

Name: Form:

4531/1
Physics
Paper 1
2009
1 1/4 hours



**PEJABAT PELAJARAN DAERAH HULU LANGAT
PEPERIKSAAN PERCUBAAN SETARA
2009**

Physics

Paper 1

One hour and fifteen minutes

DO NOT OPEN THIS QUESTION PAPER UNLESS TOLD

- 1 Kertas soalan ini adalah dalam dwi bahasa
- 2 Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu

Kertas soalan ini mengandungi 29 halaman bercetak
dan 3 halaman tidak bercetak.

The following information may be useful. The symbols have their usual meaning.

1. $a = \frac{v-u}{t}$

16. Power, $P = \frac{\text{Energy}}{\text{time}}$

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

17. $V = IR$

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

18. Kuasa, $P = IV$

4. Momentum = mv

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

5. $F = ma$

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

6. Kinetic energy = $\frac{1}{2}mv^2$

21. $g = 10 \text{ ms}^{-2}$

7. Potential energy = mgh

22. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

8. Elastic potential energy = $\frac{1}{2}Fx$

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

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

24. $n = \frac{\text{Real depth}}{\text{apparent depth}}$

10. Pressure, $P = h\rho g$

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

11. Pressure, $P = \frac{F}{A}$

26. $Q = It$

12. Heat, $Q = mc\theta$

13. $\frac{PV}{T} = \text{constant}$

14. $E = mc^2$

15. $v = f\lambda$

1. Which of the following quantities is **not** a scalar quantity ?
Antara kuantiti berikut, yang manakah bukan kuantiti skalar ?

- A Energy
Tenaga
- B Power
Kuasa
- C Force
Daya
- D Pressure
Tekanan

2. Which of the following powers same as 1500 MW ?
Antara kuasa berikut, yang manakah sama dengan 1500 MW ?

- A 1.5×10^6 W
- B 1.5×10^9 W 1500×10^6
- C 1.5×10^{11} W
- D 1.5×10^{12} W

3. The period of swing of an inertia balance on earth is T seconds. What is the period of swing of an inertia balance on the moon which has 1/6 of the strength of the gravitational field of the earth ?

Tempoh ayunan sebuah neraca inersia di bumi ialah T saat. Berapakah tempoh ayunan neraca inersia di bulan di mana kekuatan gravitinya adalah 1/6 graviti bumi?

- A $T/6$ seconds / saat
- B T seconds / saat
- C $3T$ seconds / saat
- D $6T$ seconds / saat

4. Which of the following shows the same relationship of a units ?
Antara berikut, yang manakah menunjukkan hubungan unit yang sama?

- A $1\text{ N} = 1\text{ kg m s}^{-1}$
- B $1\text{ J} = 1\text{ kg m}^2\text{s}^{-1}$
- C $1\text{ Pa} = 1\text{ kg m}^{-1}\text{s}^{-2}$
- D $1\text{ W} = 1\text{ kg m}^2\text{s}^{-3}$

5. Diagram 1 shows a micrometer screw gauge set to measure the width of a cube.
Rajah 1 di bawah menunjukkan sebuah tolok skru mikrometer untuk mengukur lebar sebuah kiub

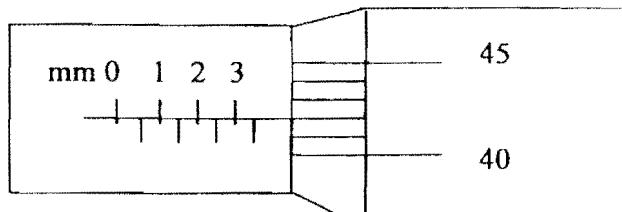


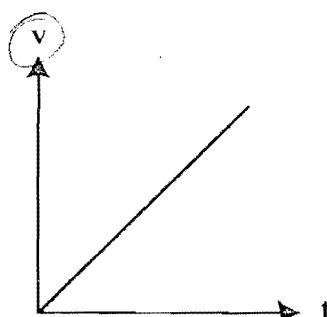
Diagram 1
Rajah 1

The width of the cube is
Lebar kiub tersebut ialah

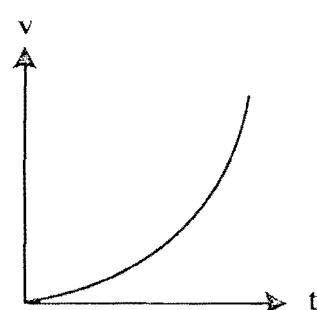
- A 3.40 mm
- B 3.42 mm
- C 3.90 mm
- D 3.92 mm

- 6 Which graph shows an increasing acceleration?
Graf yang manakah menunjukkan pecutan semakin meningkat?

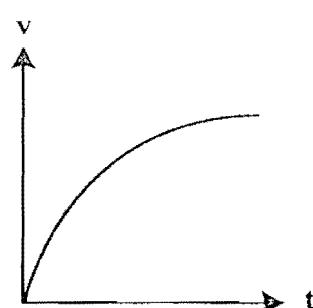
A



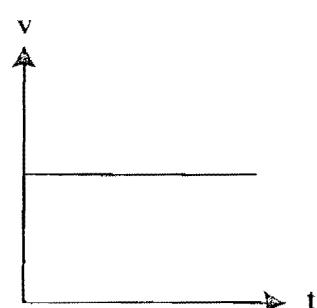
B



C

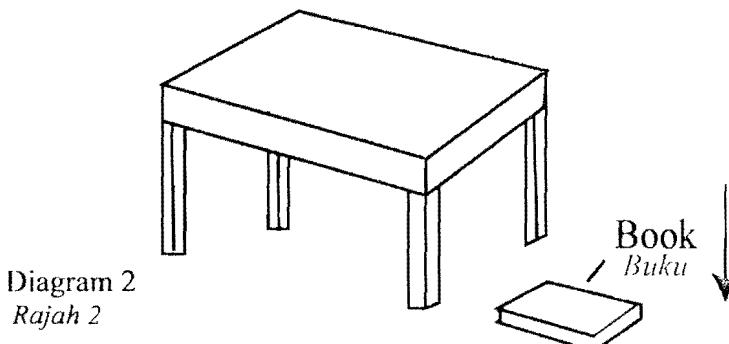


D



7 Diagram 2 shows a book falling down from a table.

Rajah 2 menunjukkan sebuah buku yang jatuh dari atas sebuah meja.



Which physical quantity of the book increases while it is falling?

Kuantiti fizik yang manakah meningkat ketika buku itu sedang jatuh?

A Mass
Jisim

B Kinetic energy
Tenaga kinetic

C Acceleration
Pecutan

D Potential energy
Tenaga keupayaan

8 Oil drips at a constant rate from a moving car. Diagram 3 shows the pattern of the drips on the road.

Minyak menitis pada kadar seragam dari kereta yang sedang bergerak. Rajah 3 menunjukkan corak titisan di atas jalan raya.



Diagram 3
Rajah 3

direction of movement
arah gerakan

Which statement describes the motion of the car?

Manakah pernyataan yang menerangkan gerakan kereta tersebut?

- A It accelerated and then moved at a steady speed.
Ia memecut dan kemudiannya bergerak dengan laju seragam.
- B It accelerated and then decelerated.
Ia memecut dan kemudiannya menyahpecut.
- C It moved at a steady speed and then decelerated.
Ia bergerak dengan laju seragam dan kemudiannya menyahpecut.
- D It moved at a steady speed and then accelerated.
Ia bergerak dengan laju seragam dan kemudiannya memecut.

- 9 Anuar lifts a heavy object underwater. He finds it is much easier to lift the object while it is underwater. This is because the object experiences

Anuar mengangkat objek yang berat di dalam air. Dia mendapati adalah lebih mudah mengangkat objek itu semasa di dalam air. Ini adalah kerana objek itu mengalami

(A)

buoyant force
daya julangan

B

force of gravity
daya graviti

C

surface tension
tegangan permukaan

D

Water friction
Rintangan air

- 10 Diagram 4 shows a car with a bumper fitted with shock absorbers.

Rajah 4 menunjukkan sebuah kereta dilengkapi bamper penyerap hentakan.

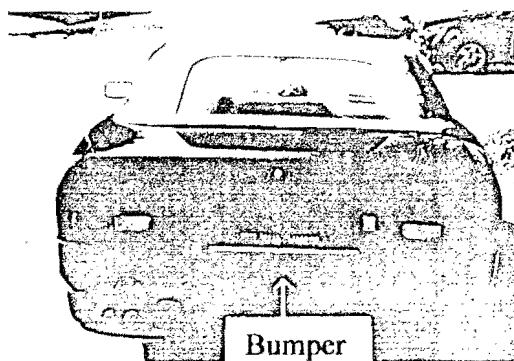


Diagram 4
Rajah 4

The advantage of using the bumper fitted with shock absorbers is
Kebaikan menggunakan bamper penyerap hentakan ialah

A

to ensure that the car will decelerate in an accident.
untuk memastikan kereta akan menyahpecut semasa kemalangan.

(B)

to minimise the impulsive force during an accident.
untuk mengurangkan daya impulse semasa kemalangan.

C

to ensure that the car is not smashed in an accident.
untuk memastikan kereta tidak remuk semasa kemalangan.

- 11 Diagram 5 shows a wooden block pulled by a force of 10N at an angle of 40° above the horizontal floor.

Rajah 5 menunjukkan sebuah blok kayu ditarik oleh daya bernilai 10N pada satu sudut 40° dari lantai mendatar.

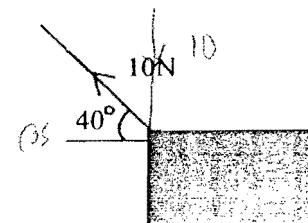


Diagram 5
Rajah 5

If the wooden block is pulled through a distance of 5m, how much work is done on the wooden block?

Jika blok kayu itu telah ditarik sejauh 5m pada lantai mendatar tersebut, berapakah kerja yang telah dilakukan oleh blok kayu tersebut?

- A 7.66 J
B 18.8 J
C 24.4 J
D 38.3 J

$$\begin{aligned} & 10 \sin 40^\circ = 6.43 \\ & 6.43 \times 5 = 32.15 \end{aligned}$$

12. Which of the following devices correctly matches the application of Pascal's principle and Bernoulli's principle?

Yang manakah alat berikut adalah padanan betul penggunaan Prinsip Pascal dan Bernoulli?

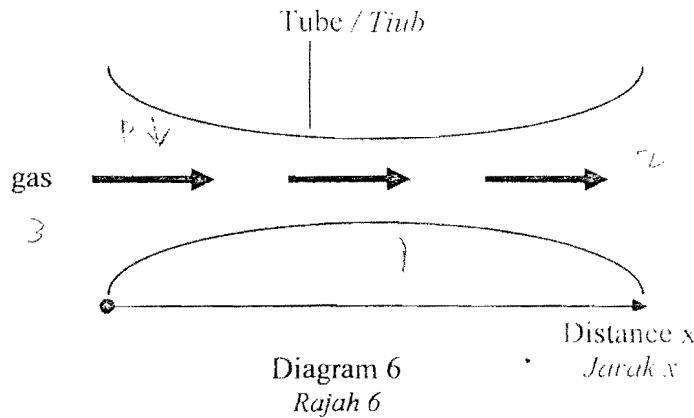
	Pascal's principle Prinsip Pascal	Bernoulli's principle Prinsip Bernoulli
A	Siphon <i>Sifon</i>	Bunsen burner <i>Penunu Bunsen</i>
B	Carburettor <i>Karburator</i>	Bourdon gauge <i>Tolok Bourdon</i>
C	Hydraulic compressor <i>Penekan hidrolik</i>	Filter pump <i>Pam Penuras</i>
D	Syringe <i>Penyuntik</i>	Insect spray <i>Penyembur serangga</i>

13. The wall of a dam is thicker at the bottom. Which of the following physical concept is used in the construction of the water dam?

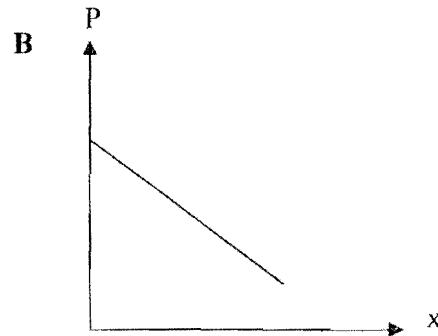
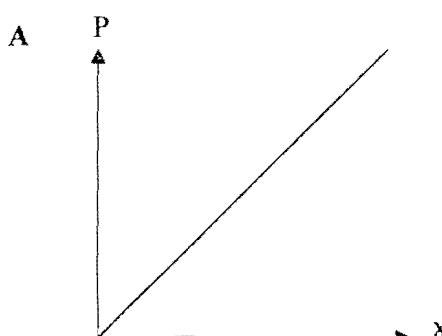
Dinding empangan lebih tebal di dasar. Antara berikut konsep yang digunakan dalam pembinaan empangan

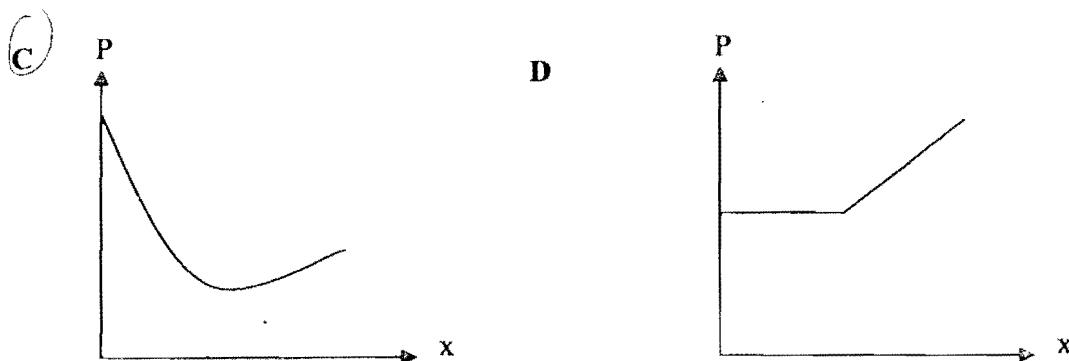
- (A) Pressure of water is directly proportional to the depth of water
Tekanan air berkadar terus dengan kedalaman air
- B Pressure of water is inversely proportional to the depth of water
Tekanan air berkadar songsang dengan kedalaman air
- C Pressure of water is directly proportional to the area of the water dam
Tekanan air berkadar terus dengan luas empangan air
- D Pressure of water is inversely proportional to the area of the water dam
Tekanan air berkadar songsang dengan luas empangan air

14. Diagram 6 shows a stream of gas flowing through a tube with a narrow neck in the middle.
Rajah 6 menunjukkan alur pengaliran gas melalui tiub yang berleher sempit di tengahnya.



Which graph shows the relationship between the gas pressure, P and the distance, x ?
Graf yang manakah menunjukkan hubungan di antara tekanan gas, P dan jarak, x ?





- 15 Diagram 7 shows a block of ice floating in a glass of water.
Rajah 7 menunjukkan satu kiub ais terapung di dalam segelas air.

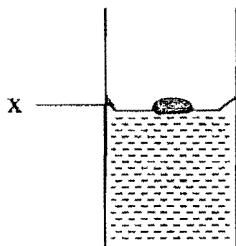


Diagram 7

Rajah 7

Which of the following statement is **not** correct?

Manakah di antara pernyataan di bawah adalah salah ?

A The buoyant force on the ice is equal to the weight of the ice.

Daya apungan pada ais adalah sama dengan berat ais tersebut.

B The density of water is higher than the density of ice.

Ketumpatan air adalah lebih tinggi berbanding dengan ketumpatan ais.

C Volume of water displaced by the ice is smaller than the volume of the ice.

Isipadu air disesarkan oleh ais adalah lebih rendah berbanding isipadu ais

D When the ice melts completely, the water level will be higher than X.

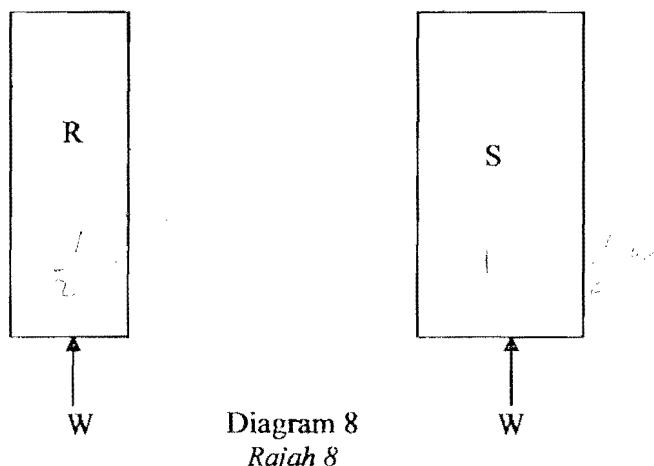
Apabila ais telah cair sepenuhnya, paras air lebih tinggi dari X.

- 16 Heat is supplied at the same rate to a 1 000 g iron block and a 1 000 g aluminium block. The temperature of the iron block rises slower because

Haba dibekalkan pada kadar yang sama kepada 1 000 g blok besi dan 1 000 g blok aluminium. Suhu blok besi naik perlahan kerana

- A. iron is denser than the aluminium
besi lebih tumpat dari aluminium
 - B. the boiling point of iron is lower than that of aluminium
takat didih besi lebih rendah dari aluminium
 - C. the melting point of iron is lower than that of aluminium
takat lebur besi lebih rendah dari aluminium
 - D. iron has a larger specific heat capacity than aluminium
besi mempunyai muatan haba tentu lebih besar dari aluminium
17. Diagram 8 shows two blocks of aluminium R and S. The mass of R is half the mass of S. The temperature rise of S is half the temperature rise of R when the same amount of heat, W supplied to each block.

Rajah 8 menunjukkan 2 blok Aluminium R dan S. Jisim R separuh dari jisim S. Suhu S naik separuh kenaikan R bila haba yang sama, W dibekalkan kepada setiap blok.



Which of the statements about R and S is **true**?

Antara pernyataan berikut yang manakah BENAR mengenai R dan S?

- A. The heat capacity of R is half the heat capacity of S
Muatan haba R separuh dari muatan haba S
- B. The heat capacity of R is equal the heat capacity of S
Muatan haba R sama muatan haba S
- C. The specific heat capacity of R is half the specific heat capacity of S
Muatan haba tentu R separuh dari muatan haba tentu S
- D. The specific heat capacity of R is twice the specific heat capacity of S
Muatan haba tentu R dua kali ganda muatan haba tentu S

18. An immersion heater rated at 200 W is fitted into a large block of ice at 0 °C. What time does it take for 20g of ice to melt?
 [Latent heat of fusion of ice, $l = 3200 \text{ Jkg}^{-1}$]

Pemanas ditenggelamkan dengan kadar 200 W ke dalam blok besar ais pada 0° C. Apakah masa diambil untuk 20 g ais melebur? {Haba pendam pengewapan ais, $l = 3200 \text{ Jkg}^{-1}$ }

- A. 0.032 s
 B. 12.5 s
 C. 320 s
 D. 640 s

$$\begin{aligned} & M L \\ & \therefore m(3200) \\ & P = \frac{E}{t} \\ & t = \frac{E}{P} \end{aligned}$$

19. Diagram 9 shows how the temperature of a substance changes with time.
Rajah 9 ialah graf yang menunjukkan bagaimana suhu suatu bahan berubah dengan masa.

Temperature / Suhu

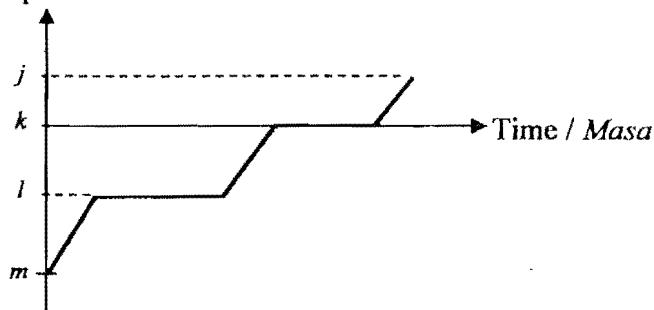


Diagram 9
Rajah 9

What is the melting point of the substance?

Apakah takat lebur bahan itu?

- A j
 B k
 C l
 D m

- 20 Diagram 10.1 shows some liquid being heated by a 1000 W immersion heater. Diagram 10.2 shows the variation of the reading of the electronic balance with time, t .

Rajah 10.1 menunjukkan suatu cecair sedang dipanaskan oleh sebuah pemanas rendam 1000 W. Rajah 10.2 menunjukkan perubahan bacaan neraca elektronik dengan masa, t .

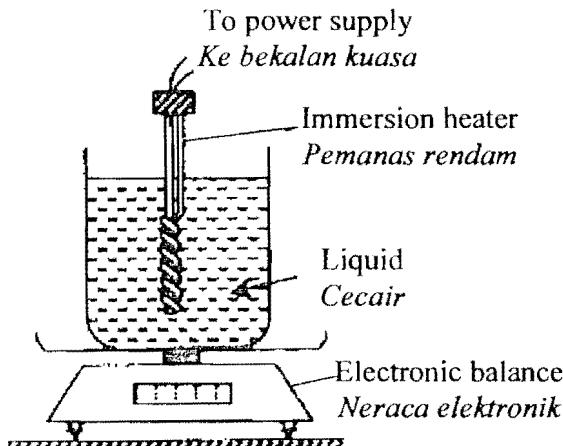


Diagram 10.1 / Rajah 10.1

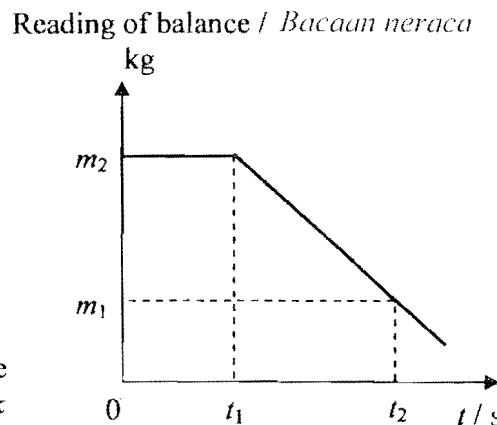


Diagram 10.2 / Rajah 10.2

Which statement about the liquid is **incorrect**?

Antara pernyataan berikut, yang manakah **tidak benar** mengenai cecair itu?

- A It starts to boil at $t = t_1$
Ia mula mendidih pada $t = t_1$

- B Its temperature increases during the period $t = 0$ to $t = t_1$
Suhunya bertambah dalam tempoh $t = 0$ hingga $t = t_1$

- C Its specific heat capacity is given by $\frac{1000t_1}{m_2}$

$$\text{Muatan haba tentunya diberikan sebagai } \frac{1000t_1}{m_2}$$

- D Its specific latent heat of vaporization is given by $\frac{1000(t_2 - t_1)}{m_2 - m_1}$

$$\text{Haba pendam tentu pengewapannya diberikan sebagai } \frac{1000(t_2 - t_1)}{m_2 - m_1}$$

- 21 Diagram 11 shows a person attempting to measure the focal length of a lens.
Diagram 11 menunjukkan seseorang ingin mengukur jarak fokas kanta

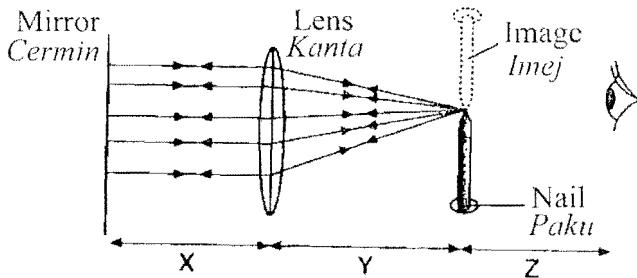


Diagram 11

Rajah 11

Which distance is the focal length of the lens?
Yang manakah jarak fokas kanta?

- A X C Y
 B Z D X + Y

- 22 Diagram 12 shows a ray of light incident on the surface of a liquid and its subsequent path.

Diagram 12 menunjukkan sinar cahaya tuju ke atas permukaan cecair dan jalan seterusnya.

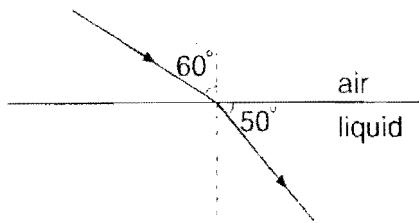


Diagram 12

Rajah 12

The refractive index of the liquid is given by
Index refraktif cecair diberi oleh

- (A) $\frac{\sin 60}{\sin 50}$ B) $\frac{\sin 40}{\sin 50}$
 C) $\frac{\sin 60}{\sin 40}$ D) $\frac{\sin 40}{\sin 60}$

- 23 Diagram 13 shows an object placed at O, in front of a concave mirror. F is the focal point of the mirror. What are the characteristics of the image formed?

Rajah 13 menunjukkan objek di O di hadapan cermin concave. F adalah titik fokal cermin. Apakah cirri-ciri imej yang terbentuk?

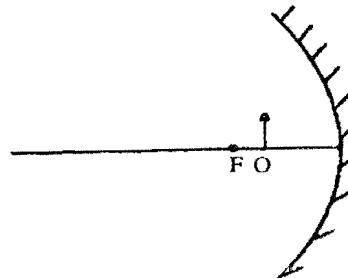


Diagram 13

Rajah 13

- A Virtual and smaller than the object
Maya dan lebih kecil dari objek
- B Real and smaller than the object
Nyata dan lebih kecil dari objek
- C Virtual and bigger than the object
Maya dan lebih besar dari objek
- D Real and bigger than the object
Nyata dan lebih besar dari objek

- 24 Diagram 14 shows a ray of light passing into a glass block. The refractive index of the glass is 1.54.

Rajah 14 menunjukkan sinar cahaya melalui satu bongkah kaca. Indeks biasan kaca ialah 1.54

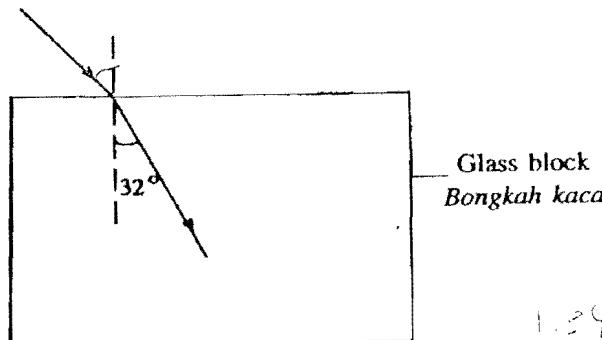


Diagram 14

Rajah 14

What is the angle of incidence?

Apakah sudut tuju?

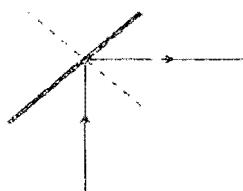
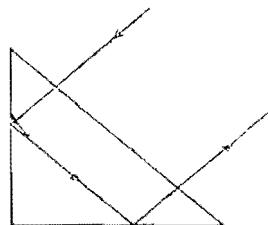
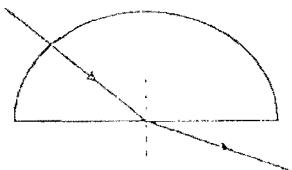
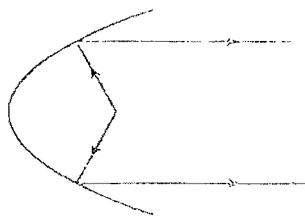
- A 19.7
- B 33.7

- C 54.7
- D 58.0

$$1.54 = \frac{\sin i}{\sin r}$$

$$1.54 = \frac{32^\circ}{r}$$

- 25 Which of the following shows total internal reflection?
Yang manakah menunjukkan pantulan dalam penuh?

 A C B D

- 26 Which waves phenomenon can change the wavelength?
Fenomena gelombang yang manakah boleh mengubah jarak gelombang?

 A refraction
Pembiasan B reflection
Pantulan C diffraction
Pembelauan D interference
interference

- 27 A system is oscillating at its natural frequency and with no damping. What happens to the total energy in the system ?
Sebuah sistem berayun dalam frequensi asli tanpa kelembapan. Apakah yang berlaku kepada jumlah tenaga di dalam sistem tersebut?

 A Remain constant
Tetap B Decreases
Berkurangan C Increases
Bertambah

28 Diagram 15 shows the cross section of water waves.

Rajah 15 menunjukkan keratan rentas gelombang air.

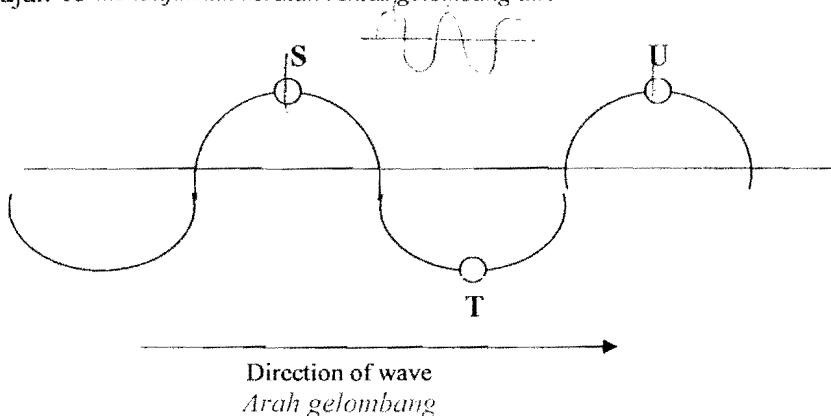


Diagram 15

Rajah 15

Which of the following statements is true about water waves ?

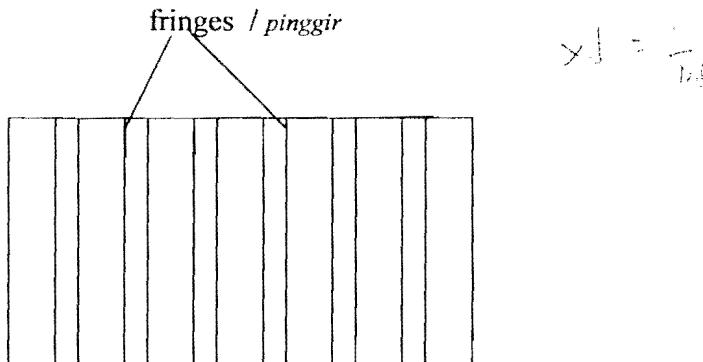
Antara pernyataan berikut, yang manakah benar mengenai gelombang air?

- A T and U have the same phase
T dan U mempunyai fasa yang sama
- B Wave energy is transferred from position S to U
Tenaga gelombang dipindahkan dari kedudukan S ke U
- C The wave length is the distance between S and T
Panjang gelombang adalah jarak di antara S dan T
- D The particle at U oscillates in a direction parallel to the direction of wave
Zarah di U berayun dalam arah yang selari dengan arah gelombang.

29 Diagram 16 shows interference fringes from a Young's double slit experiment using a yellow light source.

Rajah 16 menunjukkan pinggir interferensi dari satu eksperiment Young dwicelah yang menggunakan sumber cahaya kuning.

Diagram 16
Rajah 16



Distance between the fringes decreases if
Jarak di antara pinggir mengurang jika

- A the distance between the slits deceases
Jarak antara celah mengurang
- B** the distance between the double slit plate and the screen decreases
Jarak di antara plat dwicelah dan skrin mengurang
- C replacing the source with a red light source
Menggantikan sumber dengan sumber cahaya merah

- 30 Diagram 17 shows propagation a series of water waves across areas A and B of different depth.
Rajah 17 menunjukkan rambatan satu siri gelombang air merentasi kawasan A dan B Yang berbeza kedalaman.

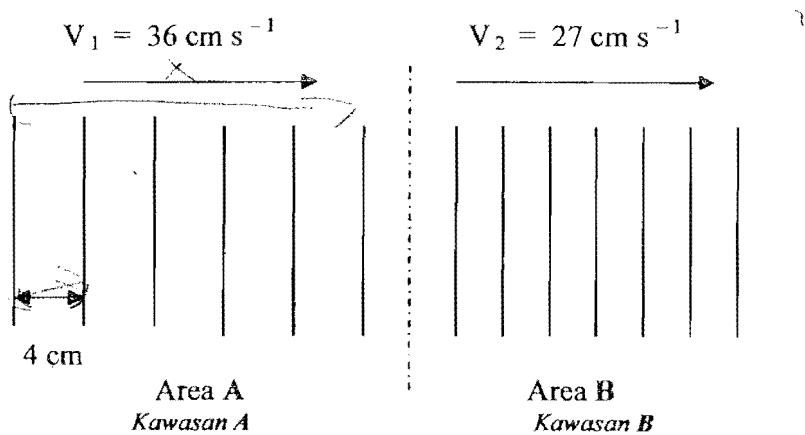


Diagram 17
Rajah 17

Calculate the wavelength at area B.
Kirakan jarak gelombang di kawasan B

- A** 2.25 cm
- B** 3.00 cm
- C** 4.00 cm
- D** 6.75 cm

$$\begin{aligned} V &= f \lambda \\ 36 &= f (4) \end{aligned}$$

$$f = 9$$

31. The diagram 18 below shows a circuit where a wire PQ is connected parallel to a voltmeter.

Litar 18 dalam rajah di bawah menunjukkan dawai PQ telah disambung secara selari dengan voltmeter.

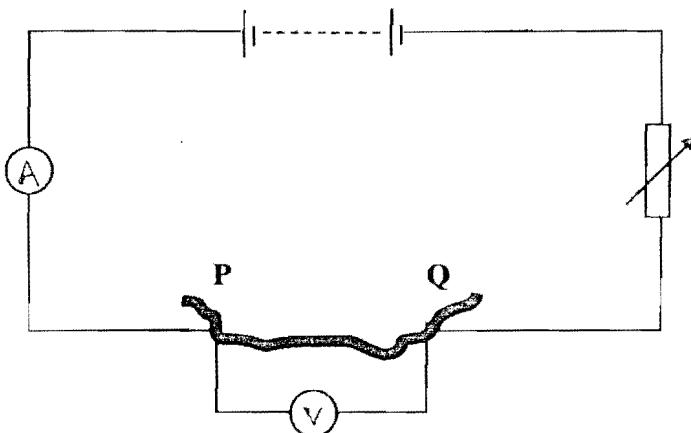


Diagram 18

Rajah 18

Which of the following statement is **true**?

Antara yang berikut penyataan manakah adalah benar?

*R ↑ C ↓
R ↓ C ↑*

- A The reading of the ammeter will increase if a longer wire PQ is used.
Bacaan ammeter akan bertambah jika dawai PQ yang lebih panjang digunakan.
- B The reading of the voltmeter will increase if a shorter wire PQ is used.
Bacaan voltmeter akan bertambah jika dawai PQ yang lebih pendek digunakan
- C The reading of the voltmeter will decrease if the rheostat is adjusted to a higher resistance value.
Bacaan voltmeter akan berkurang jika rintangan reostat dilaraskan menjadi lebih tinggi.
- D The reading of the voltmeter will decrease if the temperature of wire PQ is increased.
Bacaan voltmeter akan berkurang jika suhu dawai PQ bertambah.

32. Diagram 19 below shows a circuit containing three connected in series and in parallel.

Rajah 19 menunjukkan satu litar yang mengandungi tiga perintang yang disambung secara sesiri dan selari.

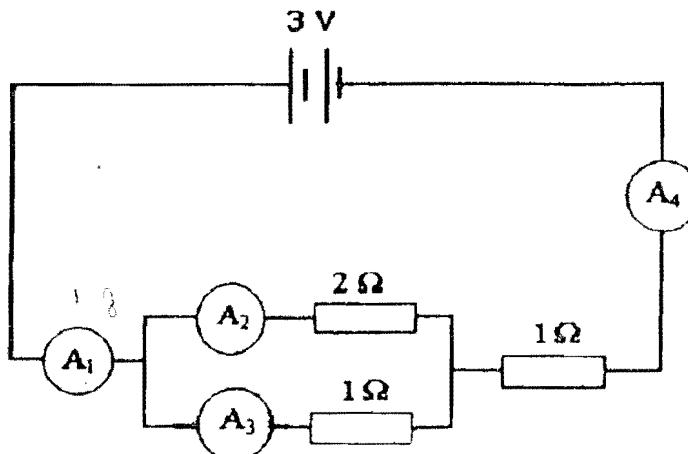


Diagram 19
Rajah 19

$$\frac{1}{2} + \frac{1}{1} = \frac{1}{\frac{2}{3}}$$

$$R = \frac{2}{3}$$

$$\frac{2}{3} + 1 = \frac{5}{3}$$

$$I = IR$$

$$I = I_1 + I_2$$

$$I = I_2 \times \frac{2}{3}$$

$$= \frac{2}{3}$$

$$I = 1(1)$$

$$V = IR$$

$$V = 1 \times 1$$

$$V = 1 \times R$$

$$V = I$$

$$V = 1 \times 1$$

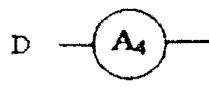
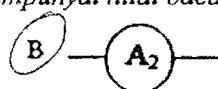
$$I = I$$

$$I = 1$$

$$I = 1$$

$$I = 1$$

- Which ammeter, has the smallest reading?
Ammeter yang manakah mempunyai nilai bacaan yang terkecil?



33. Diagram 20 shows a graph of voltage, V against current, I for a circuit which uses a dry cell for its power supply.

Rajah 20 menunjukkan beza keupayaan, V melawan arus, I, untuk satu litar elektrik yang menggunakan sel kering sebagai punca kuasa.

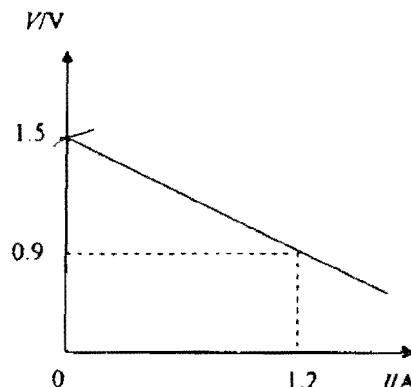


Diagram 20

Rajah 20

$$(0, 1.5)$$

$$(1.2, 0)$$

$$V = IR + r$$

$$0.9 = 1.2(R) + 1.2(r)$$

$$0.9 = 1.2(R + r)$$

$$0.75 = (R + r)$$

Based on the graph, what is the electromotive force, E and the internal resistance, r of the dry cell?

Berdasarkan graf, apakah daya gerak elektrik, E dan rintangan dalam, r sel kering tersebut?

	E (V)	r (Ω)
A	0.9	0.50
B	0.9	0.75
C	1.5 ✓	0.50
D	1.5 ✓	1.20

$$V = IR + \epsilon$$

✓

34. Diagram 21 shows a circuit with three similar resistors, R and two measuring instruments P and S .

Rajah 21 menunjukkan litar elektrik yang mengandungi tiga perintang yang serupa dan dua alat pengukur P dan S .

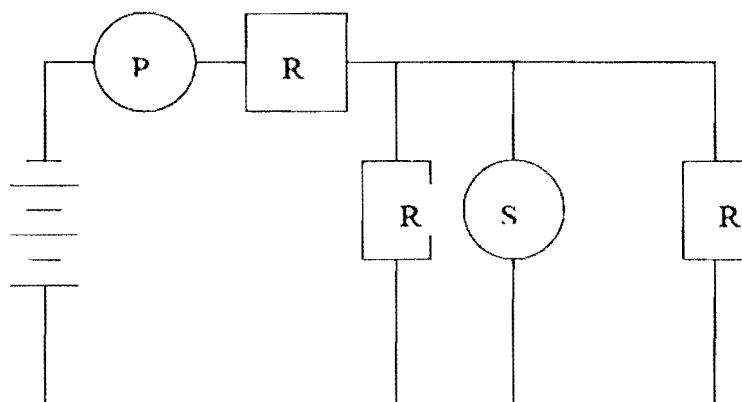


Diagram 21
Rajah 21

Which of the following shows the correct names for P and S ?
Apakah P dan S ?

	P	S
A	Ammeter ✓	Ammeter
B	Voltmeter	Voltmeter
C	Ammeter ✓	Voltmeter
D	Voltmeter	Ammeter

35. A graph of potential difference against current for a conductor is shown in Diagram 22 below.

Graf beza keupayaan lawan arus bagi sebuah konduktor ditunjukkan di rajah 22.

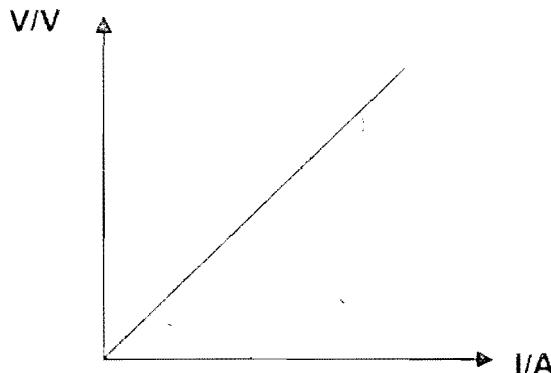


Diagram 22
Rajah 22

Which statement is **incorrect**?

Pernyataan yang manakah tidak benar?

- A The potential difference is directly proportional to the current
Beza keupayaan berkadar terus dengan arus
- B The gradient is equal to the resistance
Kecerunan graf mewakili rintangan
- C The conductor used obeys Ohm's law
Konduktor yang digunakan mematuhi Hukum Ohm
- D The conductor used is a bulb
Konduktor itu ialah sebuah mentol

36. Diagram 23 shows a bar magnet moving towards a solenoid.

Rajah 23 menunjukkan magnet bar bergerak ke arah solenoid

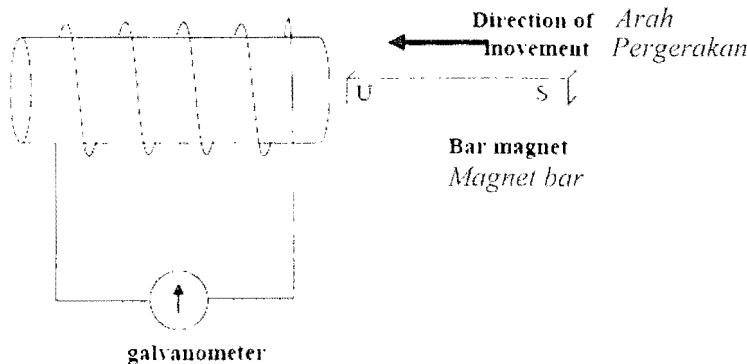


Diagram 23
Rajah 23

Which of these actions will not increase the deflection of the galvanometer pointer?

Tindakan manakah yang tidak akan menambah pesongan jarum galvanometer?

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

37. When the switch in the circuit is closed, paper clips are attracted to the soft iron rod as shows in Daigram 24 below.

Apabila suis dalam litar ditutup, klip kertas akan tertarik kepada rod besi lembut seperti yang ditunjukkan dalam rajah 24

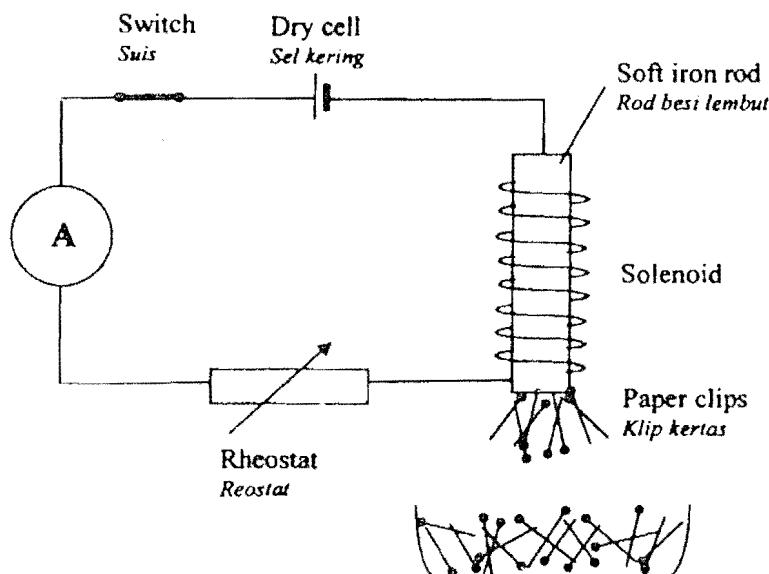
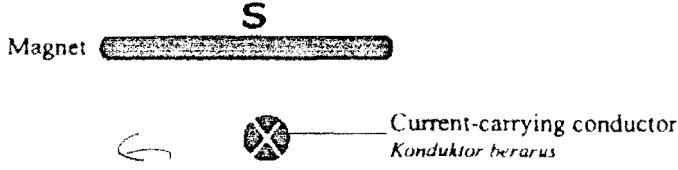


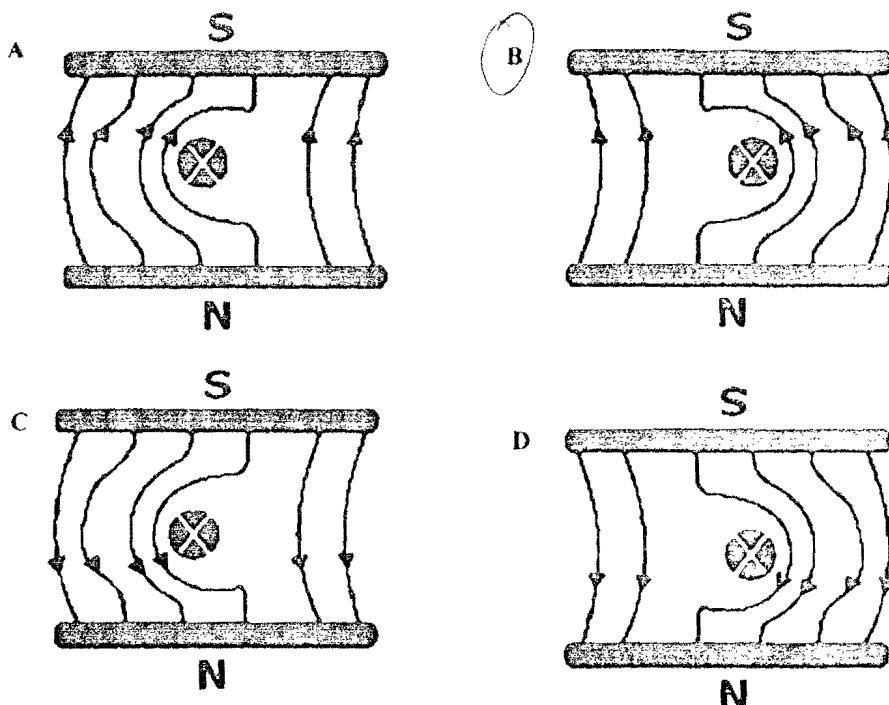
Diagram 24
Rajah 24

The number of paper clips attracted to the soft iron rod can be increased by
Bilangan klip kertas yang melekat pada teras besi lembut boleh ditukarkan dengan

- (A) Increasing the current in the circuit
Menambah arus di dalam litar
- B Increasing the resistance in the rheostat *R ↑ C ↓*
Menambah rintangan rheostat
- C Decreasing the number of turns in the solenoid *L*
Mengurangkan bilangan lilitan solenoid
- D Replacing the battery with alternating current *X*
Menggantikan bateri dengan arus ulang alik
38. A current-carrying conductor is placed in a magnetic field, as shown in Diagram 25 below.
Satu konduktor yang membawa arus diletakkan di dalam medan magnet seperti di rajah 25 di bawah
- 
- Magnet S
 Current-carrying conductor
Konduktor berarus
- Magnet N
 Diagram 25
Rajah 25

Which of the following shows the **correct** pattern of the interaction between two magnetic field?

*Manakah di antara berikut menunjukkan corak yang **betul** hasil saling tindakan di antara dua medan magnet?*



39. A transformer losses some energy as heat.
 This energy loss can be reduced by the following **except**
Sebuah transformer hilang sebahagian tenaga elektrik sebagai tenaga haba.
Kehilangan tenaga ini boleh dikurangkan dengan cara berikut kecuali
- A Using a soft iron core ✓
Menggunakan satu teras besi lembut
 - B Using thinner copper wire for the coil.
Menggunakan wayar kuprum yang halus untuk gegelung
 - C Winding the secondary and primary coils on top of each other
Melilitkan gegelung primer dan sekunder di atas satu sama lain
 - D Using thin iron sheets glued with thin layers of insulation between them
For the core
Menggunakan kepingan besi nipis yang dilekatkan dengan gam daripada bahan penebat sebagai teras

40. In the transmission of electrical power, it is important to reduce the energy loss.
Which of the following will reduce energy loss during transmission?

Dalam penghantaran tenaga elektrik, adalah penting untuk mengurangkan kehilangan tenaga

Yang manakah antara berikut akan mengurangkan kehilangan tenaga semasa penghantaran?



A High voltage transmission

Voltan penghantaran yang tinggi

B

Low voltage transmission

Voltan penghantaran yang rendah

C

High current transmission

Arus penghantaran yang besar

41. The process of adding a trivalent atom to a pure silicon crystal is known as
Proses penambahan atom trivalent kepada Kristal silikon tulen dikenali sebagai

A

doping / Pendopan

B

excitation / Pengujian

C

donating / Penderma



polarization / pengutuban

42. Which of the following is NOT a property of cathode rays?

Antara berikut yang manakah **BUKAN** sifat pancaran katod

A

It is a type of electromagnetic radiation

Ia adalah satu jenis sinaran radioaktif

B

It can be deflected by a magnetic field

Ia boleh dipengaruhi oleh medan magnet ✓



C It travels at high speed

Ia bergerak pada laju yang tinggi

D

Its kinetic energy can be converted to light

Tenaga kinetiknya boleh ditukar kepada cahaya ✓

- 43 Diagram 26 shows a logic circuit. Input P and Q is 0011 and 1001 respectively.
 Diagram 26 menunjukkan litar logic. Input P dan Q adalah 0011 and 1001 masing-masing

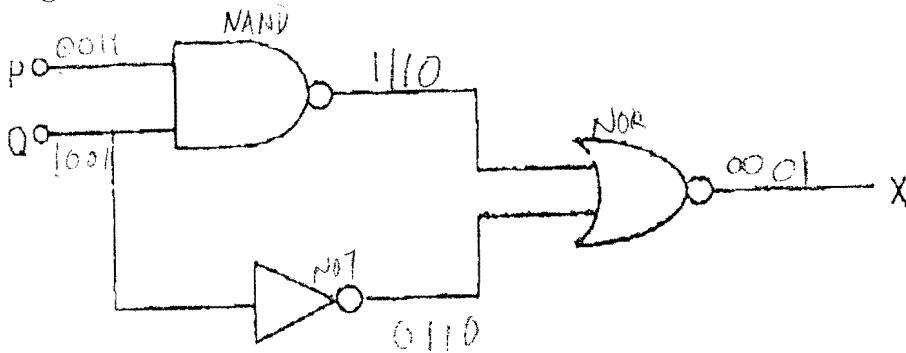


Diagram 26
 Rajah 26

What is output X?

Apakah output X?

- A 0001
- B 1110
- C 1000
- D 1100

44

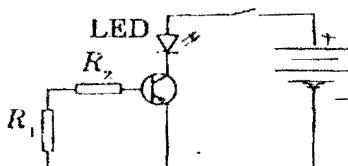
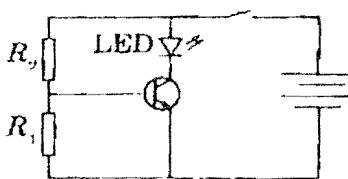
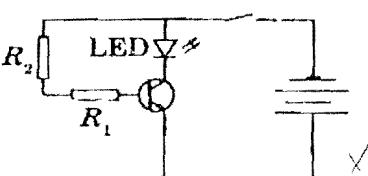
What is the function of a diode?

Apakah fungsi diod?

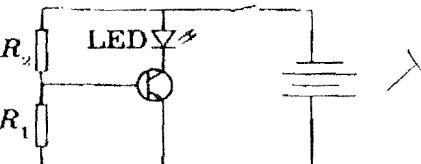
- A Acts as a current amplifier
Bertindak sebagai penguat arus
- B Acts as an automatic switch
Bertindak sebagai suis automatic
- C Stores electric charge
Menyimpan cas elektrik
- D Allows the current to pass in one direction
Membenarkan arus melalui dalam satu arah sahaja

- 45 In which circuit will the light emitting diode (LED) light up when the switch is on?

Dalam litar manakah diod pemancah cahaya (LED) akan menyala apabila suis dihidupkan.

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

X

D

X

46. In a nuclear reactor, graphite is placed around the uranium rods as moderator. Moderator helps to

Dalam sebuah rektor nuklear, grafit dikatakan di sekeliling rod uranium sebagai moderator.

Modoretor membantu untuk

- A** Carry the heat energy released

Membawa tenaga haba yang dibebaskan

- B** Prevent the reactor from reading critical

Menghalang rektor daripada mencapai tahap kritikal

- C** Protect the reactor from any radioactive radiation

Melindungi rektor daripada sebarang sinaran radio aktif

D

Slow down the neutrons involved in the chain reaction

Memperlahangkan neutron yang terlibat dalam tindak balas berantai

- 47 Table 1 shows the half-lives of some radioactive

Jadual 1 menunjukkan separuh hayat bagi suatu bahan radioaktif

Radioactive substance <i>Bahan radioaktif</i>	Half-life <i>Separuh hayat</i>
P	1.7 years 1.7 tahun
Q	1.1 years 1.1 tahun
R	6500 years 6500 tahun
S	6 hour 6 jam

Table 1

Jadual 1

Which substance is the most suitable to be used as a tracer in the detection of tumors in the human body?

Yang manakah bahan yang paling sesuai digunakan sebagai alat pengesan kehadiran tumor dalam badan manusia?

A P
B Q
C R
D S

48. Diagram 27 shows the emission of alpha, beta and gamma radiation from a source S within a lead block. There is strong magnetic field present.

Rajah 27 menunjukkan pembebasan sinaran alfa, beta dan gamma dari sumber S yang berada dalam blok plumbum. Terdapat medan magnet yang kuat di sekitarnya.

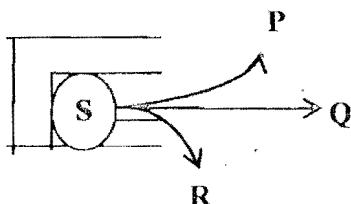


Diagram 27

Rajah 27

Which are the names of radiation **P**, **Q**, and **R**?
Yang manakah nama-nama radiasi bagi P, Q dan R?

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

49. Diagram 28 shows a series of radioactive decay
Rajah 28 menunjukkan satu siri penyusutan radioaktif



Diagram 28
Rajah 28

How many alpha particles and beta are emitted in the series of decay
Berapa banyaknya zarah alfa dan beta dipancarkan dalam satu siri penyusutan

	Alpha particles <i>Zarah alfa</i>	Beta particles <i>Zarah beta</i>
A	1	1
B	1	2
C	2	1
D	2	2

α 4
 β 2

50. The mass of an isotope is 200 g and its half-life is half a day. What is the mass of the isotope remaining after 24 hours?

*Jisim bagi satu isotop adalah 200 g dan mempunyai separuh hayat setengah hari.
 Berapakah jisim yang tinggal selepas 24 jam.*

- A 50 g
 B 100 g
 C 200 g
 D 250 g

$$\begin{array}{ccccccc} 200 & & & & & & \\ \downarrow & & & & & & \\ 100 & & & & & & \\ \downarrow & & & & & & \\ 50 & & & & & & \end{array}$$

4531/2
 Physics
 Paper 2
 Sept
 2009
 2½ hours



PEJABAT PELAJARAN DAERAH HULU LANGAT

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2009

PHYSICS

Paper 2

Two hours and thirty minutes

DO NOT OPEN THIS QUESTION PAPER UNLESS TOLD

- 1 This question paper consists of three sections: **Section A, Section B and Section C.**
- 2 Answer all questions in **Section A**. Write your answers for **Section A** in the space provided on the question paper.
- 3 Answer **one** question from **Section B** and **one** question from **Section C**. Write your answers for **Section B** and **Section C** on the lined pages at the end of this question paper. Answer questions in **Section B** and **Section C** in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
- 4 Show your working, it may help you to get marks.
- 5 If you wish to cancel any answer, neatly cross out the answer.
- 6 The diagrams in the questions provided are not drawn to scale unless stated.
- 7 A list of formulae is provided on page 2.
- 8 The marks allocated for each question or part of a question are shown in brackets.
- 9 The time suggested to answer **Section A** is 90 minutes, **Section B** is 30 minutes and **Section C** is 30 minutes.
- 10 You may use a non-programmable scientific calculator.
- 11 Hand in this question paper at the end of the examination.

For examiner only			
Section	Question	Full Mark	Marks Obtained
A	1	4	2
	2	5	1
	3	6	1
	4	7	5
	5	8	4
	6	8	4
	7	10	6
	8	12	4
B	9	20	—
	10	20	11
C	11	20	12
	12	20	—
Total			52

Kertas soalan ini mengandungi 25 halaman bercetak
 dan 7 halaman tidak bercetak.

(See Overleaf
CONFIDENTIAL

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

1. $a = \frac{v - u}{t}$
2. $v^2 = u^2 + 2as$
3. $s = ut + \frac{1}{2}at^2$
4. Momentum = mv
5. $F = ma$
6. Kinetic energy = $\frac{1}{2} mv^2$
 $[Tenaga kinetik]$
7. Potential energy = mgh
 $[Tenaga keupayaan]$
8. Elastic potential energy = $\frac{1}{2} Fx$
 $[Tenaga keupayaan kenyal]$
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. $\frac{PV}{T} = \text{constant}$
14. $E = mc^2$
15. $v = f\lambda$
16. Power , $P = \frac{\text{Energy}}{\text{Time}}$
 $[Kuasa]$, $P = \frac{\text{Tenaga}}{\text{masa}}$
17. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
18. $\lambda = \frac{ax}{D}$
19. $n = \frac{\sin i}{\sin r}$
20. $n = \frac{\text{Real Depth}}{\text{Apparent Depth}}$
 $[Dalam Nyata]$
 $[Dalam ketara]$
21. $Q = It$
22. $V = IR$
23. Power [Kuasa], $P = IV$
24. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$
25. Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100\%$
 $[Kecekapan]$
26. $g = 10 \text{ m s}^{-2}$

Section A
Bahagian A

[60 marks]
[60 markah]

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

1. Diagram 1 shows plane wave with wavelength of 1 cm propagate through a slit.
Rajah 1 menunjukkan gelombang satah yang jarak gelombangnya 1 cm merambat melalui satu celah.

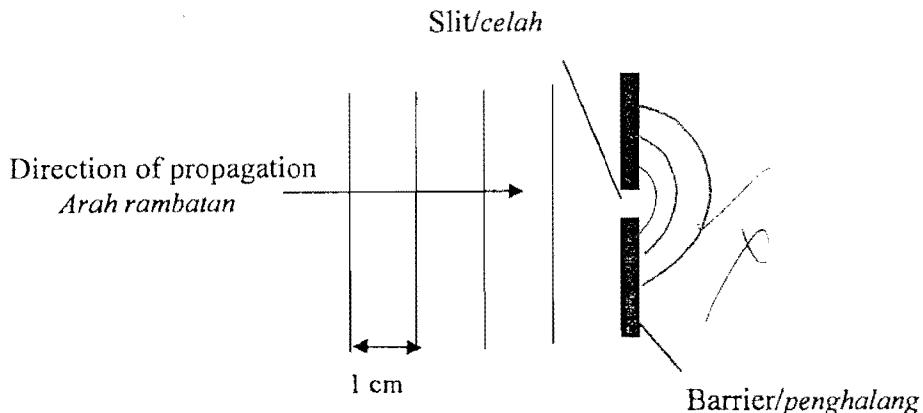


Diagram 1 / Rajah 1

- (a) What is meant by wavelength?

Apakah yang dimaksudkan dengan jarak gelombang?

The distance between two waves. X

[1 mark]

- (b) Name the wave phenomenon shown in Diagram 1.

Namakan fenomena gelombang yang ditunjukkan dalam Rajah 1.

Diffraction

[1 mark]

- (c) On Diagram 1, draw the wave pattern after it passes through the slit.

Pada Rajah 1, Lukiskan corak gelombang selepas ia melalui celah.



[2 marks]

2. A beaker containing 0.2 kg of naphthalene is heated at a constant rate using a 50 W heater. The temperature of the naphthalene is measured and recorded on the graph shown in Diagram 2.

Sebuah bikar yang mengandungi 0.2 kg naftalena dipanaskan pada kadar tetap menggunakan pemanas berkuasa 50 W. Suhu naftalena diukur dan dicatatkan pada graf seperti ditunjuk pada Rajah 2.

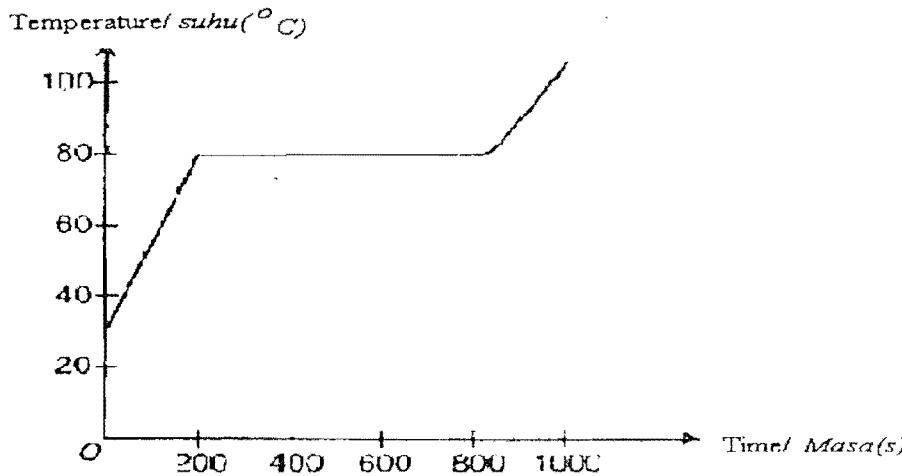


Diagram 2/ Rajah 2

- (a) What is meant by specific latent heat of fusion?

Apakah yang dimaksudkan dengan haba pendam tentu pelakuran?

The amount of heat needed to absorb by the substance at 1°C by changing the state of the substance. [1 mark]

- (b) What is the state of the matter of the naphthalene from 200 s to 800 s?

Apakah keadaan jirim naftalena dari masa 200 s hingga 800 s?

Liquid solid A liquid

[1 mark]

- (c) The temperature remains constant from time 200 s to 800 s. State the reason why.

Suhu adalah tetap dari masa 200 s hingga 800 s. Nyatakan sebabnya.

The same amount of heat is absorbed to overcome the intermolecular force. [1 mark]

- (d) Using the information in the graph shown in Diagram 2, calculate the specific latent heat of fusion, L of naphthalene.

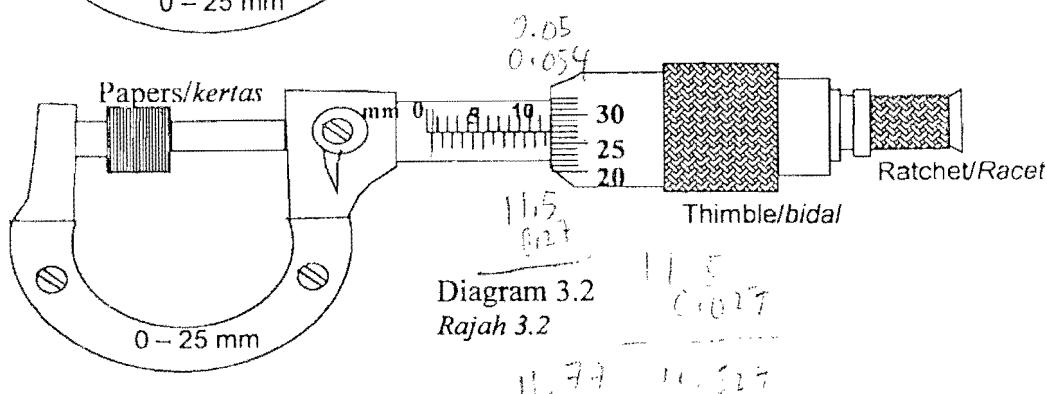
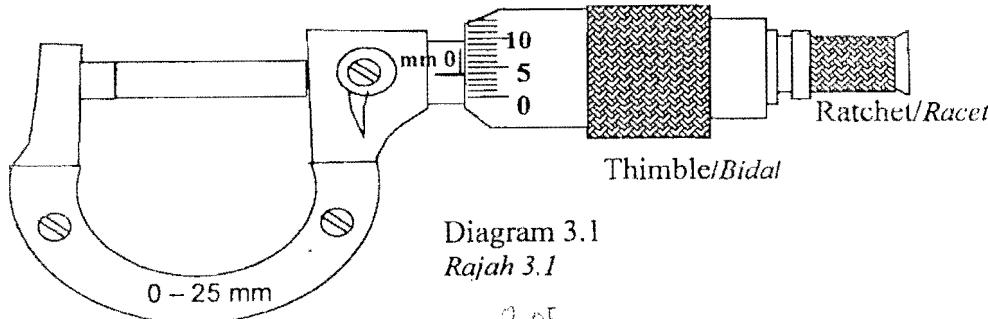
Dengan menggunakan maklumat daripada graf pada Rajah 2. hitungkan haba pendam tentu pelakuran, L bagi naftalena.

$$\begin{aligned} 50 &= mL \\ 50 &= (0.2)L \end{aligned}$$

[2 marks]

3. The instrument in Diagram 3.1 shows a zero error of an instrument. Diagram 3.2 shows a scale when it is used to measure the thickness of 50 sheets of paper.

Alat pengukur dalam Rajah 3.1 menunjukkan ralat sifar bagi alat itu. Rajah 3.2 menunjukkan skala apabila iaanya digunakan untuk mengukur 50 helai kertas.



- (a) Name the instrument above.

Namakan alat di atas.

Micrometer screw gauge

[1 mark]

- (b) State the function of ratchet.

Nyatakan fungsi racet.

*To tighten the screw without any extra pressure on the object
....To...make...sure...that...the...paper...is...fine...enough.....*

[1 mark]

- (c) What is the zero error reading for this measuring instrument?

Apakah bacaan ralat sifar bagi alat pengukur ini?

0.054 X +0.04

[1 mark]

- (d) Calculate the thickness of one sheet of paper.

Hitungkan ketebalan bagi sehelai kertas.

$$11.5 + 0.027 = 11.527 \text{ mm}$$

$$\text{sheet of paper} = (11.5 + 0.027) \cdot 10^{-3}$$

$$= 11.73$$

$$\text{thickness of 1 sheets} = (11.527 - 0.054) \div 50 \text{ sheet of paper} = 11.473 \div 50$$

$$= 0.229 \text{ mm}$$

[See Overleaf]

- 4 Diagram 4.1 shows a flower that seemed larger when it is observed through an optical instrument.

Rajah 4.1 menunjukkan sekuntum bunga yang kelihatan lebih besar apabila diperhatikan melalui satu alat optik.

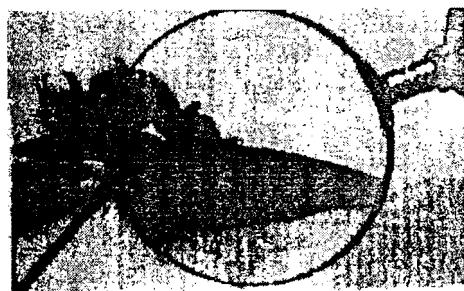


Diagram 4.1
Rajah 4.1

- (a) (i) Name the optical instrument used.
Namakan alat optik yang digunakan.

.....Magnifying glass.....

[1 mark]

- (ii) Name the light phenomenon involved.
Namakan fenomena cahaya yang terlibat.

.....refraction.....

[1 mark]

- (b) (i) In Diagram 4.2, draw a ray diagram to show how the image of the flower is enlarged.

Pada Rajah 4.2, lukiskan gambarajah sinar untuk menunjukkan bagaimana imej bunga dapat diperbesarkan.

* ANSWER [2 marks]

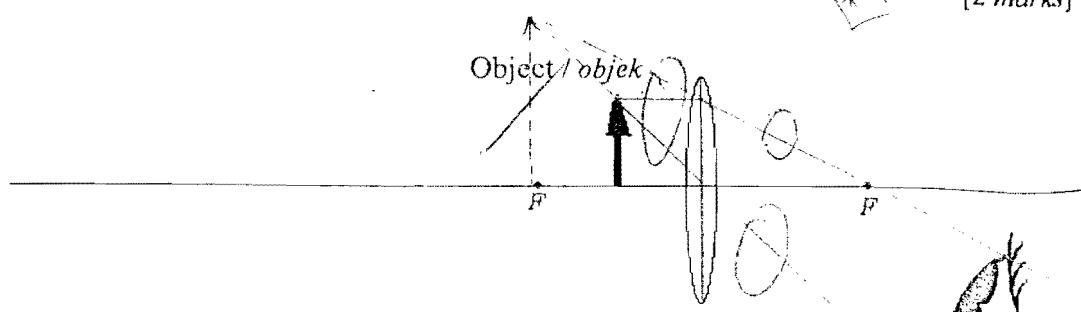


Diagram 4.2
Rajah 4.2

- (ii) State one characteristic of the image drawn in Diagram 4.2.
Nyatakan satu ciri imej yang dilukiskan pada Rajah 4.2.

magnified: *upright* [1 mark]

- (c) Focal length, f of a thin lens is 20 cm.

Calculate the distance of the image, v for an object that is positioned 10 cm from the lens.

Jarak fokus, f sebuah kanta nipis ialah 20 cm. Hitungkan jarak imej, v bagi sebuah objek yang berada 10 cm daripada kanta.

$$1m = 100 \text{ cm}$$

$$10 \text{ cm} = 0.1 \text{ m}$$

$$20 \text{ cm} = 0.2 \text{ m}$$

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

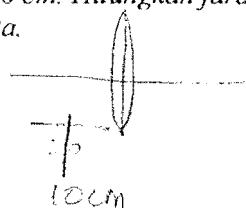
$$\frac{1}{0.2} = \frac{1}{0.1} = \frac{1}{v}$$

$$\frac{1}{v} = \frac{1}{0.12} - \frac{1}{0.1}$$

$$\frac{1}{v} = -5$$

$$v = -\frac{1}{5}$$

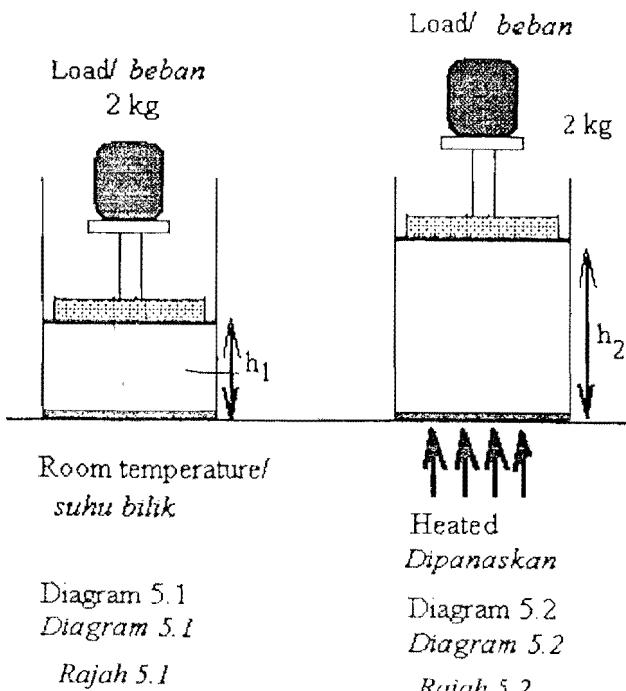
$$= -0.2 \text{ m}$$



[2 marks]

5. Two cylinders of the same size contain the same type of gas at constant mass. The apparatus in Diagram 5.1 is at room temperature while Diagram 5.2 is heated to a certain temperature. Identical load of 2 kg are placed on the piston.

Dua buah silinder yang sama saiz mengandungi gas yang jisimnya sama. Alat radas pada Rajah 5.1 adalah pada suhu bilik manakala Rajah 5.2 telah dipanaskan kepada satu suhu tertentu. Beban 2 kg yang serupa di letakkan di atas piston.



L P7
C V7
P TTP7

- (a) Based on Diagram 5.1 and Diagram 5.2, compare
Berdasarkan Rajah 5.1 dan Rajah 5.2, bandingkan

- (i) h_1 and h_2
 h_1 dan h_2

h_1 lower than h_2

[1 mark]

- (ii) the gas temperature in cylinder Diagram 5.1 and Diagram 5.2
suhu gas dalam silinder Rajah 5.1 dan Rajah 5.2

temperature in diagram 5.2 is higher than diagram 5.1

[1 mark]

- (iii) State the relationship between the temperature and the height of the piston in the cylinder. Explain your answer.

Nyatakan hubungan antara suhu dan ketinggian piston dalam silinder. Terangkan jawapan anda.

when the temperature increase, the movement of the particle in the gas move randomly and faster. When the particle collide with each other at a faster rate, the pressure of the gas will increase. Therefore, when the higher the temperature, the higher the height of the piston.

[3 marks]

- (b) Name the gas law involved.

Namakan hukum gas yang terlibat.

Pressure law

charles law

[1 mark]

- (c) What will happen to the height of the piston h_1 , in Diagram 5.1 if the mass of the load is reduced? Give a reason to your answer.

Apakah yang akan berlaku kepada ketinggian piston, h_1 pada Rajah 5.1 jika jisim beban dikurangkan. Berikan sebab kepada jawapan anda.

Remain unchanged because the pressure produced does not effected by the mass of the mass of the load.

[2 marks]



6. Diagram 6.1 and Diagram 6.2 respectively show the decay curves of radioactive substance P and Q.

Rajah 6.1 dan Rajah 6.2 masing-masing menunjukkan lengkuk pereputan bahan radioaktif P dan Q.

Activity count per minute
Keaktifan/bilangan perminit

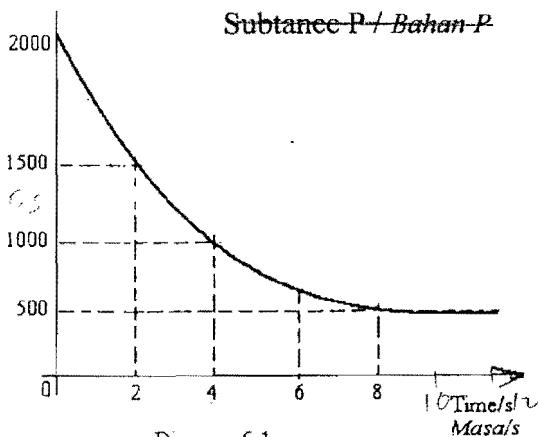


Diagram 6.1
Rajah 6.1

Activity count per minute
Keaktifan/bilangan perminit

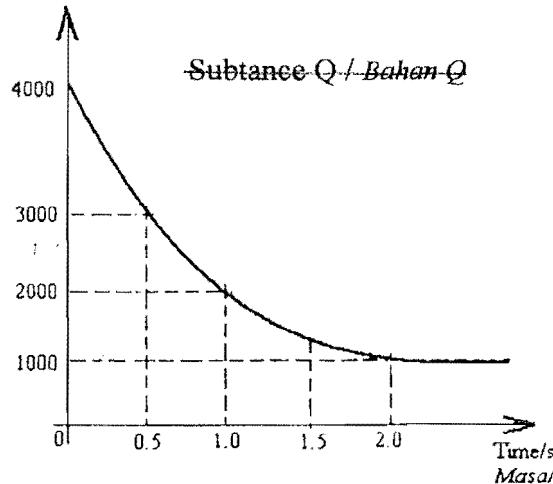


Diagram 6.2
Rajah 6.2

- (a) What is meant by radioactivity?

Apakah yang dimaksudkan dengan keradioaktifan.

Radioactivity is a random and spontaneous at which an unstable radioactive substance decay by emission of radioactive radiation. [1 mark]

- (b) Base on Diagram 6.1 and Diagram 6.2, state two observations on the activity of the radioactive substance P and Q.

Berdasarkan Rajah 6.1 dan Rajah 6.2, nyatakan dua pemerhatian tentang keaktifan bahan radioaktif P dan Q.

i) Substance Q is more radioactive than substance P.

ii) At certain time interval, the radioactivity for both substance are the same

[2 marks]

- (c) What is the time taken for the activity of substance P and substance Q to become half of its initial activity?

Berapakah masa yang diambil untuk keaktifan bahan P dan Q menjadi separuh dari keaktifan asal?

Substance P/Bahan P : 4 s

Substance Q/Bahan Q : 1.6 s

[2 marks]

- (d) State the relationship between the activity of the radioactive substance and the time interval taken in (c) and hence name the physical quantity.

Nyatakan hubungan antara keaktifan bahan radioaktif dengan sela masa yang diambil di(c) dan seterusnya namakan kuantiti fizikal tersebut.

The longer the time interval, the lower the activity for the radioactive substance.

[2 marks]

(e)

What is the activity of substance P after 12 seconds?

Berapakah keaktifan bahan P selepas 12 saat?

250

[1 mark]

7. Diagram 7.1 shows a circuit consisting of three logic gates AND, OR and NOT.
Rajah 7.1 menunjukkan satu litar mengandungi tiga get logik DAN, ATAU dan TAK.

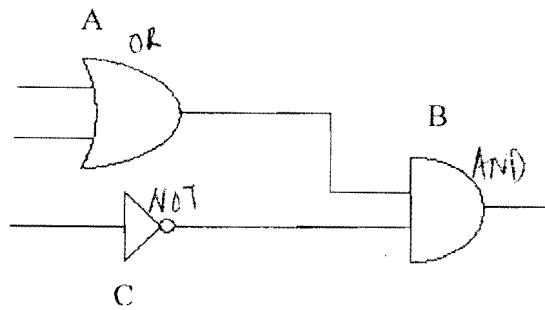


Diagram 7.1
Rajah 7.1

- (a) Logic gate OR in Diagram 7.1 is
Get logik ATAU dalam Rajah 7.1 ialah

[1mark]

- (b) Diagram 7.2 below shows the combination of two NAND gates.
 The combination will produce a single gate P
*Rajah 7.2 di bawah menunjukkan kombinasi dua get TAK DAN.
 Kombinasi ini akan menghasilkan satu get tunggal P.*

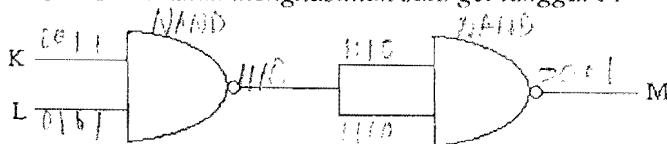


DIAGRAM 7.2
Rajah 7.2

Complete the truth table in Table 7.1 below for the combination of two NAND gates.

Lengkapkan jadual kebenaran dalam Jadual 7.1 di bawah untuk kombinasi dua get TAK DAN.

Input K	Input L	Output M
0	0	0
0	1	0
1	0	0
1	1	1

[2 marks]

Table 7.1 / Jadual 7.1

Name the logic gate P.

Namakan get logik P.

NAND gate ~~(X)~~ (AND gate)

[1mark]

- (c) Diagram 7.3 shows an alarm system fixed to the main gate of an office.

Rajah 7.3 menunjukkan satu sistem penggera yang dipasangkan pada pagar utama sebuah pejabat

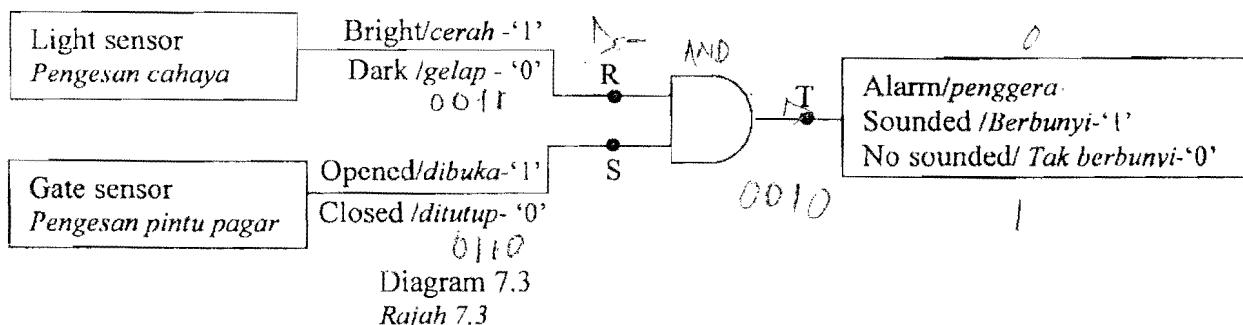


Diagram 7.3

Rajah 7.3

- (i) Based on the Diagram 7.3, complete the truth table in Table 7.2

Berdasarkan Rajah 7.3, lengkapkan jadual kebenaran pada Jadual 7.2

Light/cahaya	Gate/pintu pagar	Alarm/penggera
Dark/ Gelap - 0	Closed/ditutup - 0	0
Dark/ Gelap - 0	Opened/dibuka - 1	0
Bright/ Cerah - 1	Opened/dibuka - 1	1
Bright/ Cerah - 1	Closed/ditutup - 0	0

Table 7.2

Jadual 7.2

[1 mark]

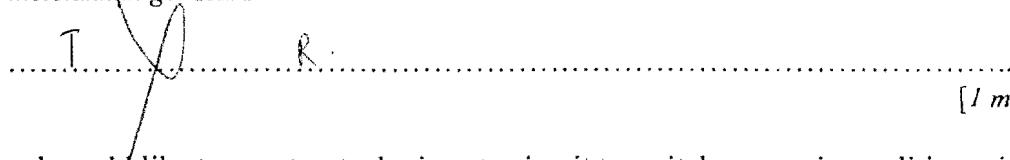
- (ii) State the condition of the light and the gate when the alarm sounded.

Nyatakan keadaan cahaya dan pintu pagar apabila penggera berbunyi.

When the light sensor turn bright and the gate sensor open, the alarm will sound.

[1 mark]

- (iii) A NOT gate should be placed in the circuit in Diagram 7.3 to avoid thefts at night. Determine the best position (R, S or T) to place the NOT gate. Give your reason.
 Sebuah get TAK sepatutnya diletakkan pada litar dalam Rajah 7.3 untuk mengelakkan kecurian pada waktu malam. Tentukan kedudukan paling sesuai (R, S atau T) untuk meletakkan get TAK.



- (e) Ahmad would like to construct a logic gate circuit to switch on an air conditioner in his house automatically. He has chosen a light-sensitive device to detect daytime and night and heat-sensitive device to detect the surrounding temperature.

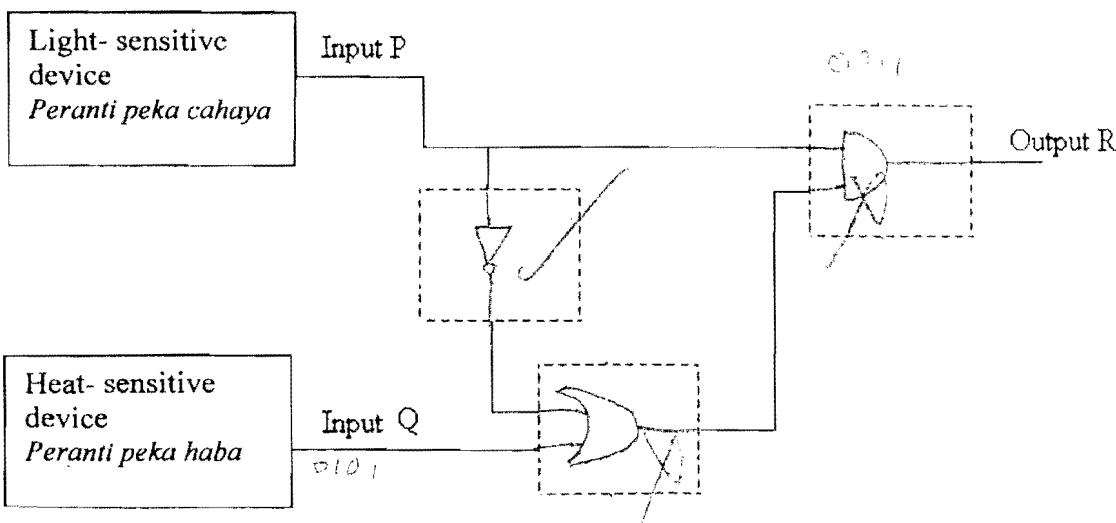
He has constructed a truth table as shown below.

Ahmad ingin membina sebuah litar get logik untuk menghidupkan pendingin udara secara automatik. Dia telah memilih peranti peka cahaya untuk mengesan keadaan cerah dan gelap dan peranti pengesan haba untuk mengesan perubahan haba persekitaran.

Dia telah membina satu jadual kebenaran seperti di bawah.

Input P	Input Q	Output R
Night/Malam - 0	Cold/Sejuk - 0	Off /Dimatikan- 0
Night/Malam - 0	Hot/Panas - 1	On /Dihidupkan- 1
Day/Siang - 1	Cold/Sejuk - 0	On/Dihidupkan - 1
Day/Siang - 1	Hot/Panas - 1	On/Dihidupkan - 1

You are given the logic gate such as OR, AND and NOT. Complete the logic gate circuit to help Ahmad to make his air conditioner functions as the situation above.
 Anda diberi get logik seperti ATAU, DAN dan TAK. Lengkapkan litar get logik untuk menolong Ahmad membuat pendingin hawanya berfungsi seperti situasi di atas.



[3 marks]

8. Diagram 8.1 shows a metal block is suspended in the air by a spring balance. Diagram 8.2, shows the metal block is lowered into a beaker filled with water. The weight of metal block is 0.50 N.

Rajah 8.1 menunjukkan blok logam digantung di udara oleh neraca spring. Rajah 8.2 menunjukkan blok logam itu diturunkan ke dalam bekas yang berisi air. Berat blok logam ialah 0.5 N.

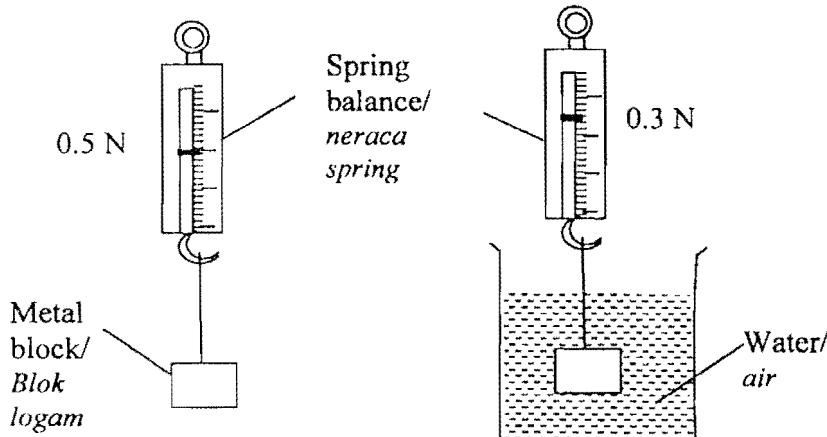


Diagram 8.1
Rajah 8.1

Diagram 8.2
Rajah 8.2

- (a) What is meant by weight?
Apakah yang dimaksudkan dengan berat?

Bouyancy force. *X*

[1 mark]

- (b) Compare the reading of the spring in Diagram 8.1 and Diagram 8.2. Give reason to your answer.

Bandingkan bacaan neraca spring dalam Rajah 8.1 dan 8.2. Berikan sebab kepada jawapan anda.

The reading of the spring in Diagram 8.2 is small than the reading of the spring in diagram 8.1 because some of the mass of the metal block is support by the water bouyancy.

[2 marks]

- (c) Reading of spring balance / N
Bacaan neraca spring/ N

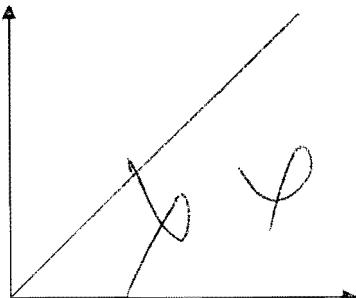


Diagram 8.3
Rajah 8.3

Depth of metal block immersed in water / cm
Kedalaman blok logam direndamkan ke dalam air / cm

On Diagram 8.3, sketch the graph of reading of the spring balance against the depth of metal block immersed in water when the metal block is lowered slowly into the water.

Pada Rajah 8.3, lakarkan graf bacaan neraca spring melawan kedalaman blok logam yang direndam ke dalam air apabila logam itu diturunkan perlahan-lahan ke dalam air.

[2 marks]

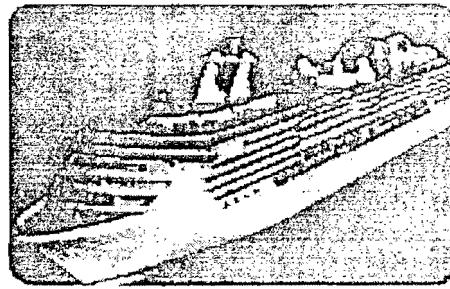


Diagram 8.4
Rajah 8.4

- (d) Diagram 8.4 shows a ship sails on the sea. The ship carries passengers and cargo.
Rajah 8.4 menunjukkan sebuah kapal belayar dipermukaan laut. Kapal itu membawa penumpang dan kargo.

Table 8.1 shows the specifications of four watercraft, K, L, M and N that can be used to carry passengers and cargo at high speed and economical.

Jadual 8.1 menunjukkan spesifikasi bagi empat pesawat air K, L, M dan N yang boleh digunakan untuk membawa penumpang dan kargo pada laju yang tinggi dan menjimatkan.

Watercraft/pesawat air	K	L	M	N
Hull shape/ Bentuk badan kapal	Broad and pointed Lebar dan tajam	Narrow and pointed Sempit dan tajam	Narrow and pointed Sempit dan tajam	Broad and pointed Lebar dan tajam
Material of hull Bahan badan kapal	Fibre glass Gentian kaca	Aluminium Aluminiun	Steel Keluli	Wood Kayu
Engine fuel/ Bahan api enjin	petrol	petrol	diesel	diesel

Table 8.1 / Jadual 8.1

Based on Table 8.1, state the suitable specifications of the hull to carry passengers and cargo at high speed and economical.

Berdasarkan Jadual 8.1, nyatakan spesifikasi yang sesuai bagi kapal untuk membawa penumpang dan kargo dengan kelajuan yang tinggi dan menimatkan.

- (i) Hull shape
Bentuk badan kapal
.....Narrow and pointed.....
Reason/sebab
.....the smaller the hull shape.....the higher the pressure..... [2 marks]
- (ii) Material of hull
Bahan badan kapal
.....Aluminium.....
Reason/sebab
.....Aluminium is a very strong metal! X..... [2 marks]
- (ii) Engine fuel
Bahan api enjin
.....Petrol.....X.....Diesel.....
Reason/sebab
.....Petrol does not pollute the environment..... [2 marks]
- (e) Based on your answer in 8(d), determine the most suitable watercraft.
Berdasarkan jawapan anda dalam 8(d), tentukan pesawat air paling sesuai.
.....L: X.....M:

Section B
Bahagian B

[20 Marks]
[20 Markah]

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

9. Diagram 9.1 and Diagram 9.2 shows a comparison of two springs, M and N. Both the springs made of the same wire and material but have different spring constant. They are attached to load of equal weight.

Rajah 9.1 dan Rajah 9.2 menunjukkan perbandingan dua spring M dan N. Kedua-dua spring dibuat daripada wayar dan bahan yang sama tetapi mempunyai pemalar spring yang berbeza. Kedua-dua spring kemudiannya diletakkan beban yang sama berat.

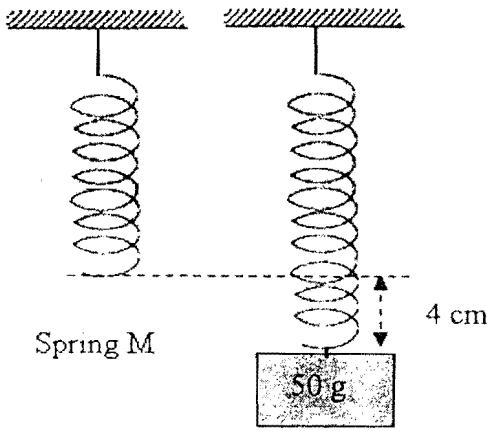


Diagram 9.1
Rajah 9.1

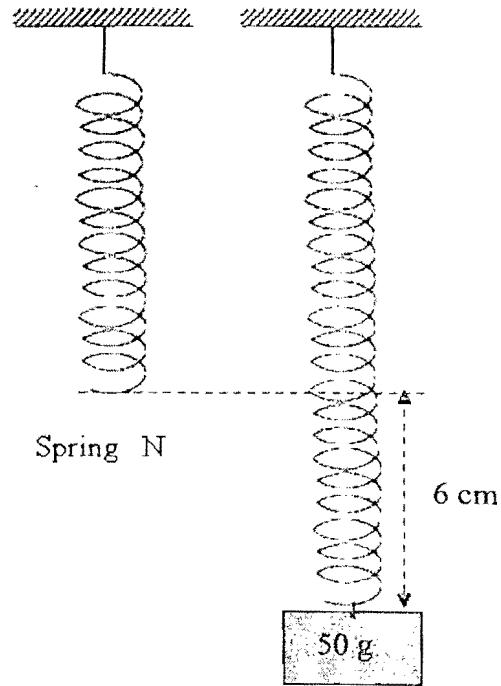


Diagram 9.2
Rajah 9.2

- (a) What is meant by spring constant of a spring?

Apakah yang dimaksudkan dengan pemalar spring bagi suatu spring?

[1 mark]

- (b) Based on Diagram 9.1 and Diagram 9.2

Berdasarkan Rajah 9.1 dan Rajah 9.2

- (i) Compare the forces of the load applied.
Bandingkan daya pada beban yang dikenakan
- (ii) Compare the extension of the spring
Bandingkan pemanjangan spring
- (iii) Compare the original length of spring.
Bandingkan panjang asal spring
- (iv) Compare the spring constant
Bandingkan pemalar spring
- (v) Relate the spring constant and the original length of the spring.
Hubungkaitkan pemalar spring dengan panjang asal spring.

[5 marks]

(c)

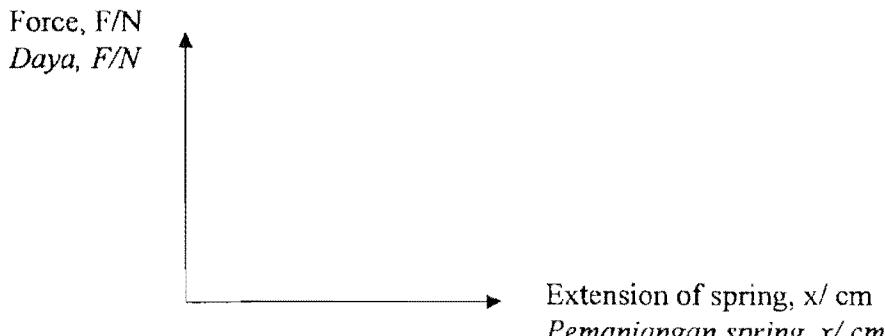


Diagram 9.3
Rajah 9.3

- (i) Diagram 9.3 shows axes of graph force, F against extension of spring,x.

Copy Diagram 9.3 on your answer sheet and sketch the graph of F against x for both spring M and N as shown in Diagram 9.1 and 9.2.

Rajah 9.3 menunjukkan paksi-paksi graf daya, F melawan pemanjangan spring,x. Salin Rajah 9.3 pada kertas jawapan anda dan lakarkan graf F melawan x untuk kedua-dua spring M and N seperti ditunjukkan dalam Rajah 9.1 dan 9.2.

[2 marks]

- (ii) Explain how you can determine the spring constant from F-x graph and state the unit of spring constant.

Jelaskan bagaimana anda menentukan pemalar spring daripada graf F-x dan nyatakan unit bagi pemalar spring itu..

[2 marks]

- (e) Diagram 9.3 shows a manually baby cradle rack set.

Rajah 9.3 menunjukkan satu set buaian bayi yang berfungsi secara manual.

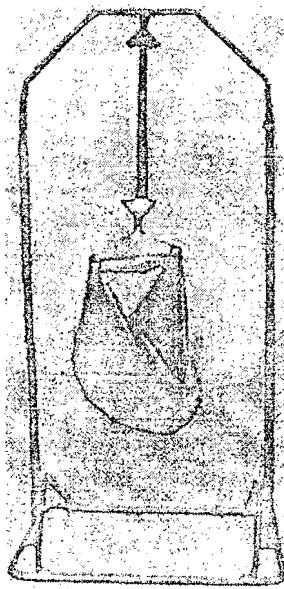


Diagram 9.3

Rajah 9.3

You are required to give some suggestions to design a fully automatic baby cradle that can support maximum weight of 26 kg and keep the baby secure and safe. Explain the suggestion based on the following aspects:

- type of spring used
- arrangement of springs
- safety features
- automatic oscillation

Anda dikehendakki memberi beberapa cadangan untuk merekabentuk satu buaian bayi automatik yang boleh menampung berat maksimum 26 kg dan berada dalam keadaan selamat dan terpelihara. Jelaskan cadangan anda berdasarkan aspek-aspek berikut:

- jenis spring yang digunakan
- susunan spring
- ciri keselamatan
- ayunan automatik

[10 marks]

10. Diagram 10.1 and Diagram 10.2 show that a current is induced when there is a relative motion between the magnet and solenoid . Ends of the coils are connected to a centre-reading galvanometer.

Rajah 10.1 dan Rajah 10.2 menunjukkan arus diaruhkan apabila wujud gerakan relatif antara magnet bar dan solenoid. Hujung gegelung tersebut disambung kepada satu galvanometer sifar-tengah.

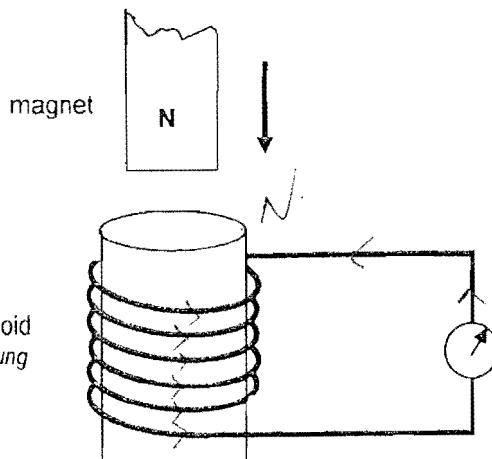


Diagram 10.1
Rajah 10.1

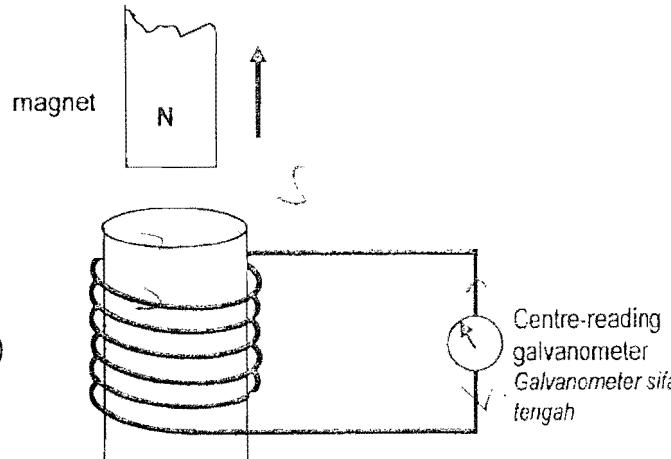


Diagram 10.2
Rajah 10.2

- (a) What is meant by **induced current**?

Apakah yang dimaksudkan dengan arus aruhan?

[1 mark]

- (b) Using Diagram 10.1 and Diagram 10.2,
Berdasarkan Rajah 10.1 dan Rajah 10.2,

- (i) compare the poles of the magnets.

bandingkan keikutinan magnet bar-magnet bar tersebut.

- (ii) compare the direction of the movement of the magnets.

bandingkan arah pergerakan magnet bar-magnet bar tersebut.

- (iii) compare the polarities produced at the top of the coils when the magnet moves towards the coil and moves away from the coil.

bandingkan keikutinan yang terhasil di bahagian atas gegelung apabila magnet bar digerakkan ke arah gegelung dan menjauhi gegelung tersebut.

- (iv) compare the direction of the deflection of galvanometer pointer.

bandingkan arah pesongan jarum galvanometer.

- (v) relate the movement of the magnet and the induced current produced.

hubungkaitkan pergerakan magnet bar dengan arus aruhan yang dihasilkan.

- (vi) state the physics law involved.

nyatakan hukum fizik yang terlibat.

[6 marks]

- (c) Diagram 10.3 shows a direct current generator
Rajah 10.3 menunjukkan satu penjana arus terus.

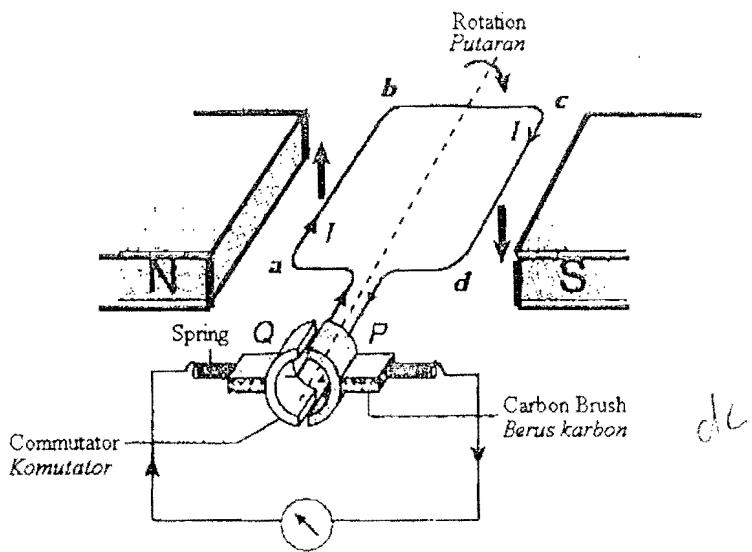


Diagram 10.3
Rajah 10.3

Explain how the generator is able to produce direct current.

Terangkan bagaimana penjana tersebut boleh menghasilkan arus terus.

[5 marks]

- (d) Using a 12V dry cell, explain the modifications that need to be done on the generator in Diagram 10.3 and the external circuit to enable the generator to be a d.c. motor, which can rotate faster and is more efficient.

Dengan menggunakan sel kering 12V, terangkan pengubahsuai yang perlu dilakukan pada penjana dalam Rajah 10.3 dan litar luar untuk menjadikan penjana tersebut sebagai motor arus terus yang mana ia boleh berputar lebih laju dan lebih cekap.

[8 marks]

Sel kering 12V

- 11 The diagram 11.1 shows three students standing in front of a window at their respective classroom L, M and N. An audio frequency generator which is connected to a speaker is placed beside the building. The generator and speaker are used to produce sound with different pitch.

Rajah 11.1 menunjukkan tiga orang pelajar sedang berdiri tingkap bilik darjah L, M dan N masing-masing. Satu penjana frekuensi audio disambungkan kepada pembesar suara yang diletakkan ditepi bangunan. Penjana dan pembesar suara digunakan untuk menghasilkan bunyi dengan kelangsungan yang berbeza.

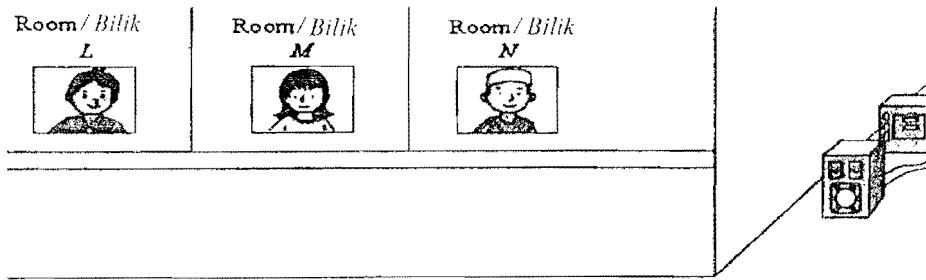


Diagram 11.1/ Rajah 11.1

- (a) What factor can affect the pitch of the sound?
Apakah faktor yang mempengaruhi kelangsungan bunyi?

[1 mark]

- (b) When a low pitch sound is generated, all of them can hear the sound clearly. When a high pitch sound is generated, only student in classroom N can hear the sound clearly. Explain this situation.

Apabila kelangsungan bunyi dihasilkan rendah, kesemua mereka boleh mendengar bunyi dengan jelas. Apabila kelangsungan bunyi dihasilkan tinggi, hanya pelajar dalam kelas N sahaja yang boleh mendengar bunyi dengan jelas. Jelaskan situasi ini.

[4 marks]

- (c) Diagram 11.2 shows a radar system in a control tower at an airport. Signals are transmitted from the radar system to determine the position of an aeroplane.

Rajah 11.2 menunjukkan satu sistem radar di menara kawalan di satu lapangan terbang. Isyarat dipancarkan dari sistem radar bagi menentukan kedudukan kapal terbang.

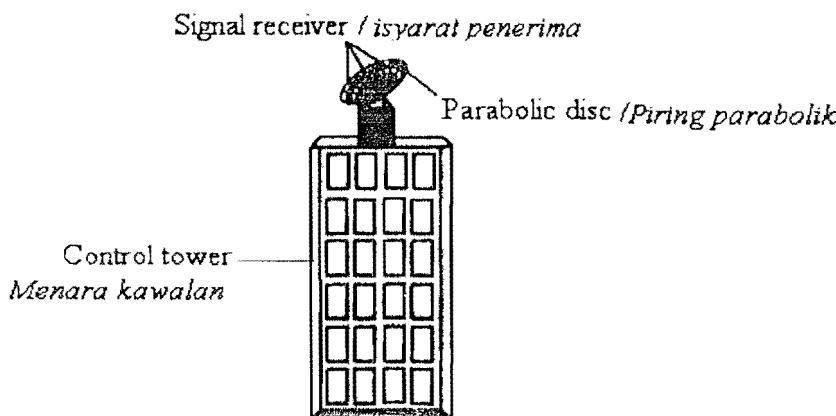
Diagram 11.2
Rajah 11.2

Table 11.1 shows the specifications of four radar systems, R1, R2, R3 and R4, that can be used to detect the position of an aeroplane.

Jadual 11.1 menunjukkan spesifikasi empat sistem radar, R1, R2, R3 dan R4, yang boleh digunakan untuk mengesan kedudukan kapal terbang.

Radar system <i>Sistem radar</i>	Size of parabolic disc <i>Saiz piring parabola</i>	Position of signal receiver <i>Kedudukan isyarat penerima</i>	Type of wave used <i>Jenis gelombang digunakan</i>	Distance from the ground <i>Jarak dari tanah</i>
R1	10 m	At focal length <i>Pada jarak fokus</i>	Radiowave <i>Gelombang radio</i>	High <i>Tinggi</i>
R2	3 m	Less than focal length <i>Kurang dari jarak fokus</i>	Microwave <i>Gelombang mikro</i>	Low <i>Rendah</i>
(R3)	8 m	At focal length <i>Pada jarak fokus</i>	Microwave <i>Gelombang mikro</i>	High <i>Tinggi</i>
R4	6 m	Twice the focal length <i>Dua kali jarak fokus</i>	Radiowave <i>Gelombang radio</i>	Low <i>Rendah</i>

Table 11.1
Jadual 11.1

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

Kaji spesifikasi semua keempat-empat sistem radar dan pilih satu sistem yang paling sesuai berdasarkan aspek-aspek yang berikut;

- the size of the parabolic disc
saiz piring parabola
- the position of the signal receiver from the centre of the parabolic disc
kedudukan isyarat penerima dari pusat piring parabola
- the types of wave transmitted
jenis gelombang yang dipancarkan
- the height of the parabolic disc from the ground
ketinggian piring parabola dari tanah

Explain the suitability of the aspects.

Terangkan kesesuaian aspek-aspek.

[10 marks]

- (d) The depth of a sea is ~~12 m~~^{30m}. A ship transmits an ultrasonic wave of frequency 30 kHz to the seabed and receives an echo 0.04 s later.
Kedalaman laut ialah 70 m. Sebuah kapal memancarkan gelombang berfrekuensi 30 kHz ke permukaan laut dan satu gema diterima 0.04 s kemudiannya.

Calculate

Hitungkan

- (i) the speed of the ultrasonic wave in the water,
laju gelombang ultrasonik dalam air
- (ii) the wavelength of the ultrasonic wave in the water
jarak gelombang 4 marks bagi gelombang ultrasonik dalam air.

[5 marks]

12. Diagram 12.1 shows a bulb labelled 12V, 36W.
Rajah 12.1 menunjukkan satu mentol berlabel 12V, 36W.

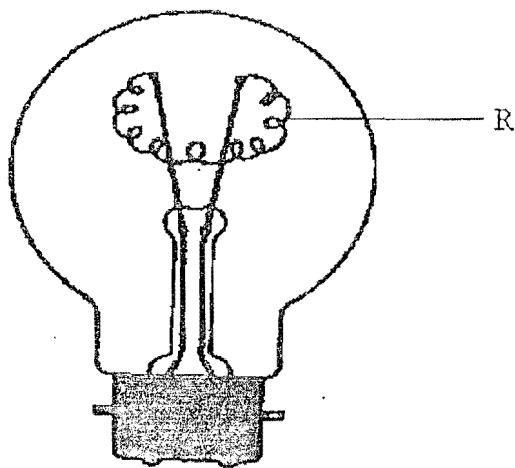


Diagram 12.1

Rajah 12.1

- (a) (i) What is meant by 12V, 36 W.
Apakah yang dimaksudkan dengan 12V, 36W?
[1 mark]
- (ii) State two factors that affect the resistance of the conductor .
Describe how the factors can affect the resistance of conductor.
Nyatakan dua faktor yang mempengaruhi rintangan konduktor.
Huraikan bagaimana faktor-faktor itu boleh mempengaruhi rintangan konduktor itu.
[4 marks]

- (b) Diagram 12.2 shows three identical resistors in an electric circuit that is connected to a supply voltage 12V.

Rajah 12.2 menunjukkan tiga perintang yang serupa dalam satu litar elektrik yang disambungkan kepada bekalan elektrik 12 V

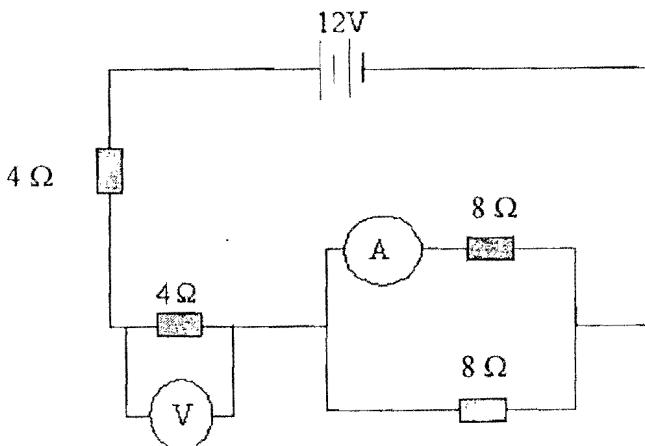


Diagram 12.2

Rajah 12.2

- (i) Calculate the effective resistance of the circuit
Hitungkan rintangan berkesan dalam litar itu. [2 marks]

- (ii) What is the reading of the voltmeter?
Berapaah bacaan voltmeter? [2 marks]

- (ii) What is the reading of the ammeter?
Berapakah bacaan ammeter? [1 mark]

- c) You are assigned to investigate the characteristics of the power of heating coil and the design of the heating element is an electric kettle.
Anda ditugaskan untuk mengkaji ciri-ciri kuasa perintang dalam alat pemanas dan reka bentuk elemen pemanas sebuah cerek elektrik.

Explain the suitability of every characteristic in the Table 12.1 and determine the most suitable electric kettle to be used to boil the water faster and safely.

Terangkan kesesuaian setiap ciri dalam Jadual 12.1 dan seterusnya tentukan cerek elektrik yang manakah paling sesuai digunakan untuk memanaskan air supaya dengan cepat dan selamat.

Give reason for your answers.

Beri sebab untuk jawapan anda.

[10 marks]

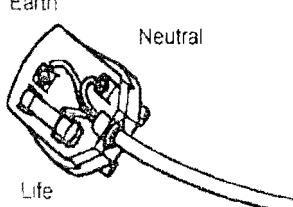
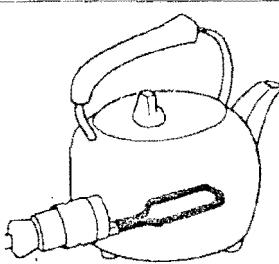
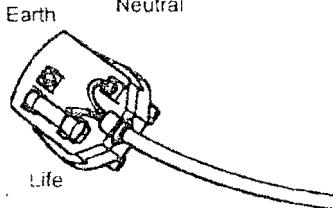
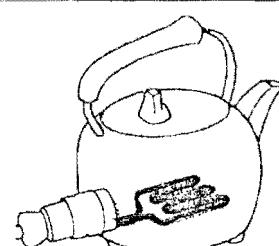
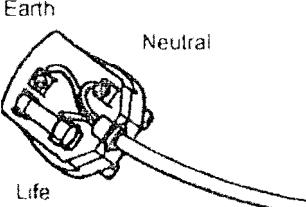
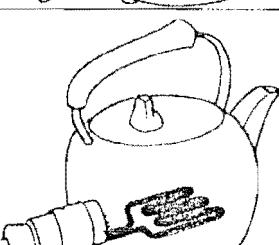
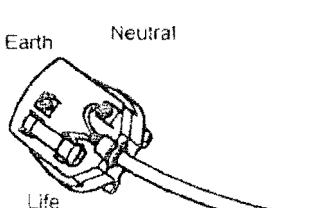
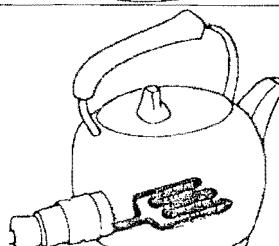
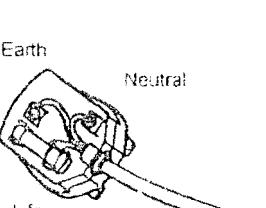
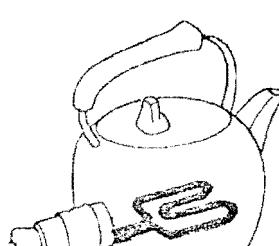
	Earthing system <i>Sistem pembumian</i>	Number of loop <i>Bilangan Gegelung</i>	Material of heating coil <i>Bahan gegelung pemanas</i>	Power of heating coil <i>Kuasa gegelung pemanas</i>
P	Earth Neutral Life	 	Constantan <i>Konstantan</i>	Power <i>Kuasa</i> 1000W
Q	Earth Neutral Life	 	Nichrom <i>Nikrom</i>	Power <i>Kuasa</i> 1 000 W
R	Earth Neutral Life	 	Nichrom <i>Nikrom</i>	Power <i>Kuasa</i> 1500 W
S	Earth Neutral Life	 	Constantan <i>Konstantan</i>	Power <i>Kuasa</i> 1500 W
T	Earth Neutral Life	 	Nichrom <i>Nikrom</i>	Power <i>Kuasa</i> 1000
				Voltage <i>Voltan</i> 240V
				Voltage <i>Voltan</i> 240 V

Table 12.1

Jadual 12.1

[See Overleaf]

CONFIDENTIAL

Name: Form : 5/1/jia :

4531/3
 Physics
 Paper 3
 2009
 $1\frac{1}{2}$ hours



**PEJABAT PELAJARAN DAERAH HULU LANGAT
 PEPERIKSAAN PERCUBAAN SETARA
 2009**

Physics

Paper 3

One hour and thirty minutes

DO NOT OPEN THIS QUESTION PAPER UNLESS TOLD

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

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

3. Answer one question from **Section B**. Write your answer for **Section B** on the lined pages at the end of this question paper. Answer **Section B** in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.

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

5. If you wish to cancel any answer, neatly cross out the answer.

6. The marks allocated for each question or part of a question is shown in brackets.

7. You may use a non-programmable scientific calculator for your calculations.

8. The time suggested answering, **Section A** is 60 minutes and **Section B** is 30 minutes.

9. Hand in this question paper at the end of the examination

<i>For examiner only</i>			
Section	Question	Score	Score obtained
A	1	16	15
	2	12	8
B	3	12	-
	A	12	8
Total Score			31

Kertas soalan ini mengandungi 12 halaman bercetak.
 dan 4 halaman tidak bercetak.

[Lihat sebelah
 SULIT]

Section A

Bahagian A

Answer all questions in this section

Jawab semua soalan dalam bahagian ini

1. A student carries out an experiment to find out the relationship between the mass of water being boiled, m and time taken for heating, t . The student arranges the apparatus as shown in Diagram 1.1. The heater labeled 1 kW 240 V is switch on until the water in the beaker starts to boil. At the moment, the total mass of the beaker and water, M_o is recorded and the stop watch is started. Diagram 1.1 on page 3 shows the initial reading of the electronic balance, M_o and time, $t = 0$.

Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara jisim air yang mendidih, m dan masa pemanasan, t . Pelajar itu menyusun radas eksperimen seperti ditunjukkan dalam Rajah 1.1. Suis pemanas yang berlabel 1 kW 240 V dihidupkan sehingga air dalam bikar mula mendidih. Pada ketika itu, jisim bikar bersama air, M_o dicatat dan jam randik dimulakan. Rajah 1.1 menunjukkan bacaan awal neraca elektronik, M_o pada masa, $t = 0$.

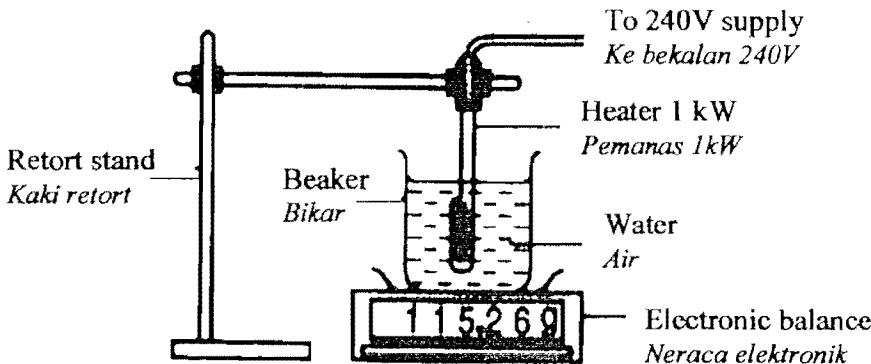
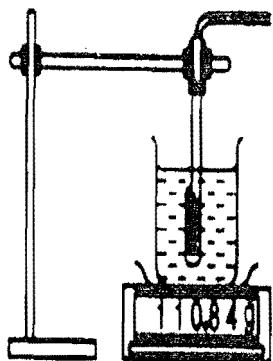


Diagram 1.1

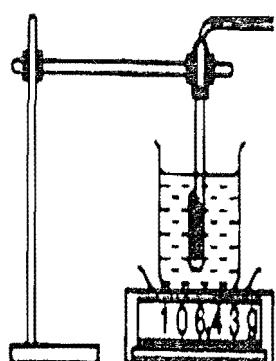
Rajah 1.1

The experiment is carried on and the total mass of the beaker and water, m is recorded every 10 seconds. The value of m at time $t = 10$ s, 20 s, 30 s, 40 s, 50 s and 60 s are shown in Figures 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 and 1.7 on page 2

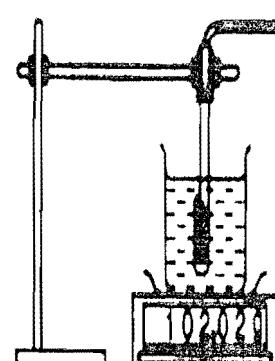
Eksperimen diteruskan dan jisim air bersama bikar, m dicatat setiap 10 s. Nilai m pada masa $t = 10$ s, 20 s, 30 s, 40 s, 50 s dan 60 s dan 70 s ditunjukkan pada Rajah 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 dan 1.7.



$t = 10\text{ s}$



$t = 20\text{ s}$

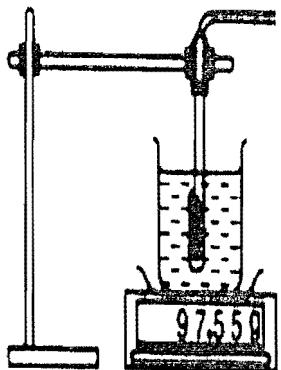


$t = 30\text{ s}$

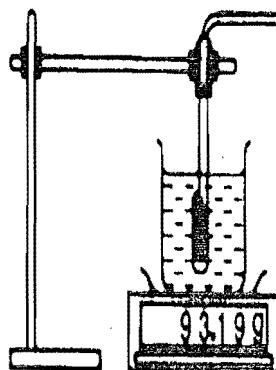
Diagram 1.2
Rajah 1.2

Diagram 1.3
Rajah 1.3

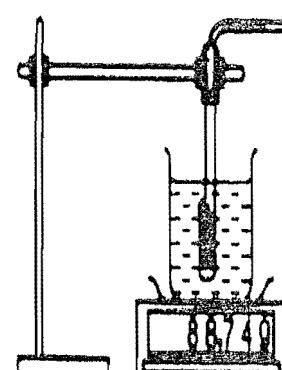
Diagram 1.4
Rajah 1.4



$t = 40\text{ s}$



$t = 50\text{ s}$



$t = 60\text{ s}$

Diagram 1.5
Rajah 1.5

Diagram 1.6
Rajah 1.6

Diagram 1.7
Rajah 1.7

(a) For the experiment, identify ;
Bagi eksperimen ini, kenalpasti;

(i) the manipulated variable
pembolehubah manipulasi

..... Time taken : ✓ [1 mark]
[1 markah]

(ii) the responding variable
pembolehubah bergerakbalas

..... the reading of the electronic balance [1 mark]
[1 markah]

(iii) a constant variable
pembolehubah dimalarkan

..... the total energy supply ✓ [1 mark]
[1 markah]

(b) In each of the measurements, calculate the mass of the water being boiled, m by using the following equation :

Dalam setiap pengukuran, hitung jisim air yang mendidih, m dengan menggunakan persamaan :

$$m = M_o - M$$

Tabulate your results for t , M_o , M and m .

Jadualkan keputusan anda bagi t , M_o , M dan m .

Time taken(s)	Initial reading of electronic balance . (g)	Reading of electronic balance after boiled (g) ✓	Mass water being boiled (g)
10	115.26	110.84	4.42
20	115.26	106.43	8.83
30	115.26	102.02	13.24
40	115.26	97.55	17.71
50	115.26	93.19	22.07
60	115.26	88.74	26.52

✓ [7 marks]
[7 markah]

(c) On the graph paper, plot a graph of m against t .

Pada kertas graf, plotkan graf m melawan t .

[5 marks]

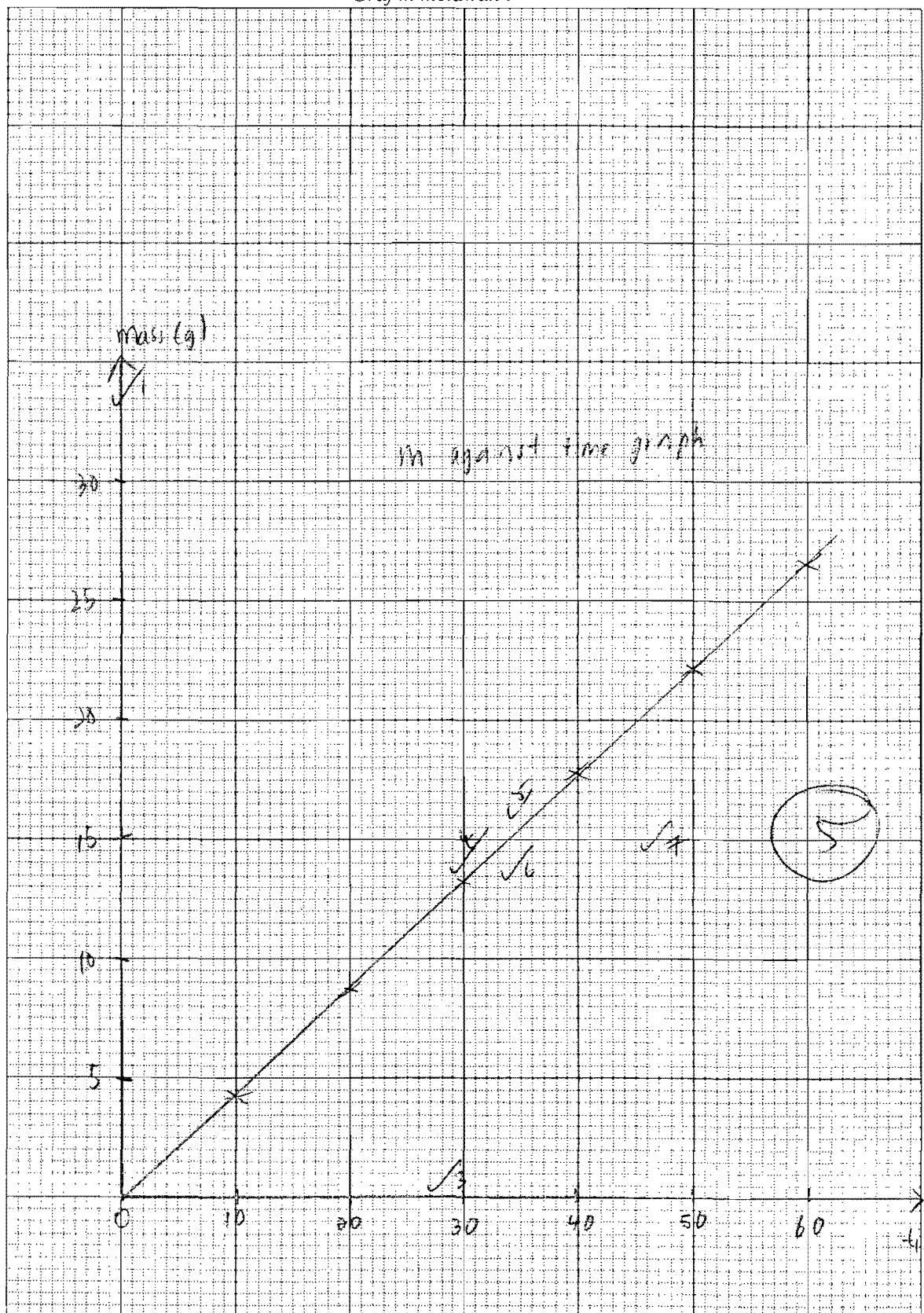
[5 markah]

(d) Based on your graph, state the relationship between m and t .

Berdasarkan kepada graf anda, nyatakan hubungan antara m dan t .

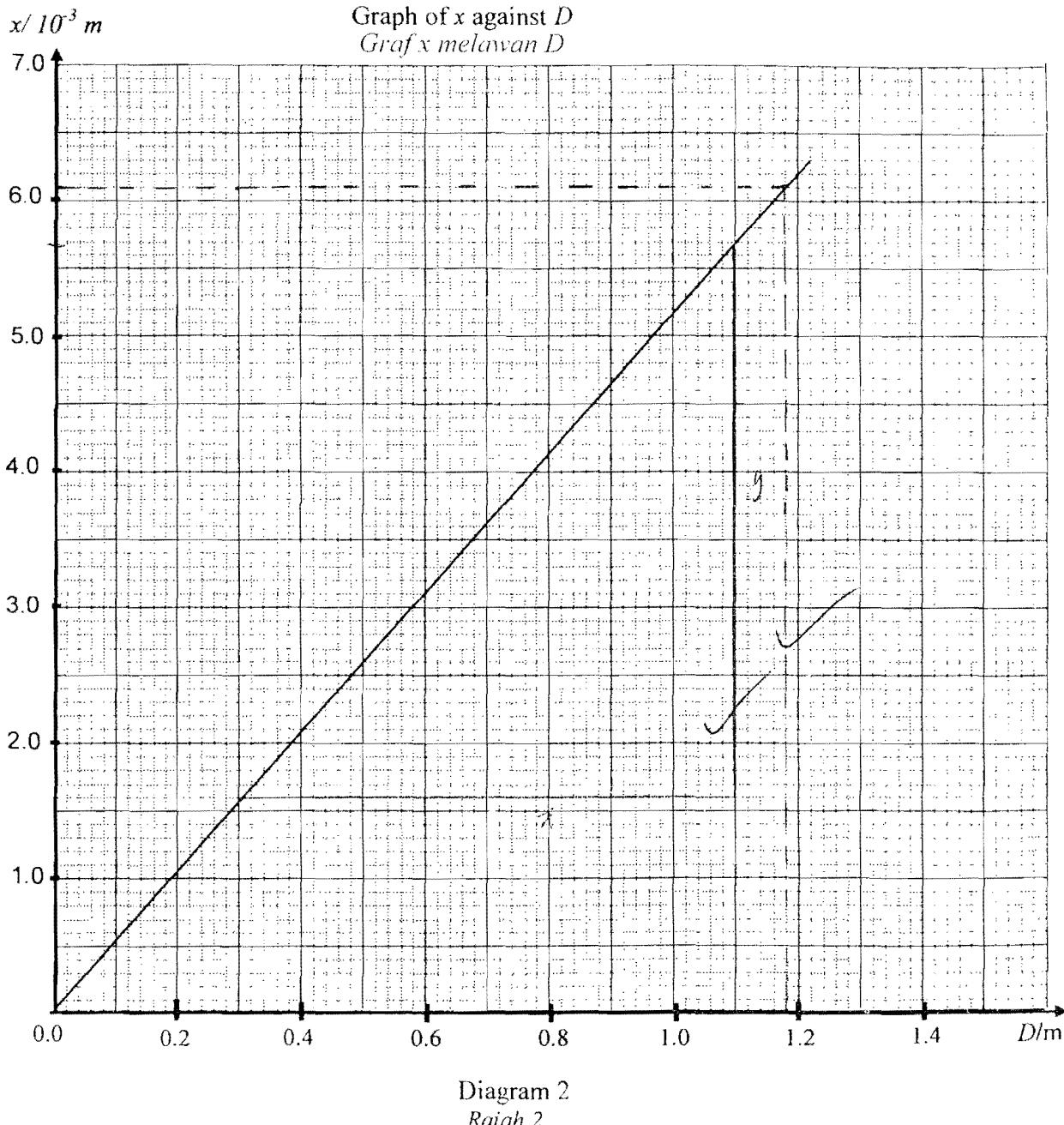
..... The higher the time taken, the higher the mass being boiled.

[1 mark]
[1 markah]

A graph of m against t
Graf m melawan t

2. A Young's double-slit experiment is carried out in the laboratory using a double slit with a separation of a . The interference pattern is observed at a distance D from the double slit. It was observed that the distance between the adjacent bright fringes is x . The results of the experiment are shown in the graph of x against D as in Diagram 2.

Satu eksperimen dwi celah Young telah dijalankan dalam makmal dengan menggunakan dwi celah yang mempunyai jarak pemisahan, a . Corak interferensi diperhatikan pada jarak D daripada dwi celah tersebut. Diperhatikan bahawa jarak antara jalur-jalur cerah yang berturut-turut adalah x . Keputusan eksperimen ditunjukkan pada graf x berlawan D seperti pada Rajah 2



- (a) State the relationship between x and D .

Nyatakan hubungan antara x dan D .

..... xis.....directly.....proportional.....to..... D

[1 mark]
[1 markah]

- (b) Determine the distance between the adjacent bright fringes, x when they are observed at a distance, $D = 1.18$ m from the double slit.

Show on the graph, how you determine the value of x .

Tentukan jarak antara jalur cerah yang berturutan, x apabila diperhatikan pada jarak $D = 1.18$ m daripada dwi celah itu.

Tunjukkan pada graf, bagaimana anda menentukan nilai x .

$x = \dots\dots 6.1 \times 10^{-3} \text{ m}$

[2 marks]
[2 markah]

- (c) Calculate the gradient of the graph x against D

Show on the graph how you determine the gradient.

Kirakan kecerunan graf x melawan D

Tunjukkan pada graf anda, bagaimana anda menentukan kecerunan.

$$\begin{aligned} m &= \frac{(5.7 - 1.6)}{1.1 - 0.3} \times \frac{?}{?} \\ &= \frac{4.1}{0.8} \times \frac{?}{?} \\ &= 5.125 \times 10^{-3} \end{aligned}$$

[3 marks]
[3 markah]

2

- (d) The relationship between x and D is given by the general equation :

Hubungan antara x dan D diberi oleh rumusan am:

$$x = \frac{\lambda D}{a}$$

If $a = 0.01 \text{ cm}$, calculate the wavelength, λ by using the formula given and the gradient calculated in (c).

Jika $a = 0.01 \text{ cm}$, cari jarak gelombang, λ cahaya dengan menggunakan formula yang diberi dan nilai kecerunan yang dikira di (c). .

[3 marks]
[3 markah]

$$X = \frac{\lambda D}{a}$$

$$0.01 \text{ cm} = 1 \times 10^{-4} \text{ m}$$

$$XA = AD.$$

$$\lambda = \frac{XA}{D}.$$

$$= (5.1125 \times 10^{-3})(1 \times 10^{-4})$$

$$= 5.1125 \times 10^{-7} \text{ m}$$

(e) If the light used has a wavelength of 500 nm, calculate the value of x when $D = 0.8 \text{ m}$.

Jika cahaya yang digunakan mempunyai jarak gelombang sebanyak 500 nm, hitungkan nilai x apabila $D = 0.8 \text{ m}$

$$X = \frac{\lambda D}{a}$$

$$X = \frac{(5 \times 10^{-7})(0.8)}{a}$$

[2 marks]
[2 markah]

$$500 \text{ nm} = 5 \times 10^{-7} \text{ m}.$$

$$X = \frac{(5 \times 10^{-7})(0.8)}{0.0976}$$

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

$$= \frac{1}{5.1125 \times 10^{-3}} \times 5 \times 10^{-7} = 4.098 \times 10^{-3} \text{ m} \#$$

$$= 0.0976$$

(f) State one precaution that should be taken during this experiment.

Nyatakan satu langkah berjaga yang perlu dijalankan untuk menambahbaiki keputusan eksperimen.

.....make sure.....that.....only.....monochromatic.....light.....is.....used.....

[1 mark]
[1 markah]



Section B
Bahagian B[12 marks]
[12 markah]Answer any **one** question from this section.*Jawab satu soalan daripada bahagian ini.*

3. Diagrams 3.1 and 3.2 show two ways of taking photographs of the same subject. It is found that the size of the image on one photograph is different from that on the other photograph.

Rajah 3.1 dan Rajah 3.2 menunjukkan dua cara mengambil photo objek yang sama. Di dapati saiz imej salah satu photo adalah berbeza dari yang satu lagi.

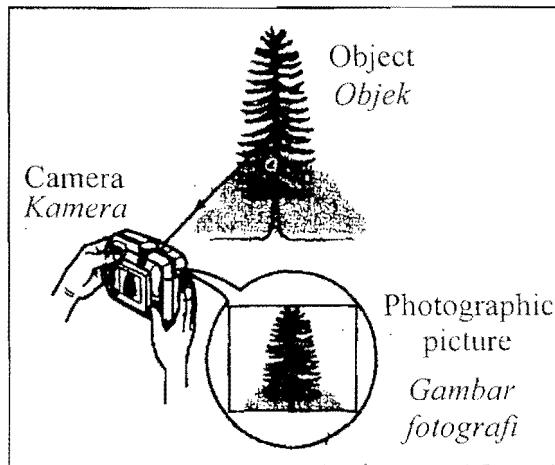


Diagram 3.1

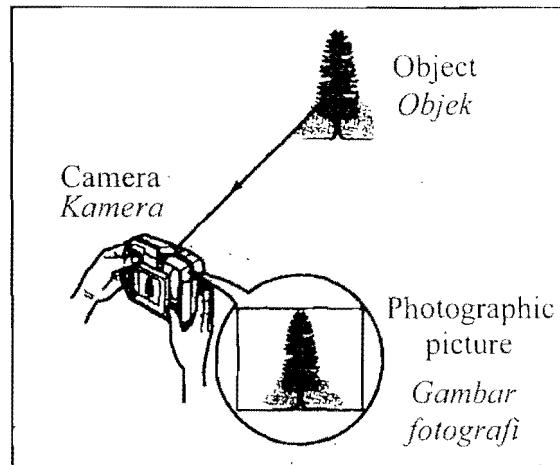
Rajah 3.1

Diagram 3.2

Rajah 3.2

Based on the information and observation:

Berdasarkan maklumat dan pemerhatian tersebut:

- (a) State **one** suitable inference. [1 mark]
Nyatakan satu 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 a filament lamp, a thin lens, and other pieces of apparatus, describe **one** experiment to investigate the hypothesis stated in 3(b).
Dengan menggunakan radas seperti sebiji lampu filamen, sebuah kanta nipis dan lain-lain radas terangkan satu eksperimen untuk menyiasat hipotesis yang dinyatakan di 3(b).

In your description, state clearly the following:

Dalam penerangan anda, nyatakan dengan jelas perkara berikut:

- i. The aim of the experiment.

Tujuan eksperimen.

- ii. The variables in the experiment.

Pembolehubah dalam eksperimen.

- iii. The list of apparatus and materials.

Senarai radas dan bahan.

- iv. The arrangement of the apparatus.

Susunan radas.

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

*Prosedur eksperimen yang mesti termasuk **satu** kaedah mengawal pembolehubah dimanipulasikan dan **satu** kaedah mengukur pembolehubah bergerak balas.*

- vi. The way you tabulate the data.

Cara anda menjadualkan data.

- vii. The way you analyse the data.

Cara anda menganalisis data.

[10 marks]

[10 markah]

4. A man who works in metal scrap yard, operates the electromagnet that lifts scrap iron in his operating room.

Seorang lelaki bekerja di kawasan mengutip logam dan mengendalikan elektromagnet yang mengangkat serpihan besi.

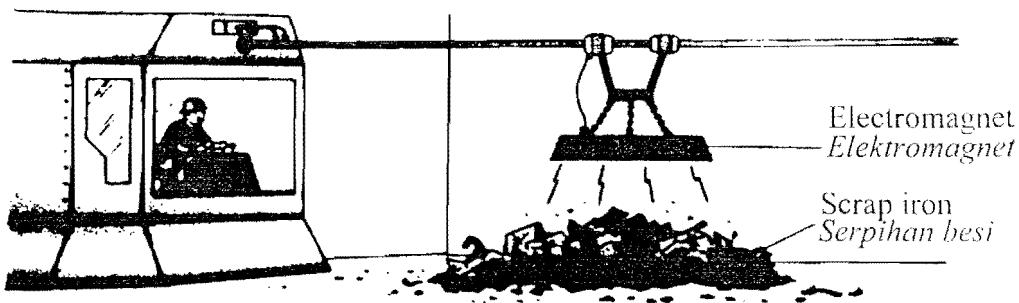


Diagram 2.1

Rajah 2.1

Diagram 2.2 and Diagram 2.3 respectively show the reading of ammeter when the electromagnet lift smaller pieces of iron and heavier pieces of iron.

Rajah 2.2 dan Rajah 2.3 masing-masing menunjukkan bacaan ammeter apabila elektromagnet mengangkat serpihan besi kecil dan kepingan besi berat.

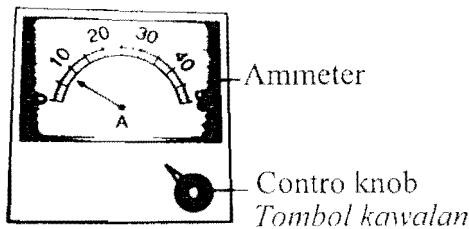


Diagram 2.2

Rajah 2.2

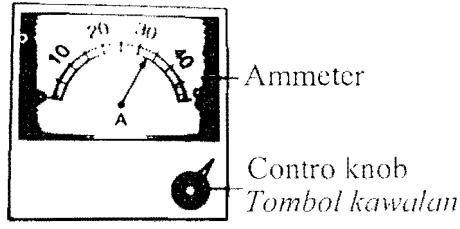


Diagram 2.3

Rajah 2.3

Based on the information and observation:

Berdasarkan maklumat dan pemerhatian tersebut:

- (a) State **one** suitable inference.

Nyatakan satu inferensi yang sesuai.

[1 mark]

[1 markah]

- (b) State **one** suitable hypothesis.

Nyatakan satu hipotesis yang sesuai.

[1 mark]

[1 markah]

- (c) With the use of apparatus such as a soft iron rod, insulated copper wire and other apparatus, describe an experiment to investigate the hypothesis stated in 2(b).

Dengan menggunakan radas seperti rod besi lembut, dawai kuprum yang bersalut dan radas lain, terangkan satu eksperimen untuk menyiasat hipotesis yang anda nyatakan dalam 2(b).

In your description, state clearly the following:

Dalam penerangan anda jelaskan perkara berikut:

- i. The aim of the experiment.
Tujuan eksperimen.
- ii. The variables in the experiment.
Pembolehubah-pembolehubah dalam eksperimen.
- iii. The list of apparatus and materials.
Senarai radas dan bahan.
- iv. The arrangement of the apparatus.
Susunan radas.
- v. The procedure used in the experiment. Describe how to control and measure the manipulated variables and how to measure the responding variables.
Prosedur yang digunakan dalam eksperimen. Terangkan kaedah mengawal pembolehubah dimanipulasikan dan kaedah mengukur pembolehubah bergerakbalas.
- vi. The way to tabulate the data.
Cara untuk menjadualkan data.
- vii. The way you would analyse the data.
Cara untuk menganalisiskan data.

[10 marks]

[10 markah]

END OF QUESTION PAPER
KERTAS SOALAN TAMAT