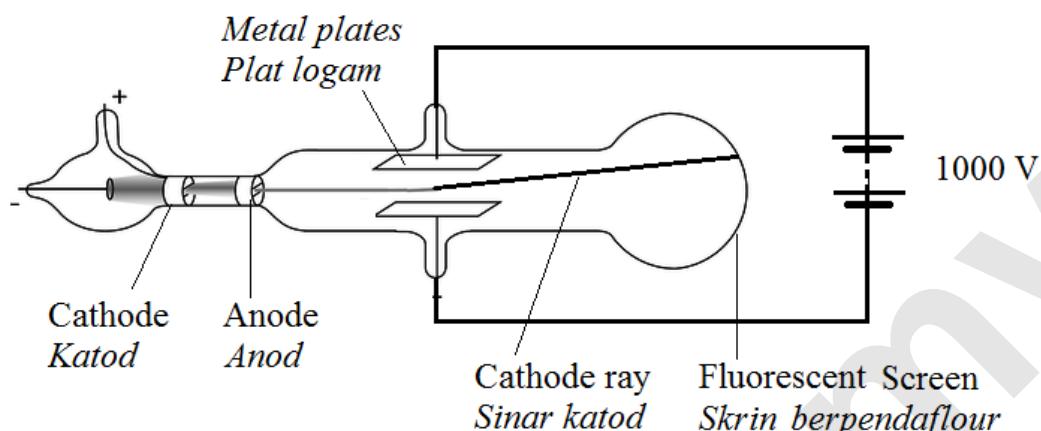


Diagram 10.1

Rajah 10.1

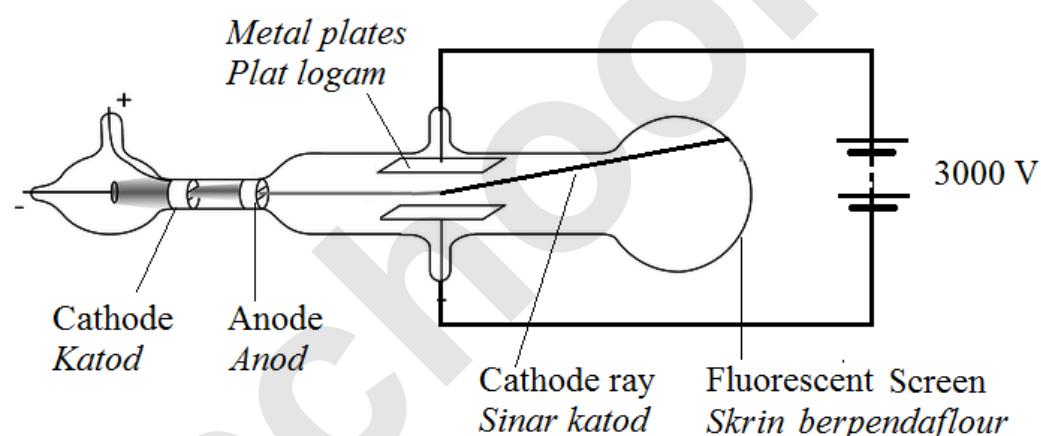


Diagram 10.2

Rajah 10.2

- (a) What is the meaning of cathode ray? [1 mark]
Apakah yang dimaksudkan dengan sinar katod? [1 markah]
- (b) By using Diagram 10.1 and Diagram 10.2, compare the value of voltage supplied (EHT), the strength of electric field between the metal plates and the deflection of the cathode ray.
 Relate the value of voltage supplied with the strength of electric field to make the deduction regarding the relationship between the strength of electric field and the deflection of the cathode ray.

Dengan menggunakan Rajah 10.1 dan rajah 10.2, bandingkan nilai voltan yang dibekalkan (VLT), kekuatan medan elektrik di antara plat logam dan pesongan sinar katod.

Hubungkaitkan nilai voltan yang dibekalkan dengan kekuatan medan elektrik untuk membuat satu deduksi yang menghubungkaitkan hubungan antara kekuatan medan elektrik dan pesongan sinar katod

[5 marks]

[5 markah]

- (c) Diagram 10.3 shows a shadow is formed on the fluorescent screen of a Maltese Cross Tube.

Rajah 10.3 menunjukkan satu bayang terbentuk pada skrin berpendaflour Tiub Palang Maltese.

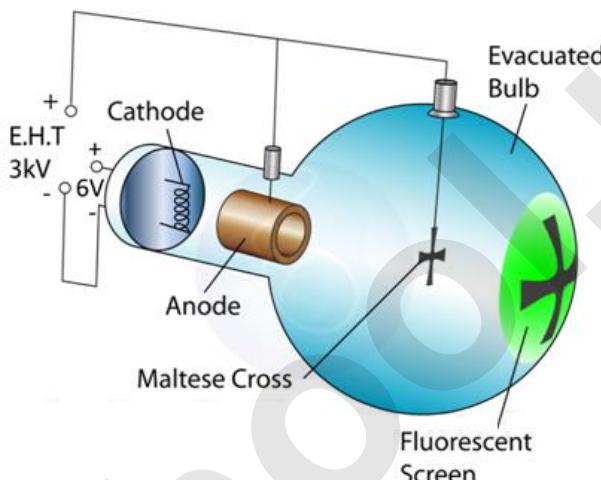


Diagram 10.3
Rajah 10.3

Explain how the shadow produced by the cathode ray on the fluorescent screen.

Terangkan bagaimana bayang terbentuk oleh sinar katod tersebut pada skrin berpendaflour.

[4 marks]

[4 markah]

- (d) Amin wishes to design a fire control system for his office. Device X will activate an alert signal when smoke is detected or the temperature in his office is high. The fire extinguisher will only be activated when there is smoke and the temperature in the office is high. The fire extinguisher needs 240 V alternating current (a.c.) supply.

Amin berhasrat untuk merekabentuk satu sistem kawalan kebakaran di pejabatnya. Alat X akan mengaktifkan satu isyarat amaran apabila asap dikesan atau suhu dalam pejabatnya tinggi. Alat pemadam api akan hanya diaktifkan apabila terdapat asap dan suhu dalam pejabat adalah tinggi. Alat pemadam api itu memerlukan 240 V bekalan arus ulang-alik (a.u).

In order to design the fire control system, Amin needs to construct a truth table.
Untuk merekabentuk sistem kawalan kebakaran itu, Amin perlu membina satu jadual kebenaran.

The operation of the control system is as follows:
Operasi sistem kawalan itu adalah seperti berikut:

Smoke <i>Asap</i>	high input <i>input tinggi</i>	logic '1' <i>logik '1'</i>
No smoke <i>Tiada asap</i>	low input <i>input rendah</i>	logic '0' <i>logik '0'</i>
High temperature <i>Suhu tinggi</i>	high input <i>input tinggi</i>	logic '1' <i>logik '1'</i>
Low temperature <i>Suhu rendah</i>	low input <i>input rendah</i>	logic '0' <i>logik '0'</i>
Fire extinguisher is ON <i>Pemadam api 'ON'</i>	logic '1' <i>logik '1'</i>	
Device X is ON <i>Alat X 'ON'</i>	logic '1' <i>logik '1'</i>	

Table 10 shows the truth table for the situation.
Jadual 10 menunjukkan jadual kebenaran bagi situasi tersebut.

Input <i>Input</i>		Output <i>Output</i>	
Smoke detector <i>Pengesan asap</i>	Heat detector <i>Pengesan haba</i>	Device X <i>Alat X</i>	Fire extinguisher <i>Pemadam api</i>
0	0	0	0
0	1	1	0
1	0	1	0
1	1	1	1

Table 10
Jadual 10

By using the truth table, help Amin to design the fire control system. State and explain the suggestions how you would design the fire control system based on the following aspects:

- Type of logic gates used to activate device X and fire extinguisher
- Necessary components in the circuit to make the fire extinguisher function
- The alert signal device required
- The electronic component to detect heat

Dengan menggunakan jadual kebenaran itu, bantu Amin untuk mereka bentuk sistem kawalan kebakaran tersebut. Nyata dan terangkan cadangan bagaimana anda merekabentuk sistem kawalan kebakaran tersebut berdasarkan aspek-aspek berikut:

- *Jenis get logik yang digunakan untuk mengaktifkan alat X dan pemadam api*
- *Komponen yang diperlukan dalam litar untuk menghidupkan pemadam api*
- *Alat isyarat amaran yang diperlukan*
- *Alat komponen elektronik untuk mengesan haba*

[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** (a) Diagram 11 shows strong wind blowing over a peaked roof causes the roof to be lifted. This situation can be explained by Bernoulli's principle.

Rajah 11 menunjukkan angin yang bertiup kuat di atas satu puncak bumbung menyebabkan bumbung itu terangkat. Situasi ini boleh diterangkan oleh prinsip Bernoulli.

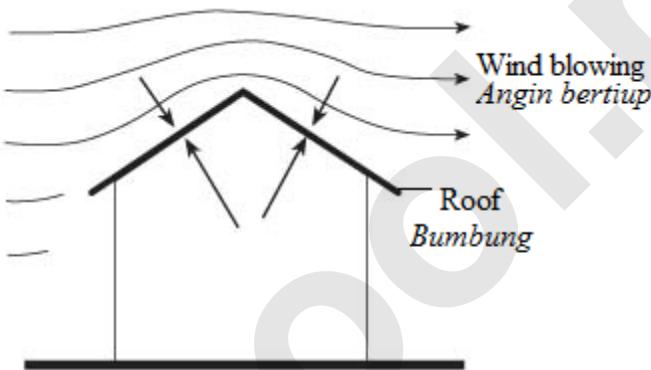


Diagram 11
Rajah 11

- (i) State Bernoulli's principle. [1 mark]

Nyatakan prinsip Bernoulli? [1 markah]

- (ii) Explain how the roof can be lifted up when the wind blowing at a very high speed.

Terangkan bagaimana bumbung boleh terangkat ke atas apabila angin bertiup dengan kelajuan yang sangat tinggi.

[4 marks]
[4 markah]

- (b) A house which has a roof of mass 10 000 kg and total surface area 100 m^2 .

During a thunderstorm, wind is blowing with a very high speed produces 3 000 Pa difference of pressure between upper part and lower part of the roof. This causes the roof to be lifted up.

Sebuah rumah mempunyai bumbung berjisim 10 000 kg dan jumlah luas permukaan 100 m^2 . Semasa berlakunya ribut, angin yang bertiup dengan kelajuan yang sangat tinggi menghasilkan perbezaan tekanan antara bahagian atas dan bawah bumbung sebanyak 3 000 Pa. Ini menyebabkan bumbung terangkat ke atas.

- (i) Calculate the weight of the roof. [1 mark]
Hitungkan berat bumbung. [1 markah]
- (ii) Determine the lifting force acting on the roof during thunderstorm. [2 marks]
Tentukan daya angkat yang bertindak semasa ribut berlaku. [2 markah]
- (iii) Determine the net force acting on the roof. [2 marks]
Tentukan daya bersih yang bertindak ke atas bumbung. [2 markah]
- (c) Table 11 shows four design of Bunsen burners, P, Q, R and S with different specifications. You are required to determine the most suitable design of a Bunsen burner to function effectively and produce a blue flame.
Jadual 11 menunjukkan empat reka bentuk penunu Bunsen, P, Q, R dan S dengan spesifikasi yang berbeza. Anda dikehendaki untuk menentukan reka bentuk penunu Bunsen yang paling sesuai untuk berfungsi dengan berkesan dan dapat menghasilkan nyalaan biru.
- Study the specifications of the four Bunsen burners based on the following aspects:
Kaji spesifikasi keempat-empat penunu Bunsen berdasarkan aspek-aspek berikut:
- (i) Size of air hole
Saiz lubang udara
 - (ii) Size of nozzle gas
Saiz muncung gas
 - (iii) Size of base
Saiz tapak
 - (iv) Has moveable collar or not
Mempunyai kolar bolehubah atau tidak

Explain the suitability of each aspect and then determine the most suitable design of a Bunsen burner.
 Give reason for your choice.

Terangkan kesesuaian setiap aspek dan seterusnya tentukan reka bentuk penunu Bunsen yang paling sesuai.

Beri sebab untuk pilihan anda.

[10 marks]
[10 markah]

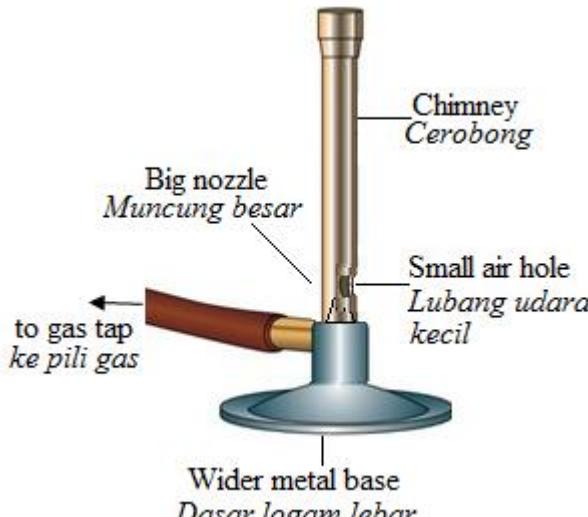
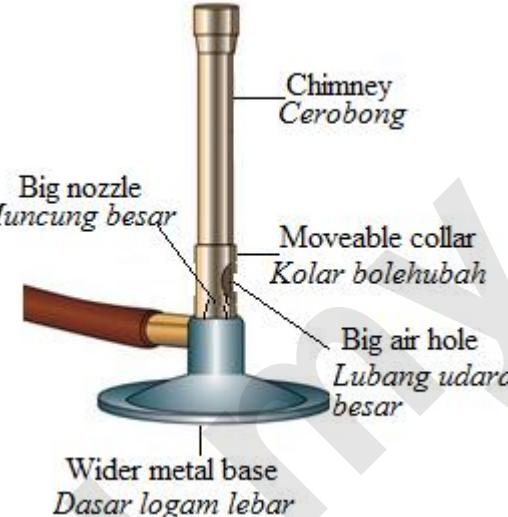
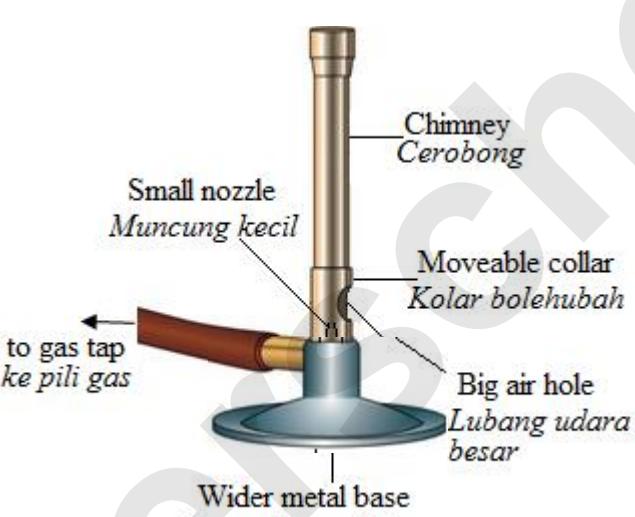
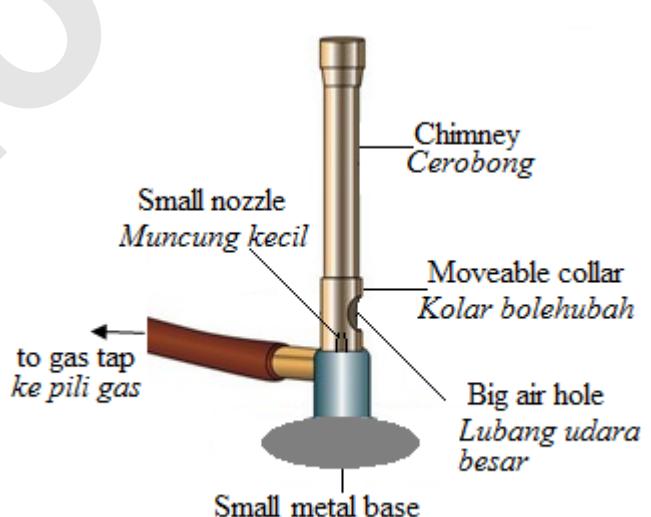
 <p>Bunsen burner P <i>Penunu bunsen P</i></p>	 <p>Bunsen burner Q <i>Penunu bunsen Q</i></p>
 <p>Bunsen burner R <i>Penunu bunsen R</i></p>	 <p>Bunsen burner S <i>Penunu bunsen S</i></p>

Table 11

Jadual 11

- 12** (a) Diagram 12.1 shows a Barton's pendulum which consist of six pendulums tied to a horizontal string. When X is displaced and released, it will oscillate with its natural frequency.

Rajah 12.1 menunjukkan bandul Barton yang terdiri daripada enam bandul yang diikat kepada satu tali mengufuk. Apabila X disesar dan dilepaskan, bandul itu akan berayun pada frekuensi aslinya.

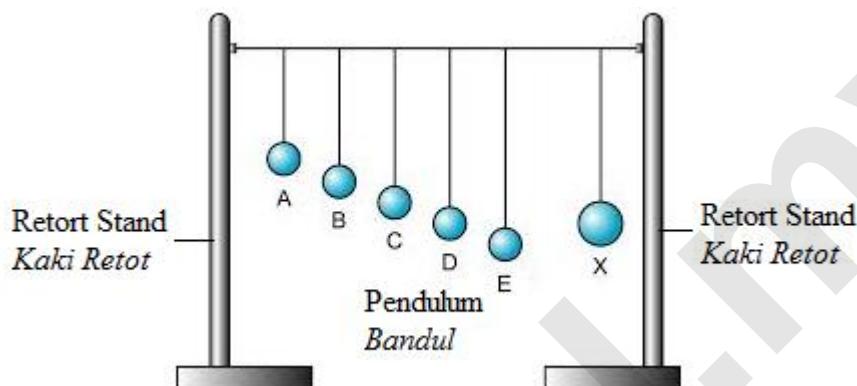


Diagram 12.1
Rajah 12.1

- (i) What is the meaning of natural frequency? [1 mark]
Apakah maksud frekuensi asli? [1 markah]
- (ii) Explain how the phenomenon of resonance occur in Diagram 12.1.
Terangkan bagaimana fenomena resonans berlaku dalam Rajah 12.1 [4 marks]
[4 markah]

- (b) Diagram 12.2 shows a radar system at an airport. Signals are transmitted from the radar system to determine the position of an aero plane.
Rajah 12.2 menunjukkan satu sistem radar di lapangan terbang. Isyarat di pancarkan dari sistem radar untuk menentukan kedudukan sebuah kapal terbang.



Diagram 12.2
Rajah 12.2

Table 12 shows the features of four radar systems, P,Q,R and S.

Jadual 12 menunjukkan ciri-ciri bagi empat sistem radar,P,Q, R dan S.

Type of radar system <i>Jenis sistem radar</i>	Diameter of the parabolic dish / m <i>Diameter piring parabola / m</i>	Type of wave transmitted <i>Jenis gelombang yang dipancarkan</i>	Distance of the signal receiver from the parabolic dish <i>Jarak penerima isyarat dari piring parabola</i>	Height of the parabolic dish <i>Ketinggian piring parabola</i>
P	10	Radiowave <i>Gelombang radio</i>	Focal length <i>Panjang fokus</i>	Low <i>Rendah</i>
Q	3	Microwave <i>Gelombang mikro</i>	Less than the focal length <i>Kurang daripada panjang fokus</i>	High <i>Tinggi</i>
R	9	Microwave <i>Gelombang Mikro</i>	Focal length <i>Panjang fokus</i>	High <i>Tinggi</i>
S	5	Radiowave <i>Gelombang radio</i>	More than the focal length <i>lebih daripada panjang fokus</i>	Low <i>Rendah</i>

Table 12
Jadual 12

Study the specifications of all the four radar systems based on the following aspects and choose the most suitable radar system.

Kaji spesifikasi untuk keempat-empat sistem radar berdasarkan aspek yang berikut dan pilih sistem radar yang paling sesuai.

- The diameter of the parabolic dish.
Diameter piring parabola
- The distance of the signal receiver from the parabolic dish.
Jarak penerima isyarat dari piring parabola.
- The type of the wave transmitted.
Jenis gelombang yang dipancarkan.
- The height of the parabolic dish from the ground.
Ketinggian piring parabola dari tanah.

Give reasons for your choice.

Berikan sebab untuk pilihan anda.

[10 marks]
[10 markah]

- (c) Ultrasonic waves are transmitted from a ship to the sea-bed to determine the depth of the sea. The frequency of the ultrasonic waves transmitted is 25 kHz. It travels at a speed of $1\ 500\ m\ s^{-1}$ in sea water. The detector on the ship receives the echoes of the ultrasonic waves 0.12 s after the waves are transmitted

Gelombang ultrasonik dipancarkan dari sebuah kapal ke dasar laut untuk menentukan kedalaman laut. Frekuensi gelombang ultrasonik yang dipancarkan adalah 25 kHz. Ia merambat dengan kelajuan $1500\ m\ s^{-1}$ dalam air laut. Alat pengesan pada kapal menerima gema gelombang ultrasonik 0.12 s selepas ianya dipancarkan.

Calculate:

Hitung:

- (i) the depth of the sea.
kedalaman laut. [3 marks]
[3 markah]
- (ii) the wavelength of the ultrasonic waves in sea water.
panjang gelombang bagi gelombang ultrasonik dalam air laut. [2 marks]
[2 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

NAMA:..... Tingkatan:.....



**KEMENTERIAN
PENDIDIKAN
MALAYSIA**

**BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN**

**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2015
PERCUBAAN SIJIL PELAJARAN MALAYSIA**

FIZIK

Kertas 3

Satu Jam Tiga Puluh Minit

JANGAN BUKA KERTAS SOALANINI SEHINGGA DIBERITAHU

Arahan:

1. Kertas soalan ini mengandungi dua bahagian : **Bahagian A** dan **Bahagian B**.
2. Jawab semua soalan dalam **Bahagian A**. Tuliskan jawapan bagi **Bahagian A** dalam ruang yang disediakan dalam kertas soalan.
3. Jawab **satu** soalan daripada **Bahagian B**. Tuliskan jawapan **Bahagian B** pada ruangan yang disediakan..
Jawab **Bahagian B** dengan lebih terperinci.
Jawapan mestilah jelas dan logik.
4. Tunjukkan kerja mengira, ini membantu anda mendapat markah.
5. Gambarajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.
6. Markah yang diperlukan bagi setiap soalan atau ceraiannya ditunjukkan dalam kurungan.
7. Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh di programkan.
8. Masa yang dicadangkan untuk menjawab **Bahagian A** ialah 60 minit dan **Bahagian B** ialah 30 minit.

Kegunaan Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah
A	1	16	
	2	12	
B	3	12	
	4	12	
JUMLAH			

Kertas soalan ini mengandungi **15** halaman bercetak.

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 extension of spring, x and weight of load, W . The apparatus is set up as shown in Diagram 1.1.

Seorang pelajar menjalankan eksperimen untuk mengkaji hubungan antara pemanjangan spring, x dan berat pemberat, W . Susunan alat radas ditunjukkan dalam Rajah 1.1.

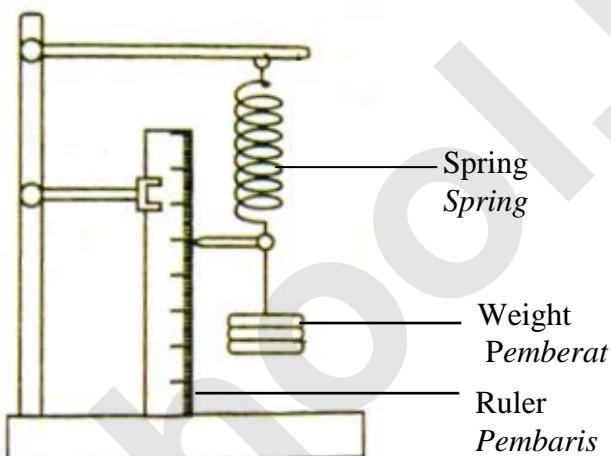


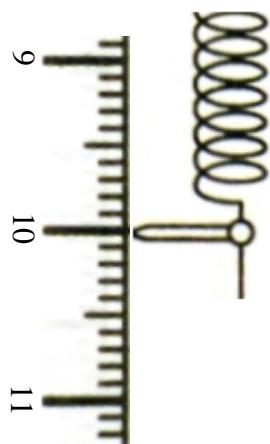
Diagram 1.1
Rajah 1.1

The spring will extend when a weight is hung at one end. The length of spring, l is recorded.

Spring akan memanjang apabila beban digantung pada hujungnya. Panjang spring, l direkodkan.

Diagram 1.2 shows the initial length of spring, l_0 .

Rajah 1.2 menunjukkan panjang asal spring, l_0 .



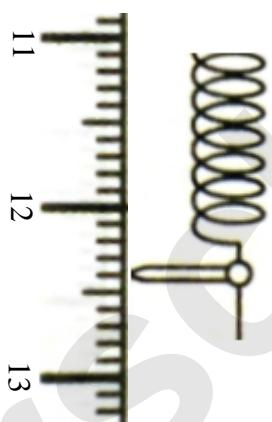
$$l_0 = \dots \text{cm}$$

Diagram 1.2

Rajah 1.2

Diagram 1.3 shows the length of spring, l , for $W = 10 \text{ N}$.

Rajah 1.3 menunjukkan panjang, l , untuk $W = 10 \text{ N}$.



$W = 10 \text{ N}$
$l = \dots \text{cm}$
$x = \dots \text{cm}$

Diagram 1.3

Rajah 1.3

The procedure is repeated with $W = 20 \text{ N}, 30 \text{ N}, 40 \text{ N}$ and 50 N . The corresponding length of spring are shown in Diagram 1.4, 1.5, 1.6 and 1.7.

Prosedur ini diulang dengan $W = 20 \text{ N}, 30 \text{ N}, 40 \text{ N}$ dan 50 N . Panjang spring yang sepadan ditunjukkan pada Rajah 1.4, 1.5, 1.6 dan 1.7.

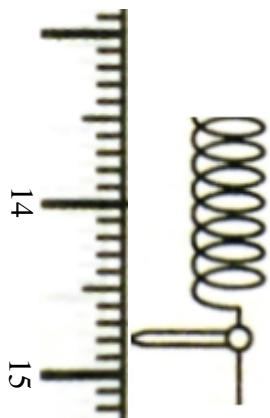


Diagram 1.4
Rajah 1.4

$$W = 20 \text{ N}$$

$$l = \dots \text{cm}$$

$$x = \dots \text{cm}$$

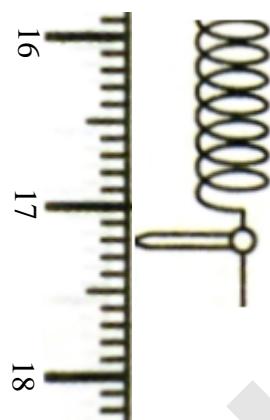


Diagram 1.5
Rajah 1.5

$$W = 30 \text{ N}$$

$$l = \dots \text{cm}$$

$$x = \dots \text{cm}$$

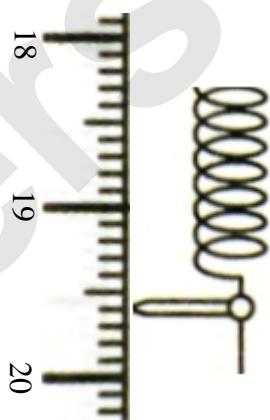


Diagram 1.6
Rajah 1.6

$$W = 40 \text{ N}$$

$$l = \dots \text{cm}$$

$$x = \dots \text{cm}$$

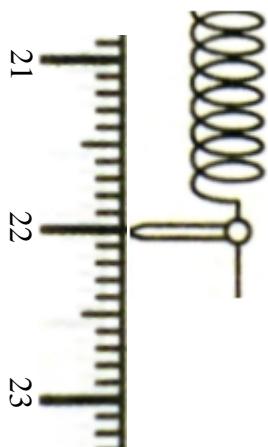


Diagram 1.7

Rajah 1.7

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

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

- (i) The manipulated variable

Pembolehubah yang dimanipulasikan

[1 mark]
[1 markah]

- (ii) The responding variable

Pembolehubah bergerak balas

[1 mark]
[1 markah]

- (iii) The constant variable.

Pembolehubah dimalarkan.

[1 mark]
[1 markah]

- (b) (i) Based on Diagram 1.2 on page 3, record the initial reading of spring, l_0 .

Berdasarkan Rajah 1.2 di halaman 3, catat panjang asal spring, l_0 .

$$l_0 = \dots \text{ cm}$$

[1 mark]
[1 markah]

- (ii) Based on Diagram 1.3, 1.4, 1.5, 1.6 and 1.7 on pages 3, 4 and 5, record the readings of l , in spaces provided.

Berdasarkan Rajah 1.3, 1.4, 1.5, 1.6 dan 1.7 pada halaman 3, 4 dan 5, catatkan bacaan l , dalam ruang yang disediakan.

[2 marks]

[2 markah]

- (iii) For each value of l , in 1(b)(ii), calculate the extension of spring, x , by using the following equation:

$$x = l - l_0$$

where l_0 is the initial reading of the spring.

Record the value of x , in spaces provided.

Bagi setiap nilai l di 1(b)(ii), hitung nilai pemanjangan spring, x , dengan menggunakan persamaan berikut:

$$x = l - l_0$$

di mana l_0 adalah panjang asal spring.

Catatkan nilai x , dalam ruang yang disediakan.

[1 mark]

[1 markah]

- (c) Tabulate your results for all values of W , l and x in the space below:

Jadualkan data anda bagi semua nilai W , l dan x dalam ruang di bawah.

[3 marks]

[3 markah]

- (d) On the graph paper on page 7, draw a graph of x against W .
Pada kertas graf di halaman 7, lukiskan graf x melawan W .

[5 marks]

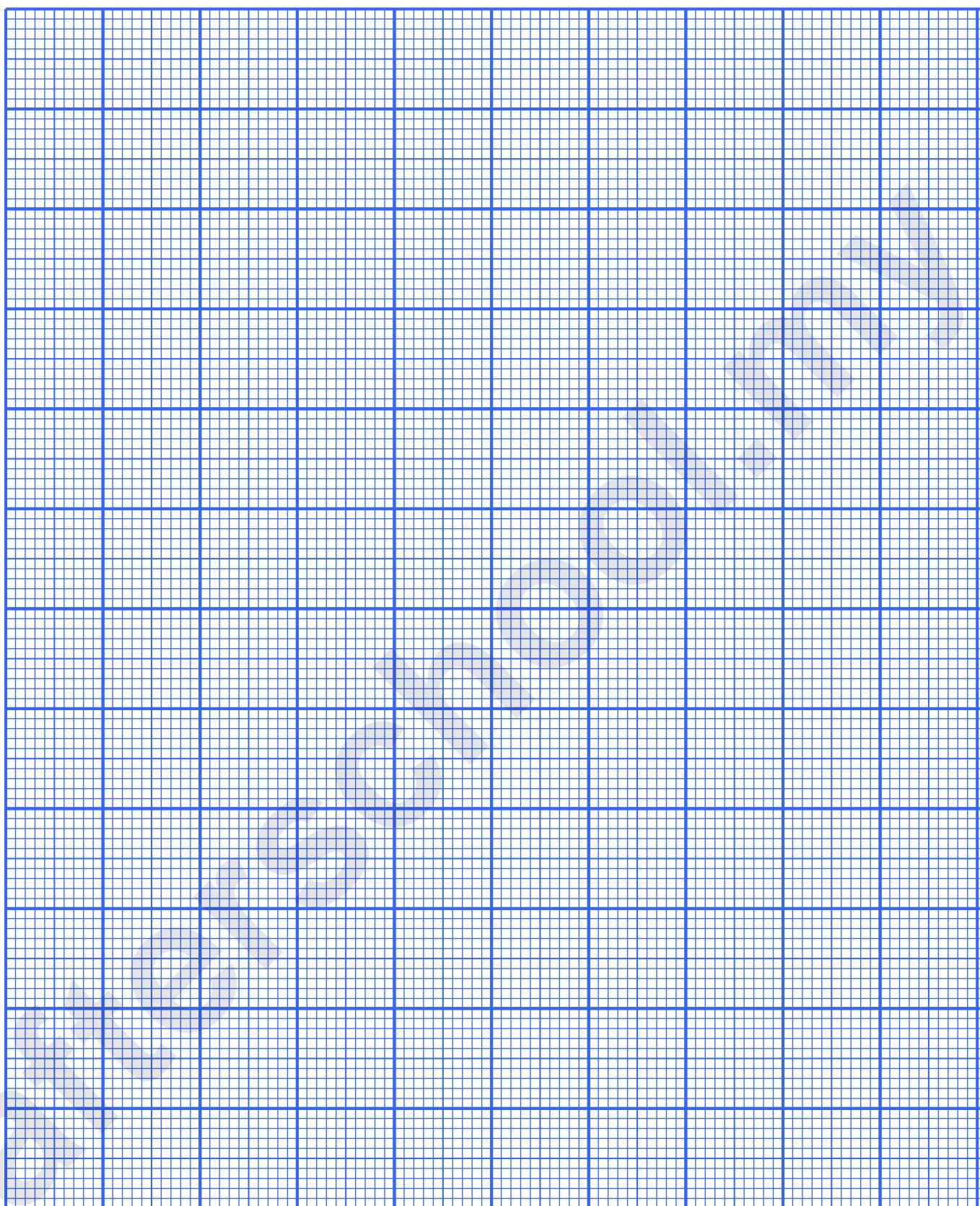
[5 markah]

- (e) Based on the graph in 1(d), state the relationship between x and W .
Berdasarkan graf di 1(d), nyatakan hubungan antara x dan W .

[1 mark]

[1 markah]

Graph of x against W
Graf x melawan W



2. A student carries out an experiment to investigate the relationship between the wavelength, λ , and frequency of water waves, f , for a fixed depth of water, $d = 1.5$ cm in a ripple tank.

The results of this experiment are shown in the graph of λ against $\frac{1}{f}$ in Diagram 2 on page 9.

Seorang pelajar menjalankan eksperimen untuk mengkaji hubungan antara panjang gelombang, λ dan frekuensi gelombang air, f bagi kedalaman air yang ditetapkan, $d = 1.5$ cm dengan menggunakan tangki riak.

Keputusan eksperimen ini ditunjukkan oleh graf λ melawan $\frac{1}{f}$ pada Rajah 2 di halaman 9.

- (a) Based on the graph in Diagram 2:
Berdasarkan graf pada Rajah 2:

- (i) State the relationship between λ and $\frac{1}{f}$.

Nyatakan hubungan antara λ dan $\frac{1}{f}$.

[1 mark]
[1 markah]

- (ii) Determine the value of f when the value of $\lambda = 0.3$ cm.

Show on the graph how you determine the value of f .

Tentukan nilai f apabila nilai $\lambda = 0.3$ cm.

Tunjukkan pada graf itu, bagaimana anda menentukan nilai f .

$$f = \dots$$

[3 marks]
[3 markah]

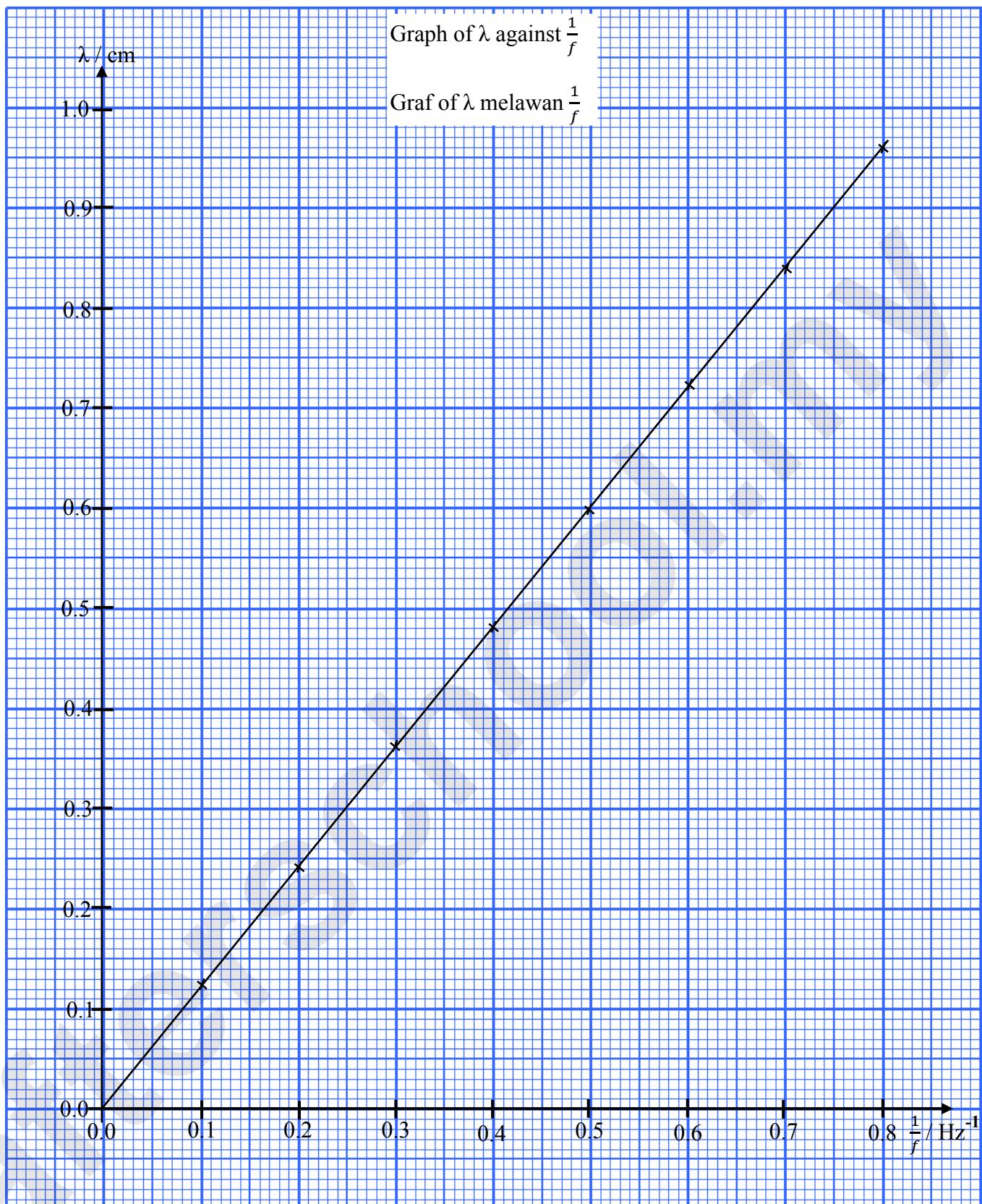


Diagram 2
Rajah 2

- (iii) Calculate the gradient, h , of the graph λ against $\frac{1}{f}$.

Show on the graph, how you determine h .

Hitung kecerunan, h , bagi graf λ melawan $\frac{1}{f}$.

Tunjukkan pada graf itu bagaimana anda menentukan nilai h .

[3 marks]
[3 markah]

- (b) The velocity, v of the water waves is given by formula;

$$v = f\lambda$$

where,

f is the frequency

λ is the wavelength

Using the value of h in 2(a)(iii) and the formula $v = f\lambda$, calculate the value of v in SI unit.

Halaju gelombang air, v diberi oleh formula;

$$v = f\lambda$$

dimana,

f adalah frekuensi

λ adalah panjang gelombang

Menggunakan nilai h di 2(a)(iii) dan formula $v = f\lambda$, hitung nilai v dalam unit SI.

$$v = \dots\dots\dots$$

[3 marks]
[3 markah]

- (c) This experiment is repeated by using different depth of water, $d = 2.0\text{ cm}$.
What happen to the gradient of the graph, h ?

*Eksperimen ini diulang menggunakan kedalaman air yang berbeza, $d = 2.0\text{ cm}$.
Apakah yang berlaku kepada kecerunan graf, h ?*

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

- (d) State **one** precaution that should be taken to improve the accuracy of the reading in this experiment.

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

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

Section B
Bahagian B

[12 marks]
[12 markah]

Answer any **one** question in this section
Jawab mana-mana satu soalan dalam bahagian ini

- 3 Diagram 3.1 shows an observer is watching the position of the image of a marble in a beaker filled with water.

Rajah 3.1 menunjukkan seorang pemerhati sedang melihat kedudukan imej bagi sebiji guli yang berada di dasar satu bikar yang berisi air.

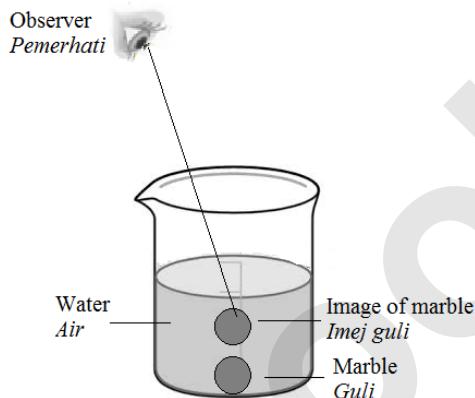


Diagram 3.1
Rajah 3.1

Diagram 3.2 shows the new position of the image of the marble when more water is poured in the beaker.

Rajah 3.2 menunjukkan kedudukan baru imej guli itu apabila lebih banyak air ditambahkan ke dalam bikar itu.

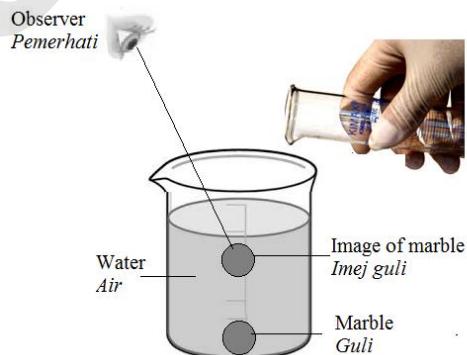


Diagram 3.2
Rajah 3.2

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

(a) State **one** suitable inference. [1 mark]
*Nyatakan **satu** inferensi 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 beaker, pin and other suitable apparatus, describe one experiment to investigate the hypothesis stated in 3(b).

Dengan menggunakan alat radas seperti bikar, pin dan lain-lain radas yang sesuai, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di 3(b).

In your description, state clearly the following;

Dalam penerangan anda sila nyata dengan jelas perkara-perkara berikut;

(i) The aim of the experiment.

Tujuan eksperimen.

(ii) The variables in the experiment.

Pembolehubah dalam eksperimen.

(iii) The list of apparatus and materials.

Senarai radas dan bahan.

(iv) The arrangement of the apparatus.

Susunan radas.

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

*Prosedur eksperimen termasuk **satu** kaedah mengawal pemboleh ubah dimanipulasikan dan **satu** kaedah mengukur pemboleh ubah bergerak balas.*

(vi) The way to tabulate the data.

Cara untuk menjadualkan data.

(vii) The way to analyse the data.

Cara untuk menganalisis data.

[10 marks]
[10 markah]

4. Diagram 4.1 shows a bulb lights up when connected to an electrical circuit.

Rajah 4.1 menunjukkan sebiji mentol menyala apabila disambungkan kepada satu litar elektrik.

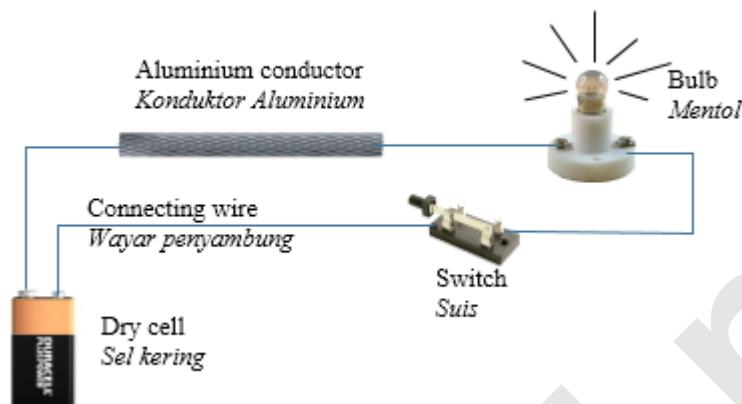


Diagram 4.1

Rajah 4.1

Diagram 4.2 shows the bulb become dimmer when the circuit is exposed to the hot sun.

Rajah 4.2 menunjukkan mentol itu menjadi semakin malap bila litar itu terdedah kepada cahaya matahari yang terik.

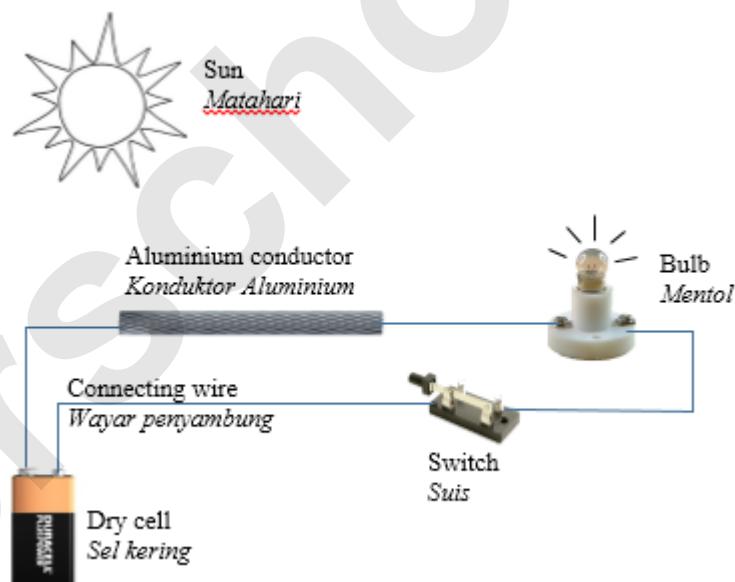


Diagram 4.2

Rajah 4.2

Based on the information and observation:

Berdasarkan maklumat dan pemerhatian itu:

- (a) State **one** suitable inference. [1 mark]
Nyatakan satu inferensi 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 thermometer, constantan wire and other suitable apparatus, describe **one** experiment to investigate the hypothesis stated in 4(b),
Dengan menggunakan alat radas seperti termometer, dawai konstantan dan lain-lain radas yang sesuai, terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di 4(b).

In your description, state clearly the following:

Dalam penerangan anda sila nyata dengan jelas perkara-perkara berikut :

- (i) The aim of the experiment.
Tujuan eksperimen.
- (ii) The variables in the experiment.
Pembolehubah dalam eksperimen.
- (iii) The list of apparatus and materials.
Senarai radas dan bahan.
- (iv) The arrangement of the apparatus.
Susunan radas.
- (v) The procedure of the experiment which include **one** method of controlling the manipulated variable and **one** method of measuring the responding variable.
Prosedur eksperimen termasuk satu kaedah mengawal pemboleh ubah dimanipulasikan dan satu kaedah mengukur pemboleh ubah bergerak balas.
- (vi) The way to tabulate the data.
Cara untuk menjadualkan data.
- (vii) The way to analyse the data.
Cara untuk menganalisis data.

[10 marks]
[10 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

MARKING SCHEME TRIAL SPM PAPER 1 2015**Paper 1**

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

SEKOLAH BERASRAMA PENUH
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2015
PHYSICS
Kertas2
Mark Scheme
Ogos / September

Question	Mark Scheme	Sub Mark	Total Mark
1 (a) (i)	Triple beam balance	1	1
(b) (i)	Zero adjustment knob	1	2
(ii)	To adjust zero reading of the instrument	1	
(c)	62.4 g	1	1
			4

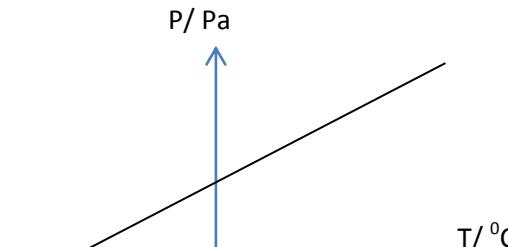
Question	Mark Scheme	Sub Mark	Total Mark
2 (a) (i)	Elasticity is the property of an object to return to its original length/shape after force exerted is removed	1	2
(ii)	The spring is permanently deformed/damage // It has reached its elastic limit // Beyond the elastic limit, Hooke's Law is no longer applied.	1	
(b) (i)	Extension, $x = 5 \text{ cm}$	1	3
(ii)	Upper spring, $100 \text{ g} \rightarrow x = 5 \text{ m}$ Two lower parallel springs, $100 \text{ g} \rightarrow x = 2.5 \text{ m}$ Total extension = $5 + 2.5 = 7.5 \text{ cm}$ Total length, $y = 10 + 10 + 5 + 2.5 = 27.5 \text{ cm}$	1 1	
		1	

Question	Mark Scheme	Sub Mark	Total Mark
3 (a)	Gamma	1	1
(b) (i)	Q neutral	1	2
(ii)	P and R has charges // P has positive charge // R has negative charge	1	
(c) (i)	141	1	

(ii)	$E = mc^2$ $= (2.988 \times 10^{-28})(3 \times 10^8)^2$ $= 2.6892 \times 10^{-11} \text{ J}$	1 1	3
			6

Question	Mark Scheme	Sub Mark	Total Mark
4 (a) (i)	Thermal equilibrium is a condition where the net rate of heat transfer between two bodies that are in contact is zero // same temperature	1	3
(ii)	The heat is transferred The net rate of heat transfer is zero// Temperature is equal	1 1	
(b) (i)	$m_w c_w (95 - \theta) = m_e c_e (\theta - 27)$ $0.6 (4200)(95 - \theta) = 0.05(3320)(\theta - 27)$ $\theta = 90.78 {}^\circ\text{C}$	1 1 1	4
(ii)	No heat loss to the surrounding.	1	
			7
5 (a) (i)	Diagram 5.1: convex lens, Diagram 5.2: concave lens	1	3
(ii)	Diagram 5.1: parallel rays converged after passing through the lens while, Diagram 5.2: parallel rays diverged after passing through the lens	1	
(iii)	The focal point of the lens in Diagram 5.1 is the other side of the incident rays//The position in Diagram 5.1 at the right //the focal point of the lens in Diagram 5.2 is at the same side as the incident rays // the position focal point in Diagram 5.2 at the left	1	
(b) (i)	If the lens is a convex lens, the light converges after pass through the lens or vice versa	1	2
(ii)	If the lens is a convex lens, the focal point real and if the lens is a concave lens, the focal point virtual.	1	
(c) (i)	The image that can be formed on the screen	1	3
(ii)	Magnified inverted	2	
Jumlah			8

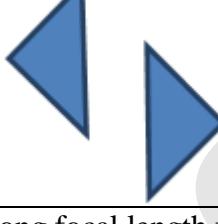
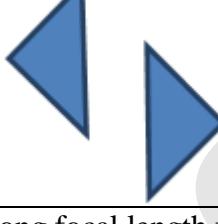
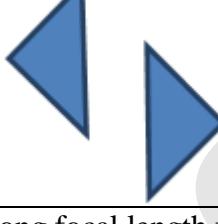
Question	Mark Scheme	Sub Mark	Total Mark
6 (a)	A region where a charged body experiences electrical force	1	1
(b)	<p>When the polystyrene ball is brought to touch plate P, the polystyrene ball received <u>negative</u> charges It is <u>repelled</u> and moves to plate Q.</p> <p>When it touches plate Q, it is <u>positively</u> charged and it is <u>repelled/attracted</u> to plate P.</p> <p>Note:</p> <p>Any two correct – 1 mark</p> <p>All correct -2 marks</p>	1 1	2
(c) (i)	Potential difference in Diagram 6.2 > Diagram 6.1 // vice-versa	1	3
(ii)	Equal	1	
(iii)	Strength of electric field in Diagram 6.2 > Diagram 6.1 // vice-versa	1	
(d) (i)	When potential difference between metal plates increases, the strength of electric field increases // vice-versa	1	2
(ii)	When strength of electric field increases, speed of oscillation increases // vice-versa	1	
			8

Question	Mark Scheme	Sub Mark	Total Mark
7 (a)	Pressure Law	1	1
(b) (i)		1	2
(ii)	-273	1	

(c)	$\frac{1.55 \times 10^5}{(12 + 273)} = \frac{P_2}{(37 + 273)}$ $P_2 = \frac{(1.55 \times 10^5)(310)}{285}$ $P_2 = 1.69 \times 10^5 \text{ Pa}$	1	2
(d)	Kinetic energy increased // Rate of collision between particles and the wall increase	1	1
(e) (i)	-Thicker wall - withstand higher pressure// wall not easily broken	1 1	4
(ii)	-More number of lock - Lid not easily open	1 1	
			10

Question	Mark Scheme	Sub Mark	Total Mark
8 (a)	Rate of charge flow	1	1
(b)	Cut magnetic flux //To produce induced current	1	1
(c)	1. current flows through the coil P produced magnetic field 2. cut by coil Q 3. Induced e.m.f across coil Q is produced//current	1 1 1	3
(d) (i)	1. Bigger diameter 2. Lower resistance/higher current flow	1 1	6
(ii)	1. More number of turns 2. Higher magnetic field/higher rate of cutting of magnetic flux	1 1	
(iii)	1. Copper 2. Lower resistance/higher current flow	1 1	
(e)	P	1	1
			12

Question	Mark Scheme	Sub Mark	Total Mark
9 (a)	The ratio of sin i to sin r // the ratio of the speed of light in vacuum or air to the speed of light in medium.	1	1
(b)	1. The incident angles in both prisms are the same. 2. The refractive index of glass is higher than the refractive index of water. 3. The critical angle of glass is smaller than the critical angle of water. 4. The higher the refractive index the smaller the	1 1 1	

	<p>critical angle.</p> <p>5. If the incident angle > the critical angle of glass will result in total internal reflection // while water which has bigger critical angle will result in refraction of light .</p>	1	1	5														
(c)	<p>1. Diamond has higher refractive index than glass.</p> <p>2. The critical angle of diamond is much smaller than the critical angle of glass.</p> <p>3. Most of the rays that entered diamond will be total internally reflected that makes diamond sparkles.</p> <p>4. Most of the rays that entered glass will be refracted but not reflected,</p>	1	1															
(d)	<table border="1"> <thead> <tr> <th>Suggestion /Design/Way</th><th>Explanation / Reason</th></tr> </thead> <tbody> <tr> <td>2 prisms 45-90-45 // from drawing</td><td>To get total internal reflection</td></tr> <tr> <td>Arrangement of prisms: </td><td>To make the image upright and not laterally inverted</td></tr> <tr> <td>Long focal length for objective lens and short focal length for eye lens</td><td>To form a magnified image</td></tr> <tr> <td>Big diameter of lens</td><td>More light can enter the instrument</td></tr> <tr> <td>The outer body made from lower density material</td><td>Light and easy to carry.</td></tr> <tr> <td>The body made from strong material</td><td>Does not break easily.</td></tr> </tbody> </table>	Suggestion /Design/Way	Explanation / Reason	2 prisms 45-90-45 // from drawing	To get total internal reflection	Arrangement of prisms: 	To make the image upright and not laterally inverted	Long focal length for objective lens and short focal length for eye lens	To form a magnified image	Big diameter of lens	More light can enter the instrument	The outer body made from lower density material	Light and easy to carry.	The body made from strong material	Does not break easily.	2	2	
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The body made from strong material	Does not break easily.																	
				Max 10														
				20														

10 (a)	A beam of fast moving electron	1	1												
	The voltage supplied in Diagram 10.1 is smaller than that in Diagram 10.2	1													
	The strength of electric field in Diagram 10.1 is smaller than that in Diagram 10.2.	1													
(b)	The deflection of the cathode ray in Diagram 10.1 is smaller than that in Diagram 10.2	1	5												
	When the value of voltage supplied is smaller, the strength of electric field is lower	1													
	The smaller the strength of electric field, the less the deflection of the cathode ray	1													
(c)	When the cathode is heated, electrons are emitted on the surface // thermionic emission. Electrons then accelerate/ attracted to anode The electrons travel in straight line The electrons / cathode ray stopped by the Maltese Cross produce shadow.	1 1 1 1	4												
(d) (ii)	<table border="1"> <thead> <tr> <th>Suggestion</th> <th>Reason</th> </tr> </thead> <tbody> <tr> <td>AND gate</td> <td>To activate the fire extinguisher when the smoke detector detect smoke and the temperature is high</td> </tr> <tr> <td>OR gate</td> <td>To activate the device X when it detects smoke or detect high temperature</td> </tr> <tr> <td>Relay switch</td> <td>To switch on the secondary circuit with higher voltage supplied</td> </tr> <tr> <td>Siren/ Alarm</td> <td>To produce sound</td> </tr> <tr> <td>Thermistor</td> <td>Sensitive to heat // resistance varies with temperature</td> </tr> </tbody> </table>	Suggestion	Reason	AND gate	To activate the fire extinguisher when the smoke detector detect smoke and the temperature is high	OR gate	To activate the device X when it detects smoke or detect high temperature	Relay switch	To switch on the secondary circuit with higher voltage supplied	Siren/ Alarm	To produce sound	Thermistor	Sensitive to heat // resistance varies with temperature	2 2 2 2 2	10
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Siren/ Alarm	To produce sound														
Thermistor	Sensitive to heat // resistance varies with temperature														
	Jumlah		20												

Question	Mark Scheme	Sub Mark	Total Mark												
11(a)(i)	Bernoulli's principle states that the pressure of a moving liquid decreases as the speed of the fluid increases and vice versa.	1	1												
(a)(ii)	<ul style="list-style-type: none"> The speed of air at the upper part of the roof is higher / The speed of air at the lower part of the roof is lower The pressure at upper part is lower / the pressure at lower part is higher The difference in air pressure between upper part and lower part of the wing produces Lifting force // $F = \text{difference } P \times A$ 	1 1 1 1	4												
(b)(i)	$\begin{aligned} W &= mg \\ &= (10\ 000)(10) \\ &= 100\ 000 \text{ N} \end{aligned}$	1													
(b)(ii)	$\begin{aligned} F &= \text{difference } P \times A \\ &= (3\ 000)(100) \\ &= 300\ 000 \text{ N} \end{aligned}$	1 1	5												
(b)(iii)	Net force, $F = 300\ 000 - 100\ 000$ $= 200\ 000 \text{ N}$	1 1													
(c)	<table border="1"> <thead> <tr> <th>Aspects</th><th>Explanations</th></tr> </thead> <tbody> <tr> <td>Size of air hole is big</td><td>More air can flows into Bunsen burner</td></tr> <tr> <td>Size of gas nozzle is small</td><td>Produce high velocity / lower pressure</td></tr> <tr> <td>Size of base is wider</td><td>More stable</td></tr> <tr> <td>Has moveable collar</td><td>To control the amount of air entering the Bunsen burner through the air hole</td></tr> <tr> <td>Chosen design: R</td><td>Because R has big size of air hole, small size of gas nozzle, wider base and has moveable collar.</td></tr> </tbody> </table>	Aspects	Explanations	Size of air hole is big	More air can flows into Bunsen burner	Size of gas nozzle is small	Produce high velocity / lower pressure	Size of base is wider	More stable	Has moveable collar	To control the amount of air entering the Bunsen burner through the air hole	Chosen design: R	Because R has big size of air hole, small size of gas nozzle, wider base and has moveable collar.	2 2 2 2 2	10
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Chosen design: R	Because R has big size of air hole, small size of gas nozzle, wider base and has moveable collar.														
	JUMLAH		20												

Question	Mark Scheme	Sub Mark	Total Mark												
12(a)(i)	Frequency of any oscillating system in the absence of any other forces.	1													
(ii)	Forced oscillation	1													
(iii)	Pendulum <i>B</i> because the natural frequency of <i>B</i> is the same as the natural/ driving frequency of <i>X</i> .	1 1													
(iv)	Resonance	1	5												
(b)	<table border="1"> <thead> <tr> <th>Characteristics</th><th>Reason</th></tr> </thead> <tbody> <tr> <td>Large diameter of the parabolic disc</td><td>that more signals are received</td></tr> <tr> <td>Type of wave is microwave</td><td>frequency is high.</td></tr> <tr> <td>Distance of signal receiver from parabolic disc is same as focal length</td><td>signals are focused at the receiver.</td></tr> <tr> <td>Height of the disc is high</td><td>signal is not blocked.</td></tr> <tr> <td>R is chosen</td><td>diameter of the parabolic disc is large, transmits microwave, distance of signal receiver from the disc is the same as the focal length and height of the parabolic disc is high.</td></tr> </tbody> </table>	Characteristics	Reason	Large diameter of the parabolic disc	that more signals are received	Type of wave is microwave	frequency is high.	Distance of signal receiver from parabolic disc is same as focal length	signals are focused at the receiver.	Height of the disc is high	signal is not blocked.	R is chosen	diameter of the parabolic disc is large, transmits microwave, distance of signal receiver from the disc is the same as the focal length and height of the parabolic disc is high.	2 2 2 2 2	10
Characteristics	Reason														
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(c)(i)	$s = \frac{vt}{2}$ $= \frac{1500 \times 0.12}{2}$ $= 1500 \times 0.06$ $= 90 \text{ m}$	1 1 1													
(ii)	$\lambda = \frac{v}{f}$ $= \frac{1500}{25\ 000}$ $= 0.06 \text{ m}$	1 1	5												
			20												

afterschool.my

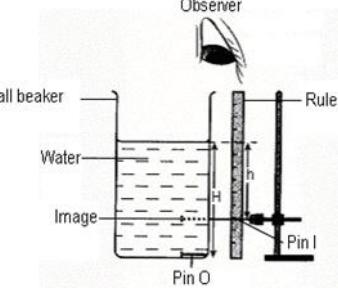
MARKING SCHEME TRIAL SPM PAPER 3 2015
SECTION A

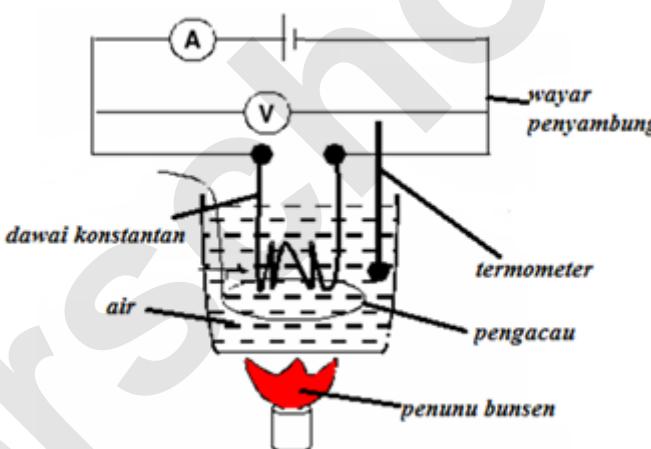
No. 1	Answer	Mark																																								
(a) (i)	Manipulated variable = Weight/W	1																																								
(ii)	Responding variable = Length of spring/ l //extension /x	1																																								
(iii)	Constant variable = Initial length of spring/ l_0 //spring constant//diameter of spring	1																																								
(b) (i)	10.0// 10	1																																								
(ii)	$l = 12.4, 14.8, 17.2, 19.6, 22.0$	2																																								
(iii)	$x = 2.4, 4.8, 7.2, 9.6, 12.0$	1																																								
(c)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>W/N</th> <th>l_1 / cm</th> <th>x /cm</th> <th></th> </tr> </thead> <tbody> <tr><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>		W/N	l_1 / cm	x /cm																																					3
	W/N	l_1 / cm	x /cm																																							
	-table -1 -unit- 1 -consistent 1 d.p- 1																																									
(d)	<p>Draw the graph of x against W.</p> <p>A - Label y-axis and x-axis correctly B - States the unit at the axis correctly C - Both axes with the even and uniform scale: D - 5 points correctly plotted: ✓ ✓ at least 3 points correctly plotted ✓ E - a smooth best straight line F - minimum size of the graph is 5 x 4 squares of 2 x 2 cm.</p> <table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No of ticks</th> <th>Score</th> </tr> </thead> <tbody> <tr><td>7</td><td>5</td></tr> <tr><td>5-6</td><td>4</td></tr> <tr><td>3-4</td><td>3</td></tr> <tr><td>2</td><td>2</td></tr> <tr><td>1</td><td>1</td></tr> </tbody> </table>	No of ticks	Score	7	5	5-6	4	3-4	3	2	2	1	1																													
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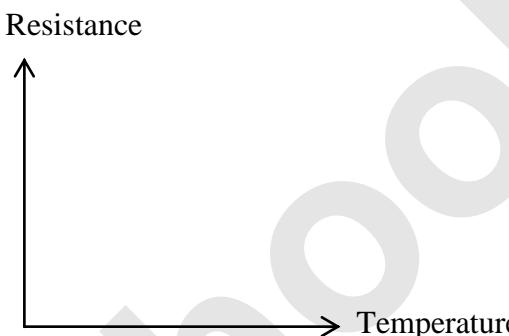
		5
(e)	State the correct relationship based on the candidate's graph x is increasing linearly to $W \propto x \propto W$	1
	TOTAL	16
No 2		Answer
(a)(i)	λ is directly proportional to $\frac{1}{f}$	1
(ii)	1. Doing correct interpolation by drawing at least a vertical or horizontal line at $\lambda = 0.3$ cm 3. The corresponding value of $\frac{1}{f} = 0.25 \text{ Hz}^{-1}$ 4. $f = 4 \text{ Hz}$ (correct unit)	1 1 1
(iii)	1. Draw a sufficient large triangle (8 cm x 10 cm) 2. $h = \frac{0.6 - 0}{0.5 - 0}$ $= 1.2 \text{ cm Hz/cm s}^{-1}$	1 1 1
(b)	$v = \text{gradient of the graph}$ $= 1.2 \text{ cm s}^{-1}$ $= 1.2 \times 10^{-2} \text{ m s}^{-1}$	1 1 1
(c)	h increase	1
(d)	Eye position must be perpendicular to scale of meter /repeat the experiment and find the average .	1
	Total	12

SECTION B

NO	ANSWER	MARK
3 (a)	State a suitable inference The apparent depth depend on the real depth	1
(b)	State a relevant hypothesis The higher the real depth the higher apparent depth	1
(c)(i)	State the aim of experiment To investigate the relationship between apparent depth and the real depth	1
(ii)	State the manipulated variable and the responding variable Manipulated : real depth Responding : apparent depth	1
	State the constant variable Constant variable: Refractive index //Density	1

(iii)	<p>Complete list of apparatus and materials Pin,ruler,water</p>	1												
	<p>Draw the functional arrangement of the apparatus</p> 	1												
	<p>State the method of controlling the manipulated variable 1.The beaker is filled with water until the depth, H is 5 cm</p> <p>State the method of measuring the responding variable 2. The position of pin I is adjusted until no parallax between the pin O and the pin I. 3.By using the ruler ,the position of pin I is measured as the apparent depth, h</p>	1												
	<p>Repeat the experiment at least 4 times 4. The experiment is repeated with 10, 15, 20 and 25 cm depth of water.</p>	1												
	<p>Tabulation of data:</p> <table border="1" data-bbox="298 1147 1113 1356"> <thead> <tr> <th>H</th> <th>h</th> </tr> </thead> <tbody> <tr> <td>5</td> <td></td> </tr> <tr> <td>10</td> <td></td> </tr> <tr> <td>15</td> <td></td> </tr> <tr> <td>20</td> <td></td> </tr> <tr> <td>25</td> <td></td> </tr> </tbody> </table>	H	h	5		10		15		20		25		1
H	h													
5														
10														
15														
20														
25														
	<p>Analyze the data.</p> 	1												
TOTAL MARK	12													

No	ANSWER	MARK
4		
(a)	<p>State the suitable inference Brightness of the bulb depends on temperature// Resistance /current depends on temperature</p>	1
(b)	<p>State a relevant hypothesis The higher the temperature, the higher the Resistance // The higher the temperature the lower the current</p>	1
(c)(i)	<p>State the aim of experiment To study the relationship between current/resistance and temperature</p>	1
(ii)	<p>State the manipulated variable and the responding variable Manipulated : Temperature Responding : Resistance/ Current</p>	1
	<p>State the constant variable Constant variable: length//diameter//resistivity of wire</p>	1
(iii)	<p>State the complete list of apparatus and materials Voltmeter, Ammeter, thermometer, constantan wire, water</p>	1
(iv)	<p>Draw the functional arrangement of the apparatus</p> 	1
(v)	<p>State the method to control the manipulated variable 1. Heat the water until 25°C</p> <p>State the method to measure the responding variable</p> <p>2. Record the reading of ammeter and voltmeter . 3. Calculate the resistance by using formulae $R = V/I$</p>	1 1

	Repeat the experiment at least 4 times with the values 4. The experiment is repeated with temperature = 30°C , 35°C , 40°C and 45°C .	1												
(vi)	State how the data tabulated with the title MV and RV <table border="1"> <thead> <tr> <th>Temperature</th> <th>Resistance</th> </tr> </thead> <tbody> <tr><td>25</td><td></td></tr> <tr><td>30</td><td></td></tr> <tr><td>35</td><td></td></tr> <tr><td>40</td><td></td></tr> <tr><td>45</td><td></td></tr> </tbody> </table>	Temperature	Resistance	25		30		35		40		45		1
Temperature	Resistance													
25														
30														
35														
40														
45														
(vii)	State how the data is analysed, plot a graph RV against MV 	1												
	Total	12												