JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA 2009   **4531/1**
EXCEL 2
PHYSICS Kertas 1
Sept 2009

1 Jam 15 minit   Satu jam lima belas minit

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Malaysia.*
3. *Calon dikehendaki membaca dengan teliti arahan di dalam kertas soalan ini.*

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED
(JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU)

1. This question paper consists of **50** questions. (*Kertas soalan ini mengandungi **50** soalan).*
2. Answer **all** questions. (*Jawab **semua** soalan).*
3. Answer each question by **blackening** the correct space on the OMR. (*Jawab setiap soalan dengan **menghitamkan** ruangan yang betul pada kertas jawapan OMR).*
4. **Blacken** only one space for each question. (***Hitamkan** satu ruangan sahaja bagi setiap soalan).*
5. Should you wish to change your answer, erase the answer you have marked completely. Then blacken the space for new answer. (*Sekiranya anda hendak menukar jawapan, padamkan jawapan yang telah ditanda. Kemudian hitamkan ruangan untuk jawapan yang baru).*
6. The figures in the questions provided are not drawn to scale unless otherwise stated.(*Rajah-rajah yang mengiringi soalan-soalan tidak dilukis mengikut skala kecuali dinyatakan).*
7. The use of non-programmable calculator is allowed. (*Penggunaan kalkulator saintifik yang tidak boleh diprogram adalah dibenarkan*).

Kertas soalan ini mengandungi 32 halaman bercetak.

[Lihat sebelah]

1. Which of the following is a base quantity and its SI unit ?

    Antara berikut yang manakah kuantiti asas dan unit SI nya?

    A. Mass / g   B. Time / h

        Jisim / g   *Masa* / j

    C. Current / mA   D. Temperature / K

        Arus / mA   *Suhu* / K

2. Figure 1 shows an ammeter with a reflecting mirror and an adjustment screw. Both parts are used to reduce error.

    Rajah 1 menunjukkan sebuah ammeter yang dilengkapi dengan cermin pantulan dan skrew pelaras. Kedua-dua digunakan untuk mengurangkan ralat.
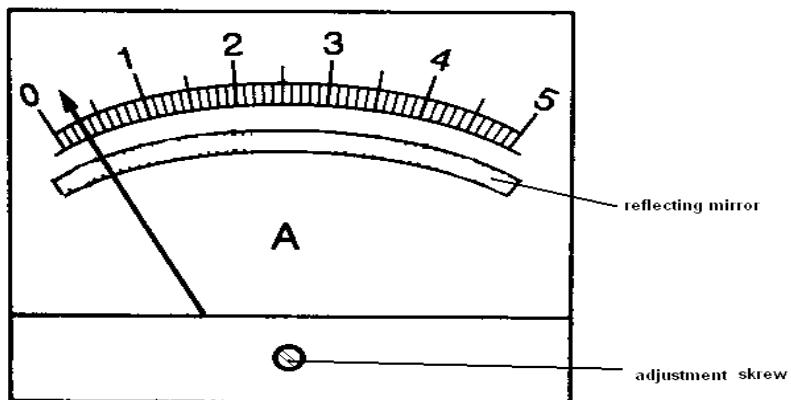

Figure 1

    Which statement shows the correct type of error being reduce?

    Di antara pasangan berikut yang manakah menunjukkan dengan betul cara mengurangkan ralat?

	Adjustment screw *Skrew pelaras*	Reflecting mirror *Cermin pantulan*
A.	zero error *ralat sifar*	random error *ralat rawak*
B.	parallax error *ralat paralak*	random error *ralat rawak*
C.	zero error *ralat sifar*	parallax error *ralat paralak*
D.	random error *ralat rawak*	parallax error *ralat paralak*

3. In a shooting competition, Remi has won the competition because his shots were very accurate and consistent. Which target board below shows the shots made by Remi?

   Dalam sebuah pertandingan menembak, Remi telah memenangi pertandingan tersebut kerana tembakannya jitu dan persis. Papan sasaran yang manakah menunjukkan tembakan yang dilakukan oleh Remi?

A

B

C

D
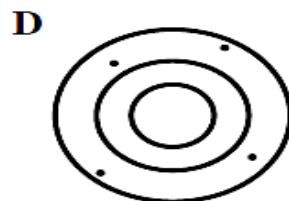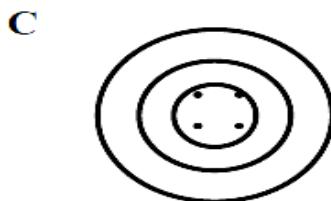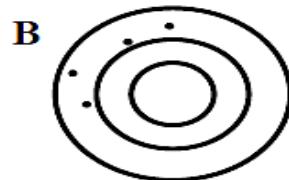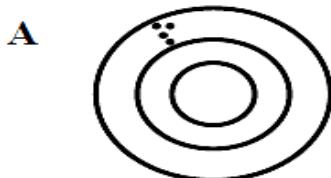
4. Figure 2 shows the reading of a vernier calliper when the jaws are closed.

   *Gambarajah 2 menunjukkan bacaan angkup vernier apabila rahang ditutup.*
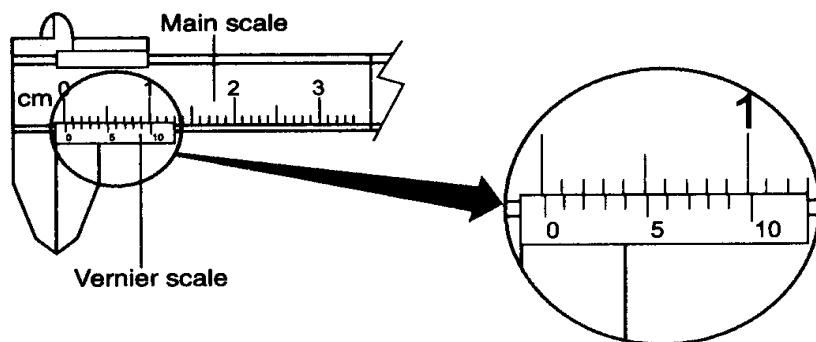
Figure 2

What is the zero error of the vernier caliper?

Apakah nilai ralat sifar angkup vernier itu?

A. 0.02 cm

B. – 0.02 cm

C. 1.10 cm

D. – 1.10 cm

5. Figure 3 below shows the journey of a bus from city A to reach city D.

   *Gambarajah 3 menunjukkan pergerakan bas dari bandar A ke bandar D.*
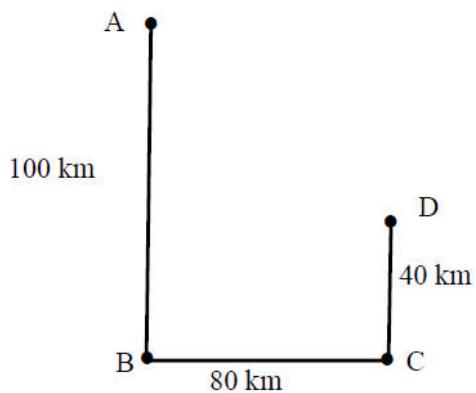
Figure 3

What is the displacement of the bus?

Berapakah sesaran bas itu?

A. 60 km

B. 100 km

C. 128 km

D. 220 km

6. Figure 4 below shows a tape charts. Every strip has 5 ticks.

Gambarajah 4di bawah menunjukkan suatu carta pita. Setiap pita mengandungi 5 detik.
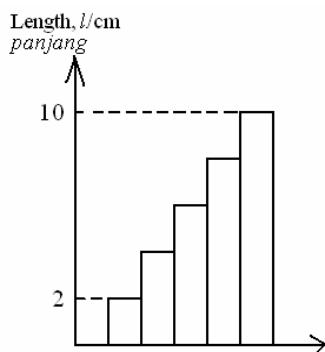

Figure 4

If the frequency used is 50 Hz, calculate the acceleration.

Jika frekuensi yang digunakan adalah 50 Hz, kirakan pecutan.

A. 100.0 cm s^{-2}

B. 160.0 cm s^{-2}

C. 200.0 cm s^{-2}

D. 250.0 cm s^{-2}

7. Which shoe would exert the greatest pressure on the ground when worn by the same lady?

Kasut yang manakah akan mengenakan tekanan paling tinggi ke atas lantai jika dipakai oleh wanita yang sama?

A.

B.
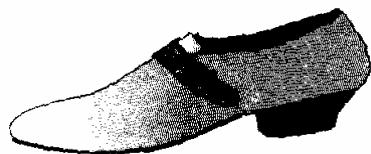
C.
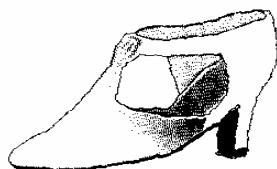
D.

8. Figure 5 below shows the pattern of oil dripping at a constant rate from a moving car.
Gambarajah 5 di bawah menunjukkan corak minyak menitis pada kadar seragam dari kereta yang sedang bergerak.
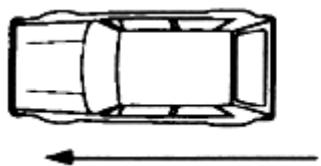
Direction of movement
(*Arah pergerakan*)

Figure 5

Which of the following describes the motion of the car?

Antara yang berikut, yang manakah menghuraikan gerakan kereta tersebut?

A. Acceleration followed by constant velocity

   Pecutan diikuti dengan halaju seragam

B. Deceleration followed by constant velocity

   Nyahpecutan diikuti dengan halaju seragam

C. Constant velocity followed by acceleration

   Halaju seragam diikuti dengan pecutan

D. Constant velocity followed by deceleration

   Halaju seragam diikuti dengan nyahpecutan

9. A 80 kg block of wood is pulled 50 m along a horizontal floor by a constant force exerted by a person, F = 100 N, which acts at a 60° angle as shown below. The floor is rough and exerts a frictional force, 20 N.

   Satu bongkah kayu berjisim 80 kg ditarik 50 m secara mengufuk pada permukaan lantai oleh seseorang dengan daya F = 100 N yang bertindak pada sudut 60° seperti dalam gambar rajah di bawah. Permukaan lantai adalah kasar dan mengenangkan daya geseran sebesar 20 N.
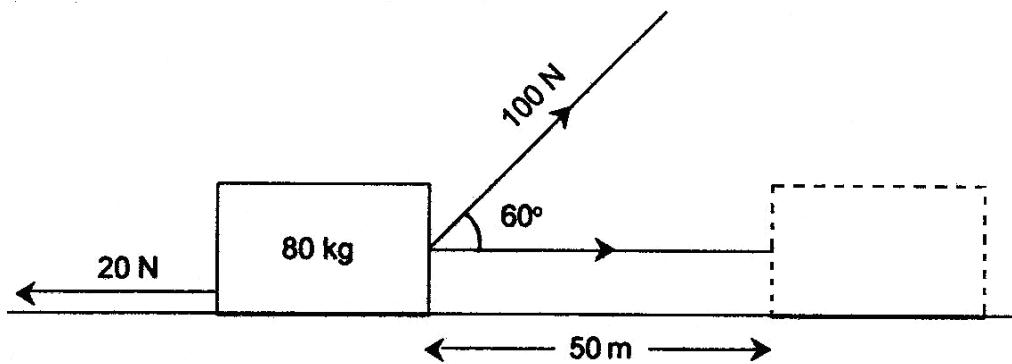
Determine the total work done on the wooden block.

Tentukan jumlah kerja yang dikenakan ke atas bongkah kayu itu.

A. 1 500 J

B. 1 400 J

C. 1 300 J

D. 1 200 J

10. Which of the following safety features in a vehicle is **not** designed to protect the driver during collision?

*Antara ciri keselamatan kenderaan berikut, yang manakah **tidak** betujuan untuk melindungi pemandu semasa pelanggaran?*

A. Reinforced driver compartment / *Ruang pemandu yang kukuh*

B. Side bars in vehicle doors / *Bar sisi dalam pintu kenderaan*

C. Shock absorbers / *Penyerap hentakan*

D. Air bags / *Beg udara*

11. Figure 6 below shows a picture is hung against a wall.

*Gambarajah 6 di bawah menunjukkan sekeping gambar tergantung di dinding.*
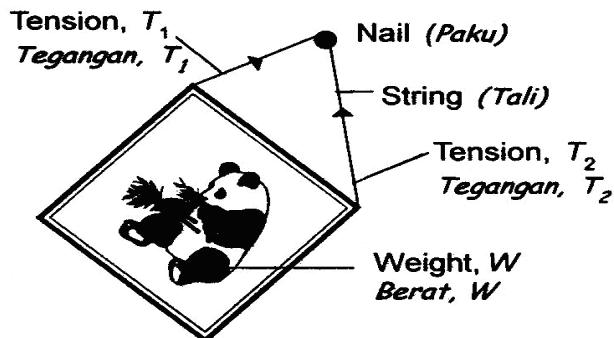
Figure 6

Which of the following vector diagram represents the forces T_1, T_2 and T_3 ?

Antara gambar rajah vektor berikut, yang manakah mewakili tindakan daya T_1, T_2 dan T_3 ?

A.
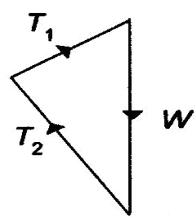
C.
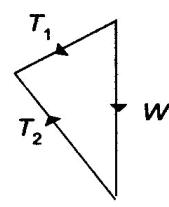
B.
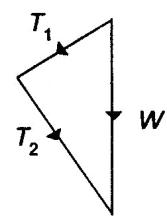
D.
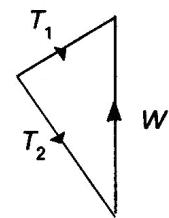
12. Figure 7 below shows a load is supported by the arrangement of springs P, Q and R. All the springs and the load are identical.

Gambarajah 7 menunujukkan satu beban digantung pada susunan spring P, Q dan R. Kesemua spring dan beban adalah serupa.
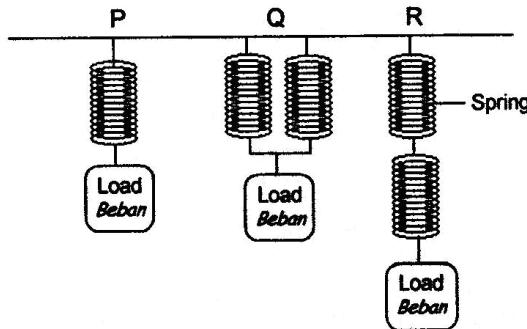
Figure 7

Which comparison is correct about the extension of P, Q and R?

Perbandingan yang manakah betul tentang pemanjangan P, Q dan R?

A. P = Q = R

B. R > P > Q

C. Q > P > R

D. R = Q > P

13. The diagram shows a velocity-time graph for the motion of a bus.

    Gambar rajah menunjukkan graf halaju melawan masa bagi satu gerakan sebuah bas.
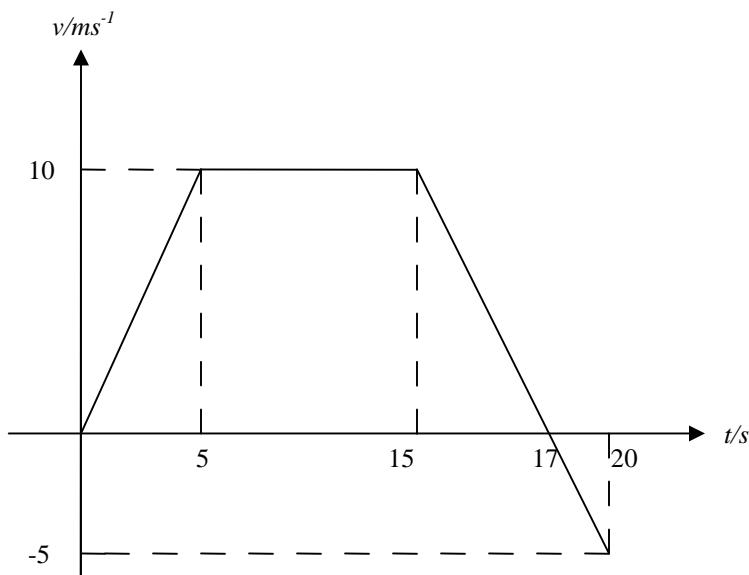
What is the displacement of the bus after 20 seconds?

Berapakah sesaran bas tersebut selepas 20 saat?

A. 135.0 m

B. 129.0 m

C. 128.5 m

D. 127.5 m

14. Figure 8 below shows the path of a marble rolling down a smooth slope.

    Gambarajah 8 menunujukkan lintasan sebiji guli yang berguling menuruni suatu cerun licin.

At which point the marble has the highest kinetic energy?

Pada kedudukan yang manakah tenaga kinetik guli itu paling tinggi?
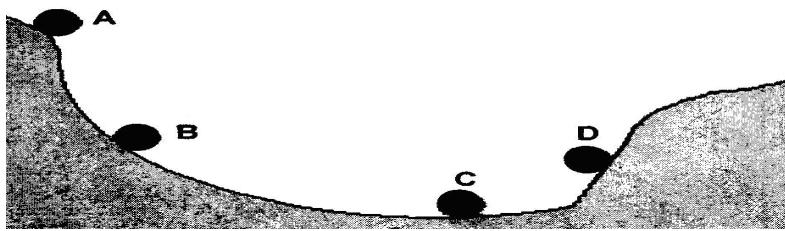
Figure 8

15. Figure 9 below shows a coin and a feather experiencing a free fall in a vacuum container,

    Gambarajah 9 di bawah menunjukkan sekeping duit syiling dan sehelai bulu ayam yang sedang jatuh bebas di dalam bekas vakum.
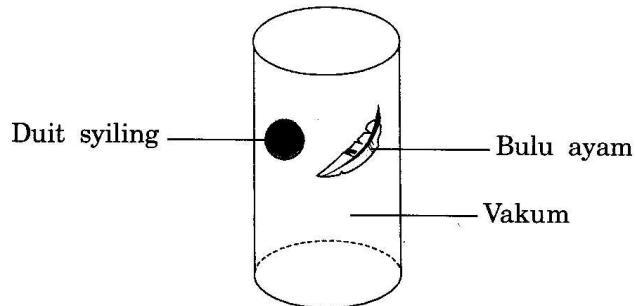
Figure 9

Which physical quantity of the motion is constant?

Kuantiti fizik yang manakah adalah tetap?

A. Velocity / *Halaju*

B. Pecutan / *Acceleration*

C. Momentum / *Momentum*

D. Kinetic energy / *Tenaga kinetik*

16. Figure 10 below shows a graph of force, *F,* against the extension, *x ,* for springs R and S.

    Gambarajah 10 menunjukkan graf daya F, *melawan pemanjangan, x , untuk spring* R *dan* S.
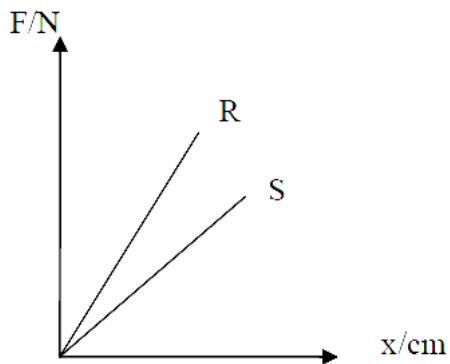
Figure 10

What is the conclusion derived from the graph?

Apakah kesimpulan yang diperolehi daripada graf itu?

A. Spring R is longer

    Spring R *lebih panjang*

B. The wire of the coils of spring R is thicker

    Wayar gegelung spring R *lebih tebal*

C. Both spring are made of the same material

    Kedua-dua spring diperbuat daripada bahan yang sama

D**.** The diameter of the coils of spring R is bigger

    Diameter gegelung spring R *lebih besar*

17. Ali is in a moving lift feels that his weight has become lighter.

    Ali yang berada di dalam sebuah lif yang sedang bergerak merasakan beratnya semakin berkurang.

Which of the following statement is true?

Antara pernyataan berikut, yang manakah benar?

A. The lift is decelerating downwards.

   Lif bergerak ke bawah dengan pecutan negatif.

B. The lift is accelerating downwards.

   Lif bergerak ke bawah dengan suatu pecutan.

C. The lift is accelerating upwards.

   Lif bergerak ke atas dengan suatu pecutan.

18. Which one of the situation below represents the application of pressure?

    Situasi manakah menunjukkan penggunaan konsep tekanan?

A.

C.

B.
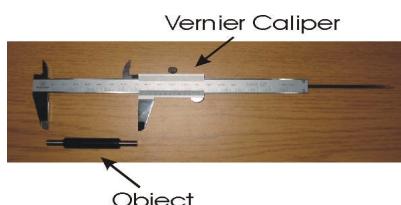
D.

19. Which of the instrument below is used for measuring atmospheric pressure?

    Alat manakah digunakan untuk mengukur tekanan atmosfera?

    A. bourdon gauge / *tolok bourdon*

    B. barometer / *barometer*

    C. pyrometer / *pyrometer*

    D. speedometer / *meter hadlaju*

20. Which of the situations below represents Pascal's principle.

    Manakah antara berikut mengaplikasikan prinsip Pascal?

    A.

    C.

    B.

    D.

21. In a hydraulic lift, a force of 100 N is applied to a piston with area of 5 cm^2. What is the pressure transmitted throughout the liquid?

100 N daya dikenakan pada piston input berkeluasan 5 cm^2 dalam pengangkat hidraulik. Kirakan jumlah tekanan terhadap cecair hidraulik tersebut.
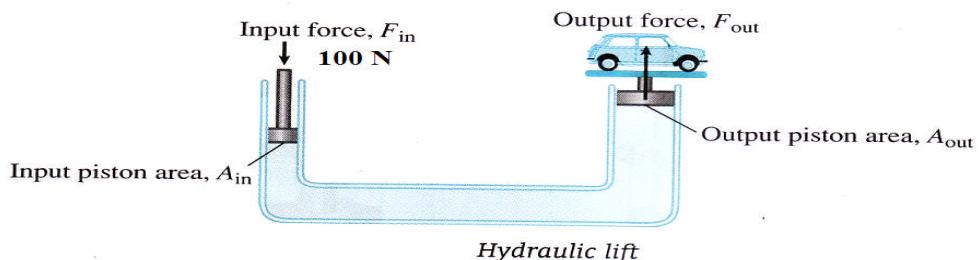
A. 500 Ncm^{-2}

B. 105 Ncm^{-2}

C. 20 Ncm^{-2}

D. 95 Ncm^{-2}

22. The atmospheric pressure is 760 mmHg and the difference in the mercury level of a manometer measuring the pressure of a gas is 40 mm. What is the pressure of the gas in mmHg?

Diberi tekanan atmosfera ialah 760 mmHg dan aras perbezaan merkuri dalam manometer di atas ialah 40 mm. Kirakan tekanan gas yang disalurkan dalam unit mmHg.
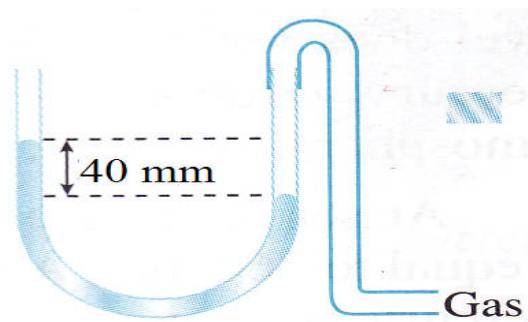
A. 760 mmHg

B. 720 mmHg

C. 800 mmHg

D. 780 mmHg

23. Two objects are said to be in thermal equilibrium if.

    Dua objek dalam keadaan keseimbangan terma sekiranya..

    A. there is massive net flow of heat between the objects

       terdapat sejumlah besar haba mengalir diantara objek-objek tersebut

    B. the temperature of both objects are differ

       Suhu kedua-dua objek adalah berlainan

    C. both objects are separated with an insulated layer

       kedua-dua objek dipisahkan dengan lapisan penebat

    D. there is no net flow of heat between the objects

       tiada aliran haba antara kedua-dua objek

24. Which of the graph below show the melting process of water?

    Manakah graf berikut menunjukkan proses pencairan air?

A.
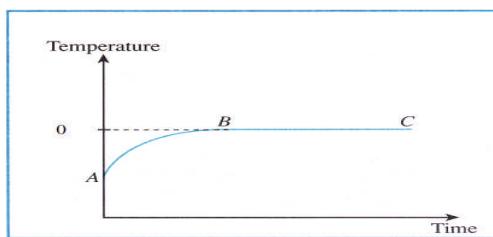
C.
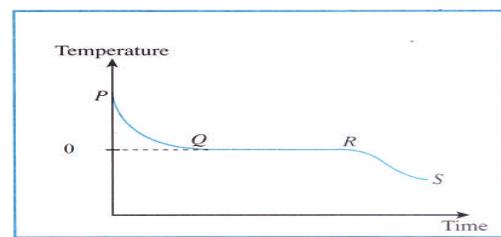
B.
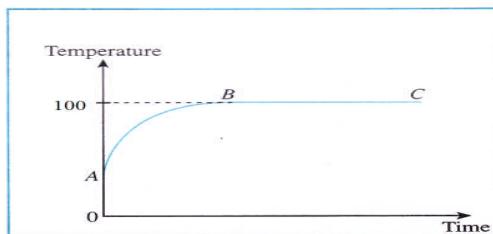
D.
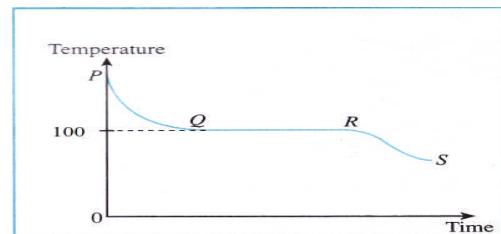
25. Picture below show the phenomenon of refraction of light **except**

*Gambar yang **tidak** menunjukkan fenomena pembiasan cahaya ialah*

A.

B.

C.

D.

26. Figure 11 below shows a pencil partially immersed in the water appear bent. Calculate the apparent depth, h if given the refractive index of water is 1.33.

    Gambarajah 11 di bawah menunjukkan sebatang pensel yang direndam dalam gelas berair kelihatan bengkok. Kirakan dalam ketara, h sekiranya indeks biasan air ialah 1.33
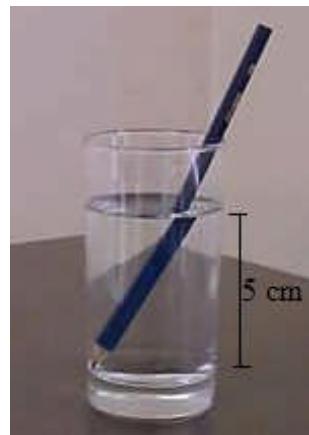
Figure11

A. 3.88

B. 3.76

C. 3.50

D. 3.11
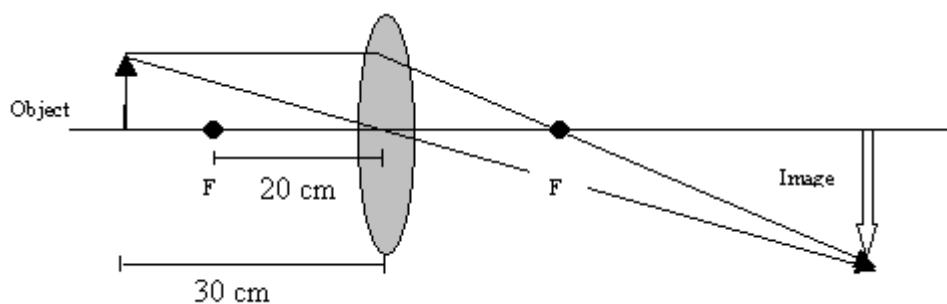
27. An object is placed in front of a convex lens of focal length 20 cm. Find the natural, position and magnification of image when the object distance is 30 cm.

    Satu objek diletakkan 30 cm daripada kanta cembung dengan nilai focus 20 cm. Kenalpasti ciri-ciri, kedudukan dan nisbah pembesaran imej yang terhasil.

| | **Nature** | **Position** | **Magnification** |
	Ciri-ciri	*Kedudukan*	*Pembesaran*
A.	Real, inverted, magnified	+60 cm	+2.0
B.	Virtual , upright, magnified	+40 cm	+1.3
C.	Real, inverted, diminished	-50 cm	-1.7
D.	Real, inverted, same size	+30 cm	1.0

28. The following graph shows the change of temperature with time as a solid is heated. Which of the following statements is **not correct**?

*Graf berikut menunjukkan perubahan suhu berdasarkan masa bagi suatu pepejal yang dipanaskan. Manakah pernyataan berikut adalah **tidak benar**?*
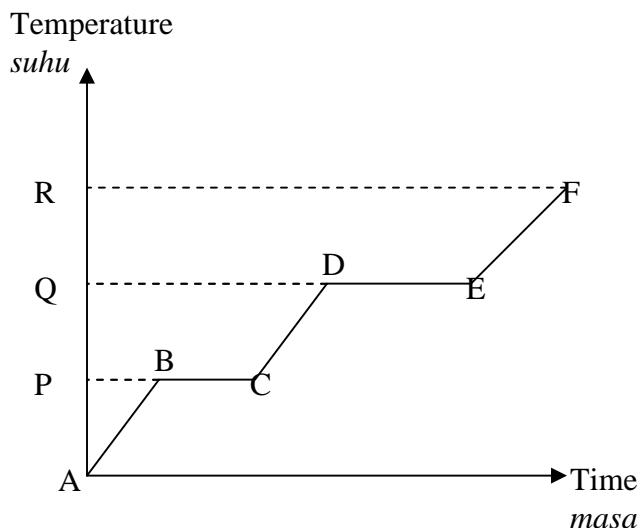
A. The energy being absorbed in BC is latent heat of fusion

Tenaga diserap di BC sebagai haba pendam pelakuran

B. The energy being absorbed in DE is latent heat of vaporisation

Tenaga diserap di DE sebagai haba pendam pengewapan

C. R is the boiling point of the liquid

R ialah takat didih cecair

D. P is the melting point of the solid

P ialah takat lebur cecair

29. The figure below shows a transverse waves formed by a rope.

Gambarajah di bawah menunjukkan gelombang melintang yang dihasilkan daripada tali.

16 cm

0 cm   15 cm   35 cm
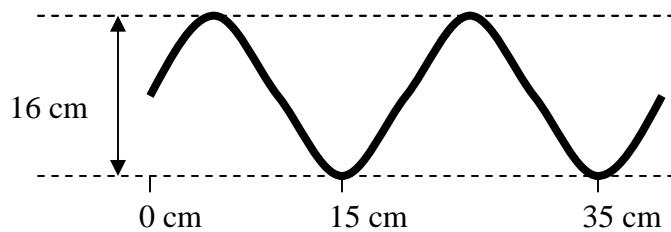
What is the wavelength and amplitude of the wave?

Berapakah panjang gelombang dan amplitud gelombang itu?

	Wavelength *Panjang gelombang*	Amplitude *Amplitud*
A.	15 cm	16 cm
B.	20 cm	8 cm
C.	20 cm	16 cm
D.	40 cm	8 cm

30. Figure 12 below shows a slinky spring being used to a create longitudinal waves.

Gambarajah 12 di bawah menunjukkan sebuah spring slinki yang digunakan untuk menghasilkan gelombang membujur.

P   Q   R   S   T
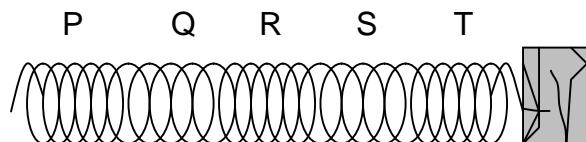
Figure 12

The wavelength of the waves is the distance between

Panjang gelombang bagi gelombang di atas adalah jarak di antara

A. P and Q

B. P and R

C. P and S

D. P and T

31. Figure 13 below shows a displacement-time graph of a particular wave.

Gambarajah 13 di bawah menunjukkan graf sesaran-masa bagi suatu gelombang.
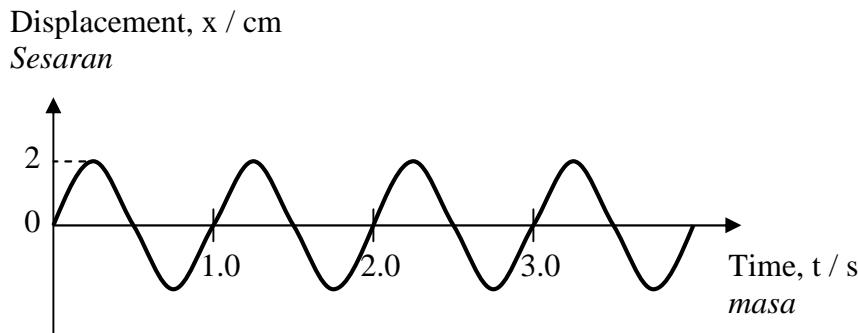
Figure 13

What is the period of a wave?

Berapakah tempoh bagi gelombang itu?

A. 0.5 s

B. 1.0 s

C. 1.5 s

D. 2.0 s

32. Figure 14 below shows the displacement-time graph of an oscillating spring.

Gambarajah 14 di bawah menunjukkan graf sesaran-masa bagi ayunan spring.
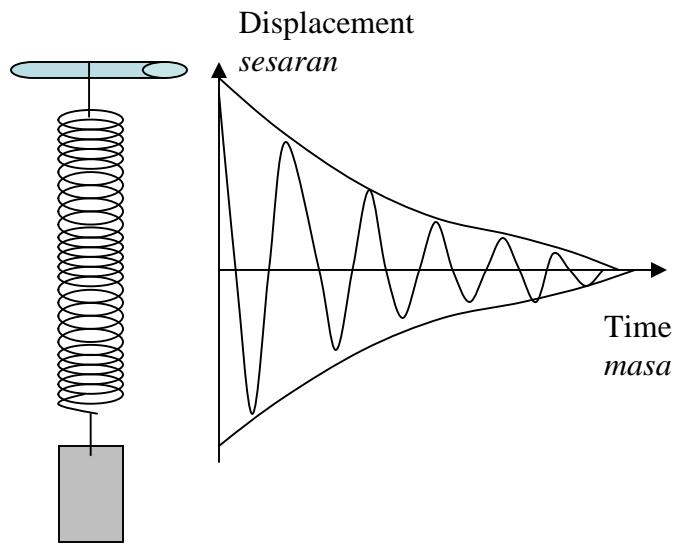
Figure 14

What oscillating system does the spring undergo?

Apakah sistem ayunan yang ditunjukkan?

A. Damping / *Pelembapan*

B. Resonance / *Resonan*

C. Forced oscillation / *Ayunan paksa*

D. Interference / *interferens*

33. Figure 15 below shows the water wave pattern formed when the dipper is placed at the centre of the ripple tank.

Gambarajah 15 di bawah menunjukkan corak gelombang air yang dihasilkan oleh penggetar yang diletakkan di tengah-tengah tangki riak.
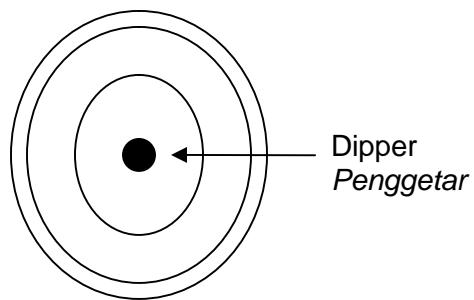
Figure 15

Which of the following is the possible side view of the ripple tank ?

Yang manakah antara berikut menunjukkan pandangan sisi pada tangki riak.

A.
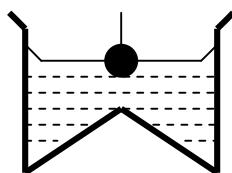
B.
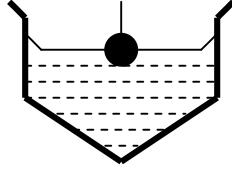
C.
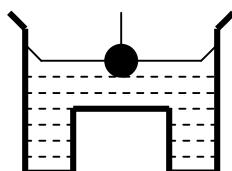
D.
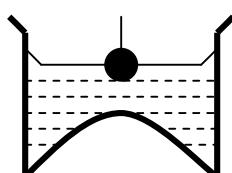
34. Which of the following diagrams shows the wave pattern **correctly** when plane waves passing through an obstacle?

Di antara gambarajah berikut yang manakah menunjukkan corak gelombang yang betul apabila gelombang satah melalui sebuah halangan?

A.

B.

C.

D.
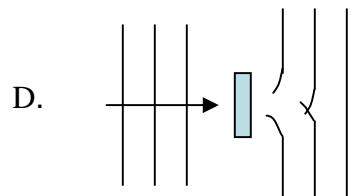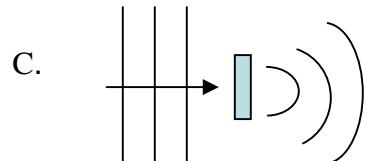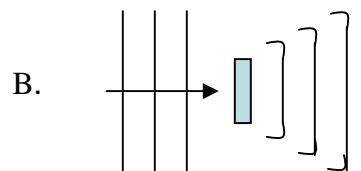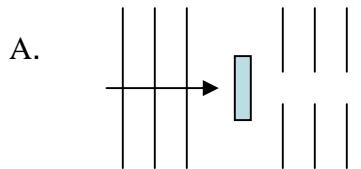
35. Figure 16 below shown the phenomenon of interference of water waves where S_1 is source 1 while S_2 is source 2.

Rajah di bawah menunjukkan fenomena interferens gelombang air dimana S_1 adalah sumber gelombang 1, manakala S_2 adalah sumber gelombang 2.
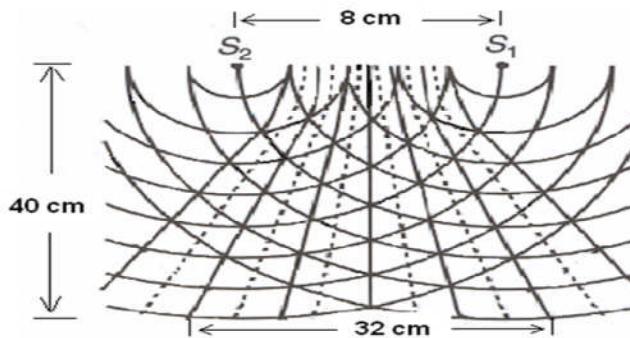
Figure 16

Find the wavelength of the water waves?

Tentukan nilai panjang gelombang air tersebut?

A. 0.8.cm

B. 1.6 cm

C. 3.2 cm

D. 6.4 cm

36. Which of the following about **P** and **Q** is **true ?**

Antara berikut yang manakah benar tentang P and Q

P	Q
Used in satellite communication.	High penetrating power.
Digunakan dalam komunikasi satelit.	*Kuasa penembusan tinggi.*
Used for cooking.	Used to kill cancerous cells.
Digunakan untuk memasak.	*Digunakan untuk membunuh sel kanser.*

A. *P* has a higher frequency than *Q*.

   Frekuensi P lebih tinggi daripada Q

B. *P* has a lower speed than *Q* in vacuum.

   Laju P adalah lebih rendah daripada Q didalam vakum.

C. *P* and *Q* have the same speed in vacuum.

   P dan Q mempunyai laju yang sama di dalam vakum.

D. *P* is a longitudinal wave and *Q* is a transverse wave.

   P adalah gelombang membujur dan Q adalah gelombang melintang.

37. Figure 17 below shows the current flowing through a circuit.

Gambarajah 17 di bawah menunjukkan aliran arus dalam sebuah litar.
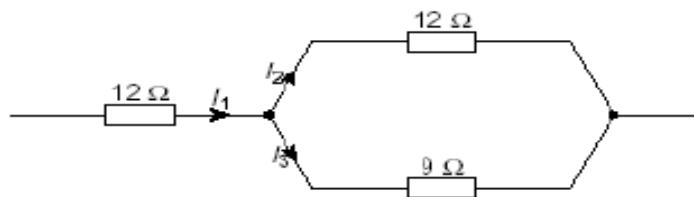
Figure 17

Which statement about current I_1, I_2 and I_3 is correct?

Di antara pernyataan berikut, yang manakah benar tentang arus I_1, I_2 dan I_3?

A. I_1 is equal to I_2 but bigger tha I_3

  I_1 sama dengan I_2 tetapi lebih besar daripada I_3

B. I_2 is bigger than I_3 but smaller than I_1.

  I_2 lebih besar daripada I_3 tetapi lebih kecil daripada I_1.

C. I_2 is equal to I_3 but smaller than I_1.

  I_2 sama dengan I_3 tetapi lebih kecil daripada I_1.

D. I_3 is bigger than I_2 but smaller than I_1.

  I_3 lebih besar daripada I_2 tetapi lebih kecil daripada I_1.

38. Figure 18 below shows two resistors are connected in parallel. The resistance is 2Ω in each resistor.

Gambarajah 18 di bawah menunjukkan dua perintang di sambungkan secara selari di dalam litar. Nilai rintangan masing-masing adalah 2Ω.
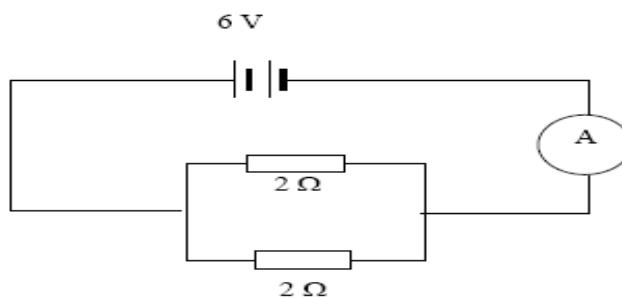
Figure 18

Find the reading of the ammeter?
Apakah bacaan ammeter tersebut?

A. 2.0 A

B. 4.0 A

C. 6.0 A

D. 8.0 A

39. An electric kettle connected to the 240 V main supply draws a current of 10 A. What is the power of the kettle?

Sebuah cerek elektrik disambung kepada bekalan utama 240 V menghasilkan arus elektrik sebanyak 10 A. Berapakah kuasa cerek elektrik itu?

A. 2000 W

B. 2400 W

C. 3600 W

D. 4800 W

40. Which of the followings will help to reduce wastage in electrical energy?

Yang manakah di antara berikut dapat membantu mengurangkan pembaziran tenaga elektrik?

A. Use filament lamps rather than fluorescent lamps, to light up a big hall.

Menggunakan lampu filamen berbanding lampu fluoresen untuk dewan yang besar.

B. When ironing clothes with electric iron, do large batches of clothing at one go.

Menseterika pakaian dalam kuantiti yang banyak pada satu masa apabila menggunakan seterika elektrik.

C. Cook the food with an electric oven immediately after taking it out from the freezer.

Memasak makanan dengan menggunakan ketuhar elektrik sebaik sahaja dikeluarkan dari peti sejuk.

41. The diagram below shows the electromagnetic patterns. Which one is **correct**?

   *Rajah di bawah menunjukkan corak electromagnet. Mana satukah menunjukkan corak yang **betul**?*
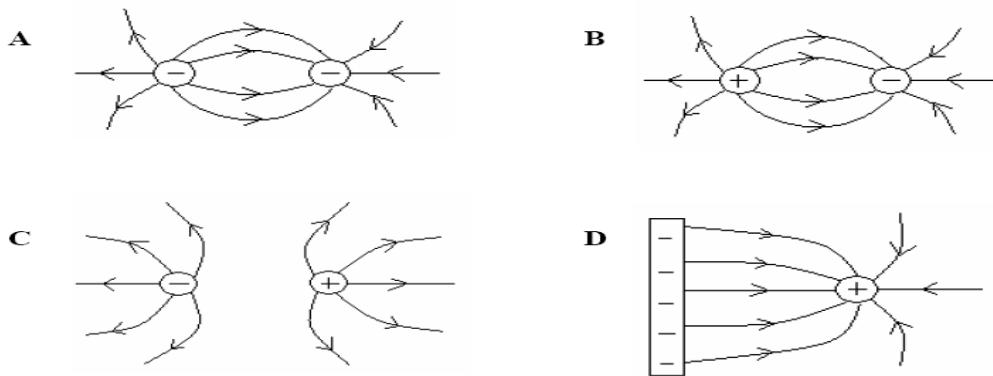
42. Figure 19 below shows an electromagnet.

   Gambarajah 19 di bawah menunjukkan sebuah electromagnet.
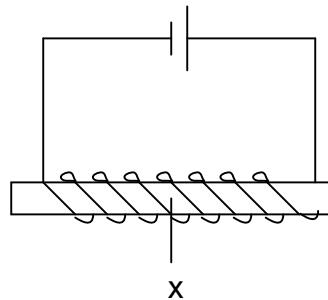
Figure 19

What is the change in the strength of the magnetic field at X when the soft iron core is pulled out of the coil ?

Apakah perubahan pada kekuatan medan magnet pada kedudukan X apabila besi lembut dikeluarkan daripada gegelung.

   A. Increases / *meningkat*

   B. Decreases / *berkurangan*

   C. Increases and then decreases / *Meningkat dan kemudian berkurangan*

   D. No change / *Tiada perubahan*

43. Which of the following is the output from a direct current generator?

Yang manakah di antara berikut adalah output daripada janakuasa arus terus?

A.

C.

B.

D.
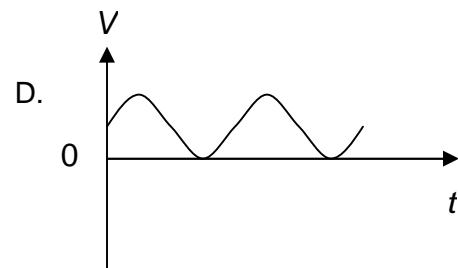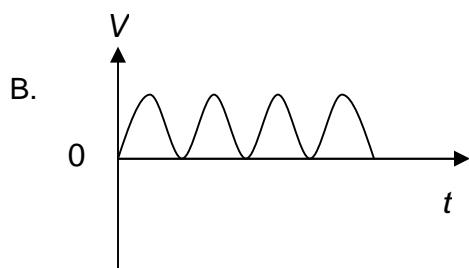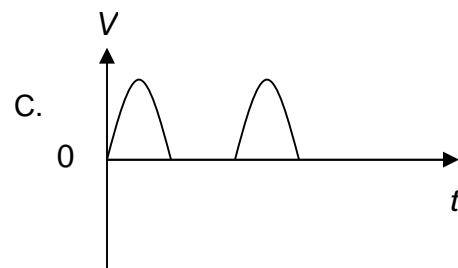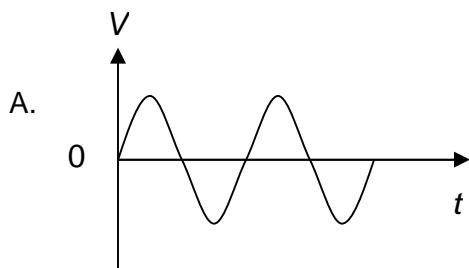
44. Figure 20 below shows a transformer supplying a voltage to light up a bulb at normal brightness.

Gambarajah 20 di bawah menunjukkan sebuah transformer bekalan beza keupayaan untuk menyalakan mentol dalam kecerahan normal.

I_p
6 A

240 W

48 W
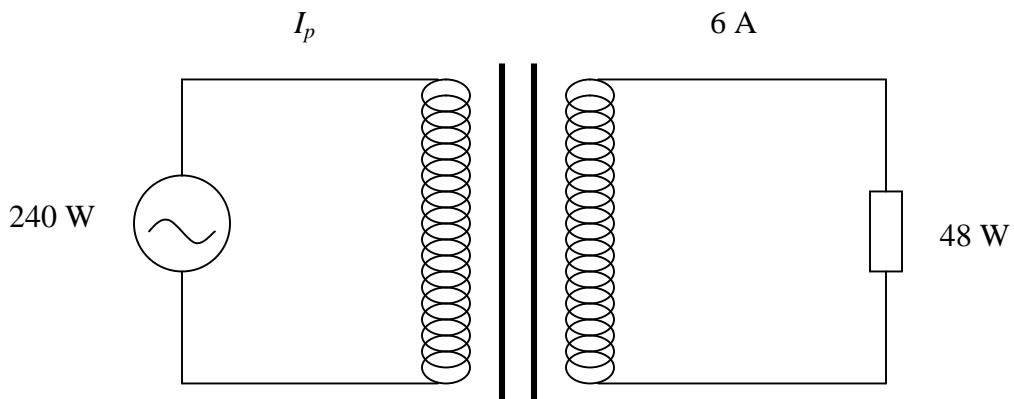
Figure 20

What is the current I_P?

Berapakah arus I_P?

A. 1.2 A

B. 1.6 A

C. 2.2 A

D. 2.6 A

E. 6.2 A

45. The electrons in a cathode-ray tube are produced by

   Penghasilan electron dalam sinar katod adalah hasil daripada

   A. Friction. / *geseran*

   B. Heating of metal filament. / *pemanasan filamen*

   C. Ionization of air. / *pengionan udara*

   D. Interaction of fluorescent material. / *tindakbalas bahan f*

46. Figure 21 below shows the arrangement of silicon atoms after an atom X is doped to form an extrinsic semiconductor.

   Gambarajah 21 di bawah menunjukkan susunan atom-atom silicon selepas atom X didopkan untuk menghasilkan ektrinsik semikonduktor.
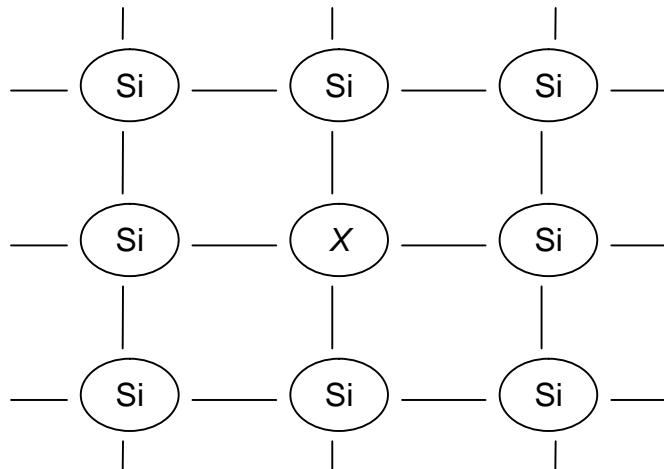
Figure 21

Which of the following is **not true?**

*Di antara pernyataan berikut, yang manakah **tidak benar**?*

A. The conductivity of the semiconductor increases. / *Kekonduksian semikonduktor meningkat.*

B. The semiconductor becomes an n-type. / *Semikonduktor adalah jeni-n*

C. The majority charge carrier is electron. / *Majoriti cas pembawa adalah electron.*

D. Atom X is a trivalent atom. / *Atom X adalah atom trivalen.*

47. Figure 22 below shows a logic circuit.

Gambarajah 22 di bawah menunjukkan sebuah litar logik.
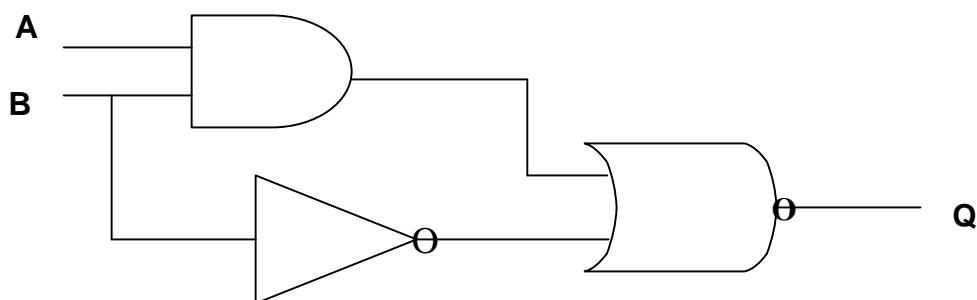
Figure 22

When output Q is 1, input A and B are

Jika output Q adalah 1, input A dan B adalah

	A	**B**
A.	0	0
B.	0	1
C.	1	0
D.	1	1

48. Figure 23 below shows a full-wave rectification circuit.

Gambarajah 23 di bawah menunjukkan rektifikasi gelombang penuh sebuah litar.
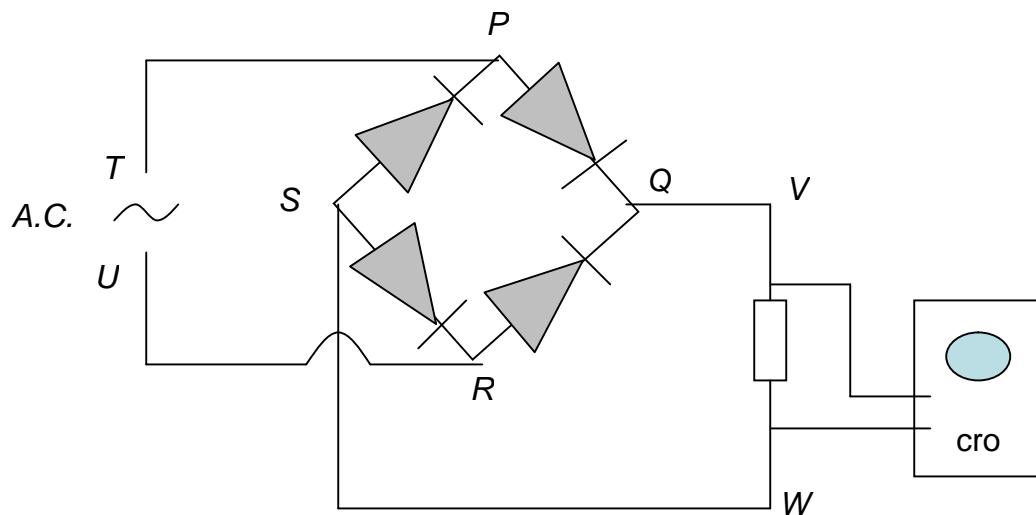
Figure 23

Which one of the possible paths of current flow?

Mana satukah mungkin urutan aliran arus?

A. T → P → Q → V → W → S → R → U

B. T → P → S → W → V → Q → P → T

C. U → R → S → P → Q → V → W → S → P → T

D. U → R → Q → V → W → S → R → U

49. The equation below shows the decay of krypton-89.

   Persamaan di bawah menunjukkan pancaran dari kripton-89.

   $$_{36}^{89}Kr \rightarrow {}_{37}^{89}Rb + {}_{-1}^{0}a + b$$

   What are *a* and *b?*

   Apakah yang diwakili oleh a dan b?

	A	B
A.	α -particle / *zarah alfa*	γ -ray / *sina* gama
B.	β -particle / *zarah beta*	γ -ray / *sinar* gama
C.	α -particle / *zarah alfa*	β -particle / *zarah beta*

50. A ratemeter a count of 900 counts per minute at 9.00 a.m. from a radioactive source. At 10.20 a.m. on the same day, the count rate has dropped to 225 counts per minute. What is the half-life of the radioactive source?

   Sebuah pembilang mencatatkan 900 bilangan per minit daripada sumber radioaktif pada jam 9.00 pagi. Pada jam 10.20 pagi hari yang sama, kadar bilangan menurun kepada 225 bilangan per minit. Berapakah separuh hayat sumber radioaktif itu?

   A. 40 minutes / *40 minit*
   B. 60 minutes */ 60 minit*
   C. 80 minutes */ 80 minit*
   D. 120 minutes / *120 minit*

END OF QUESTIONS

SOALAN TAMAT

ANSWER SCHEME

EXCELL II PHYSIC PAPER 1

2009

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

SULIT

JABATAN PELAJARAN NEGERI SABAH

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED
(JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU)

1. *Tulis nama dan kelas anda pada ruangan yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa.*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Malaysia.*
4. *Calon dibenarkan menjawab keseluruhan Atau sebahagian soalan sama ada dalam bahasa Inggeris atau dalam bahasa Melayu*

Untuk Kegunaan Pejabat			
Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	6	
	2	5	
	3	6	
	4	7	
	5	10	
	6	8	
	7	9	
	8	9	
B	9	20	
	10	20	
C	11	20	
	12	20	
	Jumlah		

Kertas soalan ini mengandungi 26 halaman bercetak.

[Lihat sebelah]

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

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

2. $a = \dfrac{v - u}{t}$

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

4. Momentum $= mv$

5. $F = ma$

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

7. Gravitational Potential Energy $= mgh$

8. Elastic Potential Energy $= \dfrac{1}{2}$ Fx

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

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

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

12. Heat, $Q = mc\theta$

13. Heat, $Q = m\ell$

14. $\dfrac{PV}{T} = $ constant

15. $E = mc^2$

16. $v = \lambda f$

17. Power, $P = \dfrac{Energy}{Time}$

18. $\dfrac{1}{f} = \dfrac{1}{u} + \dfrac{1}{v}$

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

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

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

22. $n = \dfrac{1}{\sin c}$

23. $Q = I\,t$

24. $V = IR$

25. Power, $P = IV$

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

SECTION A

[60 marks]

Answer **all** questions in this section

1. Figure 1 shows a micrometer screw gauge when the jaws are closed.

   Rajah 1 menunjukkan sebuah tolok skru mikrometer semasa rahangnya rapat.
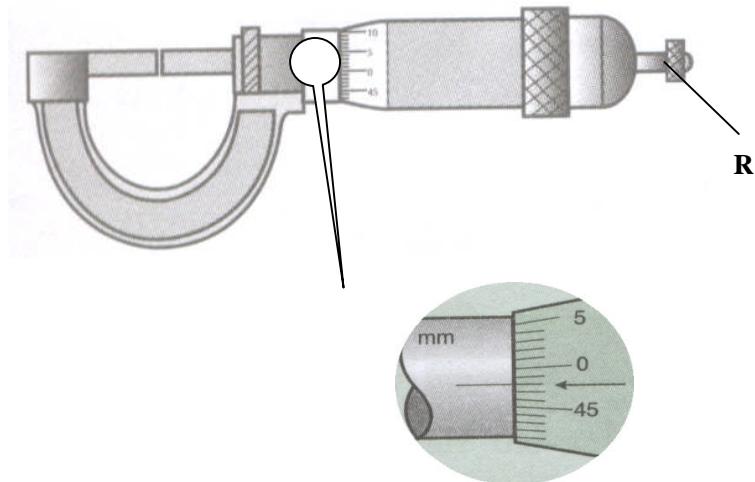
   FIGURE 1
   RAJAH 1

   a) Name the part label R.

   Namakan bahagian berlabel   R.

   _____

   [1 mark]

   b) What is the function of the part label R?

   Apakah fungsi bahagian berlabel   R ?

   _____

   [1 mark]

   c) What is the value of zero error shown by the micrometer above?

   Berapakah nilai ralat sifar yang ditunjukkan oleh tolok skru mikrometer di atas?

   _____

   [1 mark]

3

d) Identify the sensitivity of the micrometer screw gauge and the sensitivity of the vernier calipers.

Kenalpastikan kepekaan tolok skru micrometer dan kepekaan angkup vernier.

_____

[2 marks]

e) Give one reason why the measurement from the micrometer screw gauge is more accurate compare to a vernier callipers.

Berikan satu sebab tolok skru mikrometer adalah alat yang lebih jitu berbanding dengan angkup vernier .

_____

[1 mark]

2. Figure 2(a) shows a man standing 1 m away from a plane mirror.

   Rajah 2(a) menunjukkan seorang lelaki berdiri 1 m di hadapan sebuah cermin satah.

plane mirror / *cermin satah*
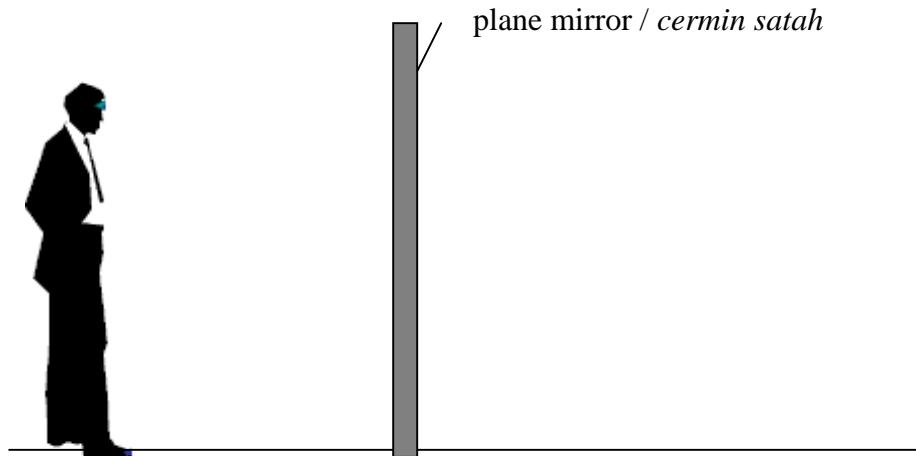
FIGURE 2(a)

RAJAH 2(a)

(a) The man walks 3 m away from the mirror. What is the distance between the man and his image now?

Lelaki tersebut berjalan 3 m menjauhi cermin. Berapakah jarak di antara lelaki tersebut dengan imejnya sekarang?

_____

[1 mark]

(b) i). Determine the minimum length of the mirror needed for the man to see his whole image.

Tentukan panjang minimum cermin yang diperlukan oleh lelaki tersebut untuk melihat keseluruhan imejnya.

_____

[1 mark]

ii). On Figure 3(a), draw a ray diagram to support your answer in quetion (b) i.

Pada Rajah 3(a), lukiskan garis sinar bagi menyokong jawapan pada b(i).

[2 marks]

(c) Figure 2(b) shows a periscope using a pair of glass prisms.

Rajah 2(b) menunjukkan sebuah periskop yang menggunakan sepasang prisma kaca.
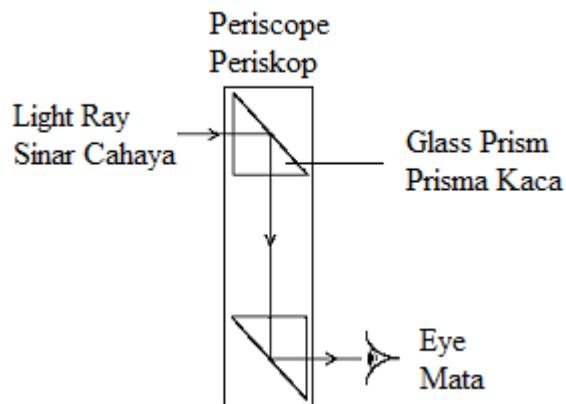
FIGURE 2(b)

RAJAH 2(b)

Give one advantage using a pair of glass prisms instead of a pair of plane mirrors

*Berikan **satu** kelebihan menggunakan sepasang prisma kaca berbanding cermin satah.*

_____

[1 mark]

3. Figure 3 shows the arrangement of the apparatus used to determine the atmospheric pressure in a laboratory. The length of the glass tube is 110 cm and the atmospheric pressure in the lab is 76cm Hg.

Rajah 3 menunjukkan satu susunan radas digunakan untuk menentukan tekanan atmosfera di dalam makmal. Panjang tiub kaca adalah 110 cm dan tekanan atmosfera di dalam makmal adalah 76 cm Hg.
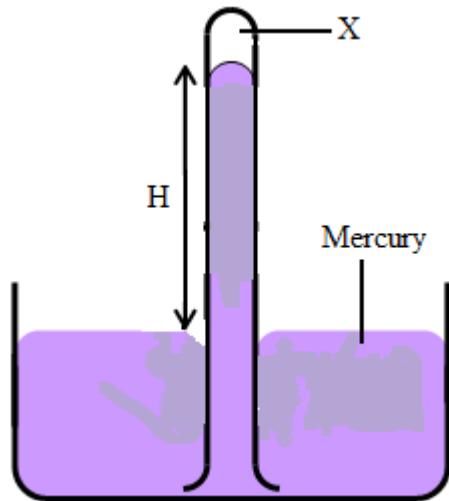
FIGURE 3
RAJAH 3

(a) Name the apparatus shown in Figure 3.

Namakan radas yang ditunjukkan pada Rajah 3.

_____

[1 mark]

(b) What is X?

Apakah X?

_____

[1 mark]

(c) (i) What is the value of H?

Apakah nilai H?

_____

[1 mark]

7

(ii)   What happens to the height, H, when this apparatus is submerged in water.

   Apakah yang berlaku kepada ketinggian, H, apabila radas ini ditenggelamkan ke

   dalam air.

   _____

[1 mark]

(iii)   Give a reason for your answer in c(ii).

   Berikan satu sebab kepada jawapan anda di c (ii).

   _____

[1 mark]

(d)   State one application of atmospheric pressure in everyday life.

   Nyatakan satu aplikasi tekanan atmosfera dalam kehidupan harian.

   _____

[1 mark]

4. Figure 4 shows the shape of the water waves propagate through two difference areas, PQ and QR. Water waves are transverse waves.

Rajah 4 menunjukkan bentuk suatu gelombang air yang merambat melalui dua kawasan berlainan, PQ dan QR. Gelombang air adalah gelombang melintang.
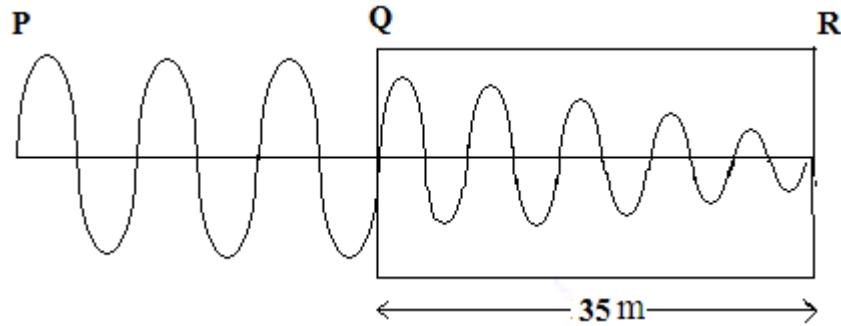
FIGURE 4
RAJAH   4

(a) What is meant by "transverse waves"?

Apakah yang dimaksudkan dengan gelombang melintang ?

_____

[1 mark]

(b) State the two physical changes in figure 4.

Nyatakan dua perubahan fizikal pada Rajah 4.

_____

[2 marks]

(c) Explain the two physical changes stated in question (b).

Terangkan dua perubahan fizikal   yang dinyatakan pada soalan (b) .

_____

_____

[2 marks]

(d)   Given that the   length of QR is 35m and the wave frequency in that region is 4 Hz. Calculate the speed of the wave in region QR.

Diberi panjang QR ialah 35 m dan frekuensi gelombang di kawasan itu adalah

4 Hz. Hitungkan halaju gelombang di kawasan QR.

[2 marks]

5.

Figure 2a(i)   Figure 2a(ii)
Rajah 2a(i)   *Rajah 2a(ii)*

Figure 2a(i) shows a boy pushing a shopping cart at the start of a shopping trip and Figure 2a(ii) shows the cart at the end of the shopping trip.

Rajah 2a(i) menunjukkan seorang budak sedang menolak sebuah troli pada permulaan sesi membeli belah dan Rajah 2a(ii) menunjukkan troli tersebut pada akhir sesi membeli belah.

(a).

(i) Define mass.

Berikan definasi jisim.

_____

[1 mark]

(ii) State whether mass is scalar quantity or a vector quantity.

Nyatakan sama ada jisim adalah kuantiti skalar ataupun kuantiti vektor.

_____

[1 marks]

(b).

(i) Compare the mass of the cart in Figure 2a(i) and Figure 2a(ii).

Bandingkan jisim troli di dalam Rajah 2a(i) dan Rajah 2a(ii).

_____

[1 mark]

(ii) Which cart would be more difficult to start moving?

Troli yang mana satu lebih sukar untuk dimulakan gerakannya?

_____

[1 mark]

(iii) Which cart would be more difficult to stop once it's moving?

Troli yang mana satu adalah lebih sukar untuk dihentikan jika ia sedang ditolak?

_____

[1 mark]

(iv) Based on your answers in b(i)-(iii), state the relationship between mass and the rate of change in motion.

Berdasarkan jawapan anda di b(i)-(iii), nyatakan hubungan antara jisim dengan kadar perubahan gerakan.

_____
_____

[1 mark]

(c). Name the physics concept involved in (b).
Namakan konsep fizik yang terlibat di (b).

_____
[1 marks]

(d).
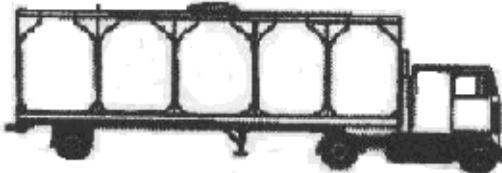
Tanker with 5 small tanks
Lori tanki dengan 5 tangki kecil

Figure 2b(i)
Rajah 2b(i)
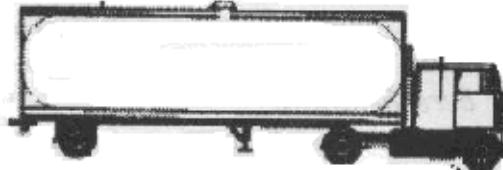
Tanker with 1 large tank
Lori tangki dengan 1 tangki besar

Figure 2b(ii)
Rajah 2b(ii)

Figure 2b(i) and Figure 2b(ii) show tankers with the same capacity but built differently.
Rajag 2b(i) dan Rajah 2b(ii) menunjukkan lori tangki yang mempunyai kapasiti yang sama tetapi dibina berbeza.

(i) Which tanker is safer to be used?
Lori tangki yang mana satukah yang lebih selamat digunakan?

_____
[1 mark]

(ii) Explain your answer in (d)(i).
Terangkan jawapan anda di (d)(i).

_____
[2

mark]

12

6.

(i)   (ii)

Figure (a)

Rajah(a)

(i)   (ii)
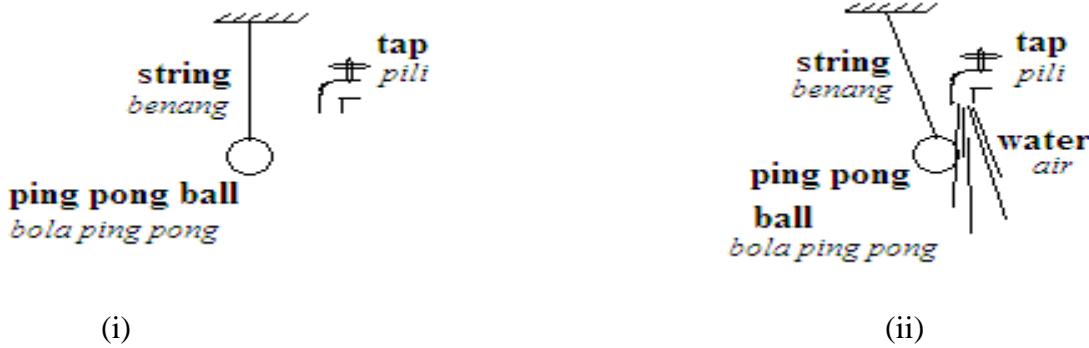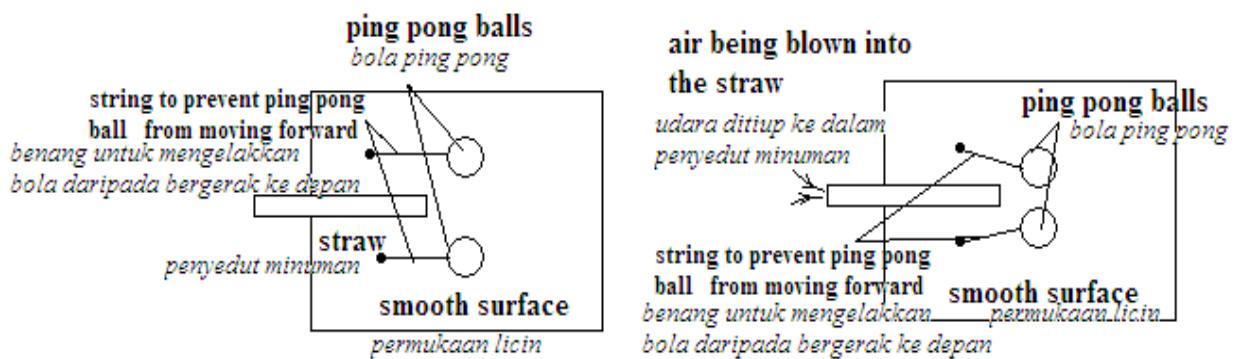
Figure (b)

Rajah (b)

(a). What is velocity?

Apakah halaju?

_____

[1 mark]

(b). Figure (a) shows what happens when a freely hanging ping pong ball is placed near a tap with no running water and a tap with running water.

Figure (b) shows what happens when there is no air blown through the straw and when air is blown through the straw.

Rajah (a) menunjukkan keadaan sebiji bola ping pong yang tergantung secara bebas dan diletakkan dekat dengan ppili air yang kering dan pili air yang sedang memencutkan air.

Rajah (b) menunjukkan keadaan semasa tidak ada udara ditiup malaui penyedut minuman dan apabila udara ditiup melalui penyedut minuman.

(i) Describe the observations in Figures (a)(ii) and (b)(ii).

Huraikan pemerhatian yang dilakukan dalam Rajah (a)(ii) dan Rajah (b)(ii).

_____

<div align="right">[1 mark]</div>

    (ii) Compare the speed of air between the two ping pong balls in Figure (b)(i) and Figure (b)(ii).

        Bandingkan laju udara di antara bola ping pong dalam Rajah (b)(i) dan Rajah (b)(ii).

_____

<div align="right">[1 mark]</div>

    (iii) In Figure(b)(ii), mark with a 'P', to indicate the position where the air pressure is low.

        Di dalam Rajah (b)(ii), tandakan kedudukan di mana tekanan udara adalah rendah dengan huruf 'P'.

<div align="right">[1 mark]</div>

    (iv) Based on your answers in (b)(ii) and (iii), relate the speed of the air to the pressure of the air.

        Berdasrakan jawapan anda dalam (b)(ii) dan (b)(iii), nyatakan hubunganantara lahu udara dengan tekanan udara.

_____

<div align="right">[1 mark]</div>

    (v) Name the principle involved.

       Namakan prinsip yang terlibat.

_____

<div align="right">[1 mark]</div>

(c). "It is dangerous for a child to stand near a fast moving train."

Using a suitable physics concept, explain the statement.

"Adalah berbahaya untuk seorang budak berdiri dekat dengan sebuah keretapi yang sedang bergerak dengan laju yang tinggi."

Gunakan satu konsep fizik untuk menerangkan kenyataan di atas.

_____
_____

<div align="right">[2 marks]</div>

7.
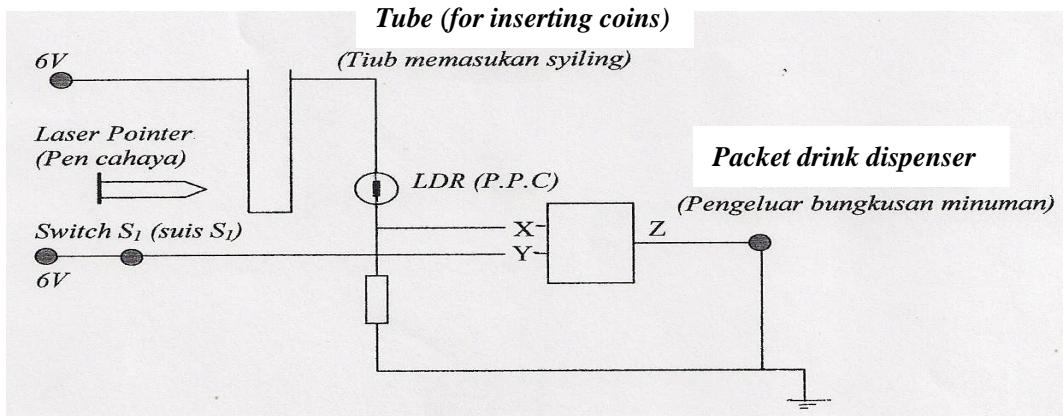
The circuit above is used to control a vending machine for packet drink. The packet drink is dispensed by the machine when a coin with a definite size is inserted and switch S_1 is turned on. A packet drink will be released by the dispenser when the output Z is 1.

Litar di atas adalah digunakan untuk mengawal sebuah mesin minuman layan diri. Minuman kotak hanya dikeluarkan oleh mesin minuman layan diri itu jika syiling dengan size tertentu dimasukkan melalui lubang syiling dan suis S_1 dipasangkan. Minuman kotak akan dikeluarkan apabila output Z ialah 1.

(a) Before the coin is inserted into the tube, state the input of *X*.

Sebelum syiling dimasukkan, nyatakan input bagi X.

_____

[1 mark]

(b) If a coin is inserted into the tube;

Jika sebiji syiling dimasukkan melalui tiub lubang syiling;

(i) What happens to the resistance of the LDR?

Apa akan berlaku kepada rintangan perintang peka cahaya (P.P.C)?

_____

[1mark]

(ii) What is the input of *X* now?

Apakah input X sekarang?

_____

[1 mark]

(c) Construct a truth table to show the inputs and outputs for the vending machine used.

Binakan jadual kebenaran untuk menunjukkan input dan output bagi mesin minuman layan diri itu.

[2 marks]

15

(d) Form a Boolean equation based on the truth table obtained and name the logic gate that should be used.
Bentukkan persamaan Boolean berdasarkan kepada jadual kebenaran; dan namakan Get logik patut digunakan.

_____

_____

[2 marks]

(e) Identify and state the weakness of the circuit used. Suggest a method to overcome the weakness.
Tentukan kelemahan litar yang digunakan. Cadangkan cara yang boleh diguna untuk mengatasi kelemahan tersebut.

_____

_____

[2 marks]

8.

Activity
Aktiviti

220

70

10   40   *t / min*

Graph (a)

m / g

10

2.5

30   *t / min*
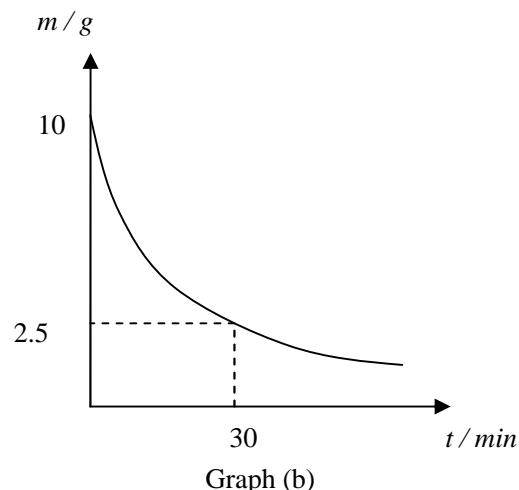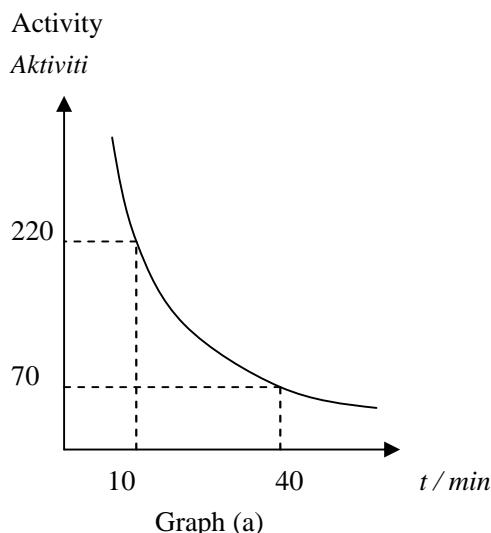
Graph (b)

Graph (a) shows the activity of a nucleus *X* vary with time. Graph (b) show how the mass of the nucleus *X* vary with time. Both the activities are carried out under the same conditions to determine the half life of nucleus *X*.

Graf (a) menunjukkan aktiviti nukleus X yang berubah dengan masa pereputan. Graf (b) menunjukkan jisim nuklues X yang berubah dengan masa pereputan. Kedua-dua aktiviti dijalankan dalam keadaan yang sama untuk menentukan separuh hayat bagi nuklues X.

(a) What is meant by the term,
    Apa yang anda faham dengan istilah-istilah berikut;
   (i) Half life
      Separuh hayat

_____

[1 mark]

  (ii) Background count
      Bacaan latar belakang

_____

[1 mark]

(b) Between the 2 methods used to determine the half life of a nucleus, which method is more practical? Give reason to justify your choice.
    Di antara 2 kaedah yang digunakan untuk menentukan separuh hayat bagi nukleus X, kaedah yang manakah lebih praktikal? Berikan alas an bagi jawapan anda.

_____

_____

[2 marks]

(c) Estimate the half life of the nucleus from the results of the two graphs above.
    Anggarkan separuh hayat bagi nukleus X daripada kedua-dua graf di atas.
   (i) Graph (a)
      Graf (a)

17

_____

(ii) Graph (b)
      Graf (b)

_____

[1 mark]

(d)State the reason that causes the difference between the half life determined from the 2 activities.

Nyatakan sebab yang menyebabkan perbezaan di antara separuh hayat yang ditentukan dari graf (a) dan (b).

_____

[1 mark]

(e)Suggest the correct method to rectify the error made.

Cadangkan kaedah yang boleh dijalankan untuk mengatasi kesilapan yang dinyatakan dalam soalan (d).

_____

[2 marks]

Section B
Answer one question only.
Jawab satu soalan sahaja.

1. (a) What is meant by specific heat capacity?
        Apa maksud muatan haba tentu?   [2 marks]

    (b) A housewife found that the time taken to cook the same quantity of food when the wok is
        covered is shorter than when using the wok without its cover. Explain this statement.
        *Seorang suri rumahtangga mendapati masa untuk memasak kuantiti makanan yang sama
        dengan menutup makanan dengan tudung kuali adalah lebih pendek daripada tidak
        menggunakan tudung kuali. Terangkan pernyataan tersebut.*
                                                                        [3 marks]

    (c)
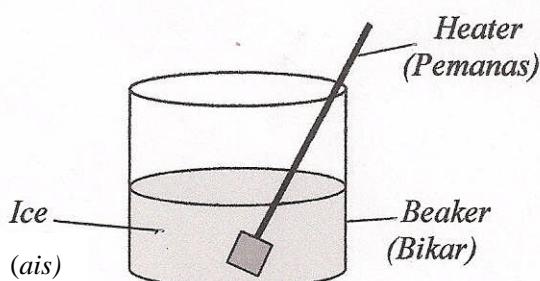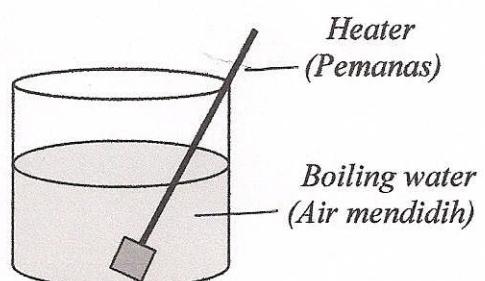
Figure (a)   **Figure (b)**

        Figures (a) and (b) show the quantity of ice and boiling water left behind after being heated
        for 10 minutes. Initially, the quantity of the ice and the boiling water used are the same.
        The power of the 2 heaters used are identical too.
        Compare the rate of the mass loss by the ice and the boiling water.
        Compare the physical change by the ice and the boiling water.
        Relate the rate of mass loss and the physical change to deduce a physics concept from it.

        *Rajah (a) dan (b) menunjukkan baki kuantiti ais dan air mendidih tertinggal selepas
        dipanaskan selama 10 minit. Pada mulanya, kuantiti ais dan air mendidih diguna adalah
        sama. Kuasa kedua-dua pemanas yang digunakan adalah sama.*
        Bandingkan kadar kehilangan jisim oleh ais dan air mendidih.
        Bandingkan perubahan fizikal oleh ais dan air mendidih.
        *Kaitkan kadar kehilangan jisim dengan perubahan fizikal dan nyatakan konsep fizik
        tersebut.*   [5 marks]

(d) Anandon bought a new resort home in Kundasang. He finds that the house is not comfortable because of the coolness; especially at night. He decides to install a heating system to overcome the problem. The heating system used by him needs to heat up the floor before heat up the air in the house. Discuss the design of the heating system from the aspect of the

(i) Heating agent used.

(ii) Material and structure of the piping system to transfer heat through the floor.

Anandon membeli sebuah rumah rehat di Kundasang. Dia rasa kurang selesa tinggal di rumah itu kerana kesejukan; khasnya pada waktu malam. Dia ingin memasang sebuah sistem pemanas untuk mengatasi masalah itu. Sistem pemanas digunakan perlu memanas lantai sebelum memanas udara di dalam rumah. Bincangkan rekabentuk sistem pemanas dari segi

(i) Agen pemanas digunakan

(ii) Bahan dan struktur paip untuk menghantar haba melalui lantai. [10 marks]

2. (a) State Fleming's left hand rule.
   Nyatakan Hukum Tangan Kiri Fleming. [2 marks]

   (b) From the aspect of the component and the working principle, state the difference between a D.C motor and an A.C dynamo.
   Dari segi komponen dan carakerja, nyatakan perbezaan di antara sebuah motor D.C dan sebuah dynamo A.C. [3 marks]

   (c)

   Motor A   Motor B
   Figure (a)   Figure (b)
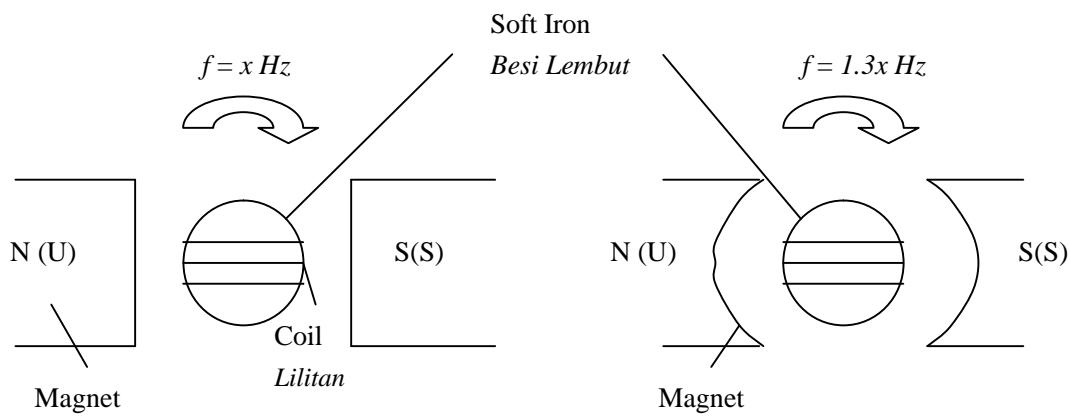
   The magnetic flux, the current and the number of coils used in both the motors are the same.
   Compare the shape of the magnet used in the 2 motors.
   Compare the efficiency of the 2 motors.
   Correlate the shape of the magnet used with the efficiency and deduce a relevant physics concept.
   Fluks magnet, arus dan bilangan lilitan diguna dalam kedua-dua motor di atas adalah sama.
   Bandingkan bentuk magnet digunakan dalam kedua-dua motor.
   Bandingkan kecekapan kedua-dua motor.
   Hubungkaitkan bentuk magnet dengan kecekapan motor kemudian bentukkan konsep fizik terlibat. [5 marks]

(d) James buys a new bigger fishing boat. When he transfers the motor from his previous fishing boat to the new boat, he finds that the power of the motor is low. But he has no more money to buy a new motor. He decides to modify the old motor by using new magnetic coil and replaced the permanent magnet with a electromagnet.

Based on the 2 ideas of James, suggest modifications can be done by him to upgrade the power of the old motor.

James membeli sebuah kapal yang mempunyai ruang yang lebih besar. Apabila dia memindah motor dari kapal lamanya ke kapal baru itu, ia mendapati kuasa motor itu adalah rendah. James tidak mempunyai wang untuk membeli motor baru. Dia cuba mengubahsuai motor lamanya dengan mengubah lilitan magnet yang menggantikan magnet kekal dengan sebuah electromagnet.

Berdasarkan kedua-dua idea James, cadangkan pengubahsuaian yang boleh dilakukan untuk meningkatkan kuasa motor lama itu. [10 marks]

Section C
Answer one question only.
Jawab satu soalan sahaja.

1. (a) What is meant by focal length?
       Apa yang anda faham dengan jarak focus? [2 marks]

   (b) Both the convex and concave lenses can be used to form magnified image. State the position of object and types of images formed by each lens. Which lens is more suitable to be used as a magnifying glass?
       Kedua-dua kanta cembung dan cekung boleh diguna untuk menghasilkan pembesaran imej. Nyatakan keadaan yang sesuai dan jenis imej yang dihasilkan oleh setiap kanta. Kanta yang manakah lebih sesuai diguna sebagai kanta pembesar? [4 marks]

   (c) The table below shows 5 different projectors and their characteristics.
       Jadual di bawah menunjukkan 5 projektor yang berbeza bersama dengan ciri-ciri tertentu.

Projector	Lens	Focal Length / cm	Object distance / cm	Diameter / cm
A	Convex	10	12	20
B	Concave	20	5	20
C	Convex	50	50	10
D	Convex	20	25	10
E	Concave	10	15	5

Projektor	Kanta	Jarak fokus / cm	Jarak Objek / cm	Diameter / cm
A	Cembung	10	12	20
B	Cekung	20	5	20
C	Cembung	50	50	10
D	Cembung	20	25	10
E	Cekung	10	15	5

   Explain the suitability of each characteristic so that the projector can form a bright and enlarged image on the screen. Select the most suitable projector that should be used.
   Terangkan keadaan yang diperlukan supaya projektor dapat menghasilkan imej yang terang dan membesar pada skrin. Pilihkan keadaan yang paling sesuai. [10 marks]

(d)

Convex Lens
Kanta Cembung

Image
Imej

Object
Objek

5 cm

45 cm

1 m
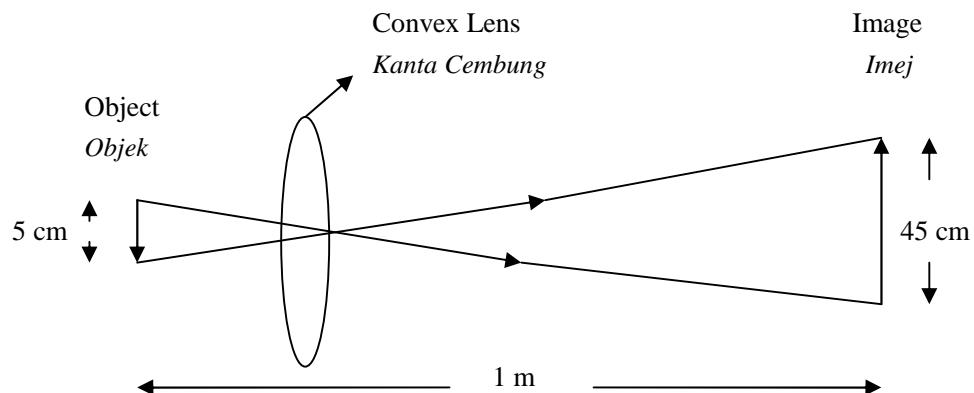
The figure above shows the image formed by a projector.
Rajah di atas menunjukkan imej yang dibentuk oleh sebuah projektor.

(i) Calculate the object distance used.
     Kirakan jarak objek yang digunakan.   [2 marks]

(ii) Determine the power of the lens used.
     Tentukan kuasa kanta yang digunakan.   [2 marks]

2. (a) Define *Potential Difference*.
   Takrifkan Beza Upaya. [1 marks]

(b) Nichrome wire is widely used as a heating filament. However, tungsten wire is more preferred as heating filament in the light bulb. Explain the statement.
   Wayar nikrom adalah luas digunakan sebagai wayar pemanas. Namun, wayar tungsten adalah lebih utama digunakan sebagai wayar pemanas dalam lampu. Terangkan kenyataan tersebut. [4 marks]

(c)

Items	Voltage / *V*	Power / *W*
Fan	240	60
Dish Washer	200	100
2 Decorative Light Bulbs	120	40
Resistor	/	/
Step-Up Transformer	/	/
Oven	800	1000
4 Switches	/	/

Items	Voltan / *V*	Kuasa / *W*
Kipas	240	60
Pencuci Pinggan	200	100
2 Lampu Hiasan	120	40
Perintang	/	/
Transformer Menaik	/	/
Oven	800	1000
4 Suis	/	/

The table above shows the electrical appliances bought by Ah Kong to install in his new house.
Jadual di atas menunjukkan alat elektrik yang dibeli oleh Ah Kong untuk dipasang di rumah barunya.
Show the connection of the circuit so that all the electrical appliances can work under normal condition.
Tunjukkan sambungan litar yang sesuai supaya setiap alat elektrik dapat berfungsi dalam keadaan normal.
Explain the connection used for each item in the circuit.
Berikan penerangan bagi setiap item yang disambung dalam litar itu. [10 marks]

(d)
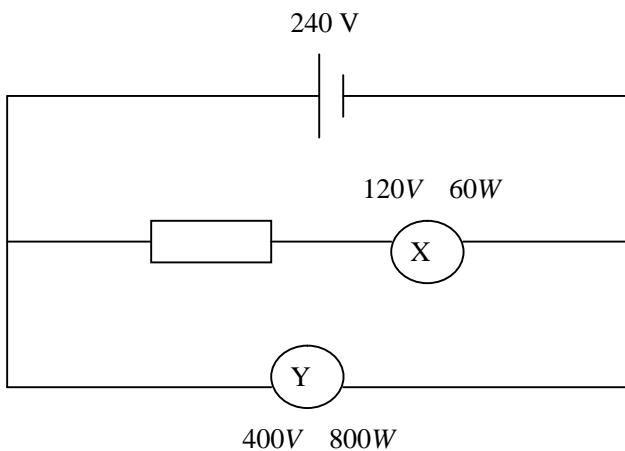
The circuit above shows the connection of 2 electrical appliances *X* and *Y*.

Litar di atas menunjukkan sambungan 2 alat elektrik X dan Y.

(i) Calculate the magnitude of the resistance of the resistor used so that the electrical appliance *X* works under normal condition.

   Kirakan nilai rintangan bagi perintang yang digunakan supaya alat elektrik X dapat berfungsi dalam keadaan normal. [2 marks]

(ii) Calculate the power consumed by electrical appliance *Y*.

   Kirakan kuasa yang diguna oleh alat elektrik Y. [3 marks]

Answer scheme for Pyhsic Paper TWO
Section A

Answer	Answer Schemes	Marks
1 (a)	Ratchet	1
(b)	To prevent the user from exerting undue pressure on the object @ To prevent the user from exerting too much pressure / over tightening	1
(c)	-0.02mm	1
(d)	0.01mm , 0.01cm	2
(e)	Able to measure the smallest unit 0.01mm / higher sensitivity	1
	TOTAL	**6**
2. (a)	4 + 4 = 8 m	1
(b)(i)	Half his height.	1
(ii)		2

Minimum required mirror

Virtual image
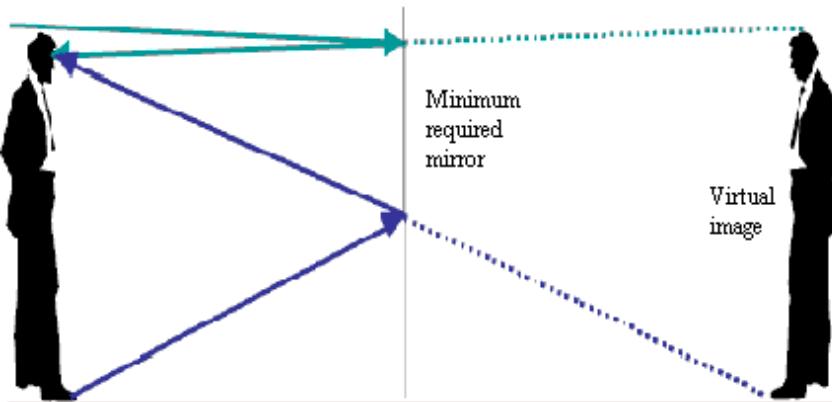
b (i) (ii)	Image formed is brighter (because all the light energy is reflected)//The image formed is clearer (as there are no multiple images formed as in the mirror)	1
	TOTAL	**5**
3.(a)	Barometer.	1
(b)	Vacuum.	1
I (i)	76 cm Hg.	1
(ii)	H increase.	1
(iii)	Because the total pressure increase.// The pressure outside glass tube increases // pressure of water + atmospheric pressure	1
(d)	Siphon, suction cup, vacuum cleaner, straw, syringe	1
	TOTAL	**6**
4.(a)	Vibration of particles in the medium is perpendicular to the direction of propagation of the wave	1
(b)	Wave travel from deeper region to shallower region	2
I	Energy Decrease Because amplitude decrease	2

(d) $\quad\quad\quad\quad\quad$ λ_{BC} = 35/5 = 7 m $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

$\quad\quad\quad\quad\quad\quad\quad\quad$ V_{BC} = λ f

$\quad\quad\quad\quad\quad\quad\quad\quad\quad$ = 7 x 4

$\quad\quad\quad\quad\quad\quad\quad\quad\quad$ = **28 m s^{-1}** $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ **Total** $\quad\quad\quad$ **7**

5.

(a) (i) $\quad$ mass is the amount of matter in a substance $\quad\quad\quad\quad\quad\quad$ 1

$\quad$ (ii) $\quad$ scalar $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

(b) i $\quad\quad$ mass of cart in Figure2a(ii) is bigger $\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

$\quad$ ii $\quad\quad$ cart in Figure2a(ii) $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

$\quad$ iii $\quad\quad$ cart in Figure2a(ii) $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

$\quad$ Iv $\quad\quad$ Bigger mass smaller rate of change of motion $\quad\quad\quad\quad\quad$ 1

(c) $\quad\quad\quad$ inertia $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

(d) i $\quad\quad$ tanker in Figure 2b(i) $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

$\quad$ ii $\quad\quad$ because the tanks are divided into 5 smaller tanks therefore the mass of the $\quad$ 2

$\quad\quad\quad\quad$ liquid in each tank would be smaller and hence the inertia would also be

$\quad\quad\quad\quad$ smaller.

$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ **Total** $\quad\quad\quad$ **10**

6.

(a) $\quad\quad\quad$ velocity is the rate of change of displacement $\quad\quad\quad\quad\quad\quad\quad$ 1

(b) (i) $\quad$ a(ii) the ping pong ball is attracted to the flowing water $\quad\quad\quad\quad$ 1

$\quad\quad\quad\quad$ b(ii) the two ping pong balls move towards each other

$\quad$ (ii) $\quad$ b(i) speed is slow $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

$\quad\quad\quad\quad$ b(ii) speed is faster

$\quad$ (iii) $\quad$ 'P' is between the two balls $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

$\quad$ (iv) $\quad$ when the speed of the air increases, the pressure of the air decreases $\quad$ 1

$\quad$ (v) $\quad$ Bernoulli's principle $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ 1

(c) $\quad\quad\quad$ When the train is moving fast, the velocity of air between the train and child $\quad$ 2

$\quad\quad\quad\quad$ will also be fast, this creates an area of low pressure between the child and the

$\quad\quad\quad\quad$ train. The child may be pushed/pulled towards the train

$\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ **Total** $\quad\quad$ **8**

7. (a) 0 (1)
    (b) (i) Resistance increases (1)
        (ii) 1 (1)
    (c)

X	Y	Z
0	0	0
1	0	0
0	1	0
1	1	1

(2)

(d) $X \bullet Y = Z$, AND gate (2)

(e) The coin in the tube can't be released. Switch S_1 should be connected to a coin release valve. (2)

Total : 9

8. (a) (i) Time taken for half of the number of atoms or activity to decrease by half from the initial value. (1)
        (ii) Reading obtained before radioactive source is used. (1)
    (b) Graph (a): Activity can be measure easily using Geiger Muller tube whereas mass is hard to measure. (2)
    (c) (i) A bit more than 30 min. (1)
        (ii) 30 min (1)
    (d) The activity recorded is affected by background reading. (1)
    (e) Record the background reading. Substract the background reading before plotting graph (2)

Total : 9

Answer: Section B:
1. (a) Heat energy required to raise 1 unit mass with $1°C$ [2 marks]
    (b) To trap the water vapour. [1 mark]
        Condensation of water vapour releases latent heat of vaporization to the food.
        [2 marks]
    (c) Rate of mass lost by ice is more than boiling water.
        [1 mark]
        Ice: solid → liquid   Boiling water: Liquid → gas
        [1 mark]
        Speasific latent heat of vaporization is more than specific latent heat of fusion
        [1 mark]
        To change 1 unit mass of liquid to gas need more energy than to change solid to liquid
        [1 mark]
        For the same matter, $l_{vaporization} > l_{fusion}$ [1 mark]
    (d)

Choice	Reason
Cooling agent in liquid form is preferred	It can absorb the heat and flow to other area
Specific heat capacity of the agent must be high	Can increase more heat energy absorbed
Boiling point of the agent must be high	Can absorb more heat energy
Material of the paip used must be a good conductor of heat	Rate of heat transferred to the floor is fast
Paip in coil structure is used	Increase the time of flow and increase the quantity of heat transferred.

        [5 marks]   [5 marks]
                                    Total : 20

2. (a) When the first finger, second finger and the thumb are extended with an angle of
        $90°$ to each other; the first finger shows the direction of the magnetic field, the second
        finger show the current and then the thumb show the direction of force generated.
        [2 marks]
    (b)

D.C Motor	A.C Dynamo
Need power supply	Need no power supply
Consist a pair of split ring commutator	Consist a pair of slip ring commutator
Transform electrical energy into mechanical energy	Transform mechanical energy into electrical energy.

        [3 marks]
    (c) Planar surface magnet and concave surface magnet. [1 mark]
        Figure (b) has higher efficiency [1 mark]
        Concave surface magnet produce radial magnetic field.
        The direction of force generated always act along the tangent of a circle. This produces
        smooth rotation and waste no energy. [2 marks]
        Radial magnetic flux always alters the direction of force generated to ensure smooth
        rotation. [1 mark]

(d)

Choice	Reason
Increase the number of the coil	Increase the total force generated
Increase the length of the coil	Increase the total force generated
Using thicker copper wire to generate magnetism	Reduce resistance to increase current
Increase the density of the coil to generate magnetism	Increase magnetic flux
Using concave surface soft iron	Produce radial magnetic field to ensure smooth rotation.

<div align="center">

[5 marks]   [5 marks]

Total : 20 marks

</div>

Answer :Section C

1.   (a)   Distance measure from the centre of a lens to the focal point (or diagram).

<div align="right">[2 marks]</div>

(b)

Convex	Concave
$2f > u > f$	$u < f$
Real, inverted, enlarged	Virtual, upright, enlarged
Not suitable because a screen is required	Suitable, no screen is required

<div align="right">[4 marks]</div>

(c)

Choice	Reason
Convex lens	Can form real image
Shorter f is preferred	Can increase the magnification
u a bit bigger than f	Can produce maximum magnification
Diameter should be larger	Increase the brightness of the image

<div align="center">

[4 marks]   [4 marks]

</div>

A is chosen because it is a convex lens with shorter f and bigger diameter and u is a bit bigger than f.

<div align="right">[2 marks]</div>

$$u = x, v = 1 - x, m = 9$$

(d)   (i) $$\frac{1 - x}{x} = 9$$

$$x = \frac{1}{10} m$$

<div align="right">[2 marks]</div>

       (ii) $$\frac{1}{u} + \frac{1}{v} = p$$

$$p = \frac{100}{9} D$$

<div align="right">[2 marks]</div>

2. (a) Potential difference is the ratio of the work done to the quantity change.   [1 mark]

   (b) Nichrome wire is an alloy with low rate of oxidation and its resistance does not vary with temperature. The melting point of tungsten is higher than nichrome.

   [4 marks]

   (c)

Circuit	Reason
	All appliances connected in parallel and with individual switch is to ensure each appliance get the right voltage and can be controlled individually.
	2 light bulbs are in series to share the voltage equally.
	The resistor work as potential divider to share the voltage with the dish washer.
	Transformer is to step up the voltage needed by the oven.

   [6 marks]   [4 marks]

   (d) (i) $R = 240\Omega$ (2 m)

       (ii) $R = 72\Omega$, $p = 800W$ (3m)

   Total : 20 marks

NAMA: _____

KELAS: _____

JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA 2009
EXCEL II
PHYSICS Kertas 3
Sept 2009

1 Jam 30 minit   Satu jam tiga puluh minit

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED
(JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU)

1. *Tulis nama dan kelas anda pada ruangan yang disediakan.*
2. *Kertas soalan ini adalah dalam dwibahasa*
3. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
4. *Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau dalam bahasa Melayu.*

	Untuk Kegunaan Pejabat		
Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
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. Ah Chong carried out an experiment to investigate the relationship between the
    rise in temperature of water and the mass of water. 100 g of water is poured into
    the beaker and the initial temperature is measured. The water heater is submerged.
    The switch and stopwatch switched on simultaneously. The water was stirred
    continuously. After 2 minutes, the stopwatch and water heater are switched off.
    The maximum water temperature is recorded. (Diagram not in scale)

    *Ah Chong menjalankan eksperimen untuk mengkaji hubungan antara kenaikan
    suhu air dengan jisim. 100 g air diisikan ke dalam bikar dan suhu awal air
    dicatatkan. Pemanas rendam dimasukkan ke dalam air. Suis dan jam randik
    dihidupkan serentak. Air dikacau secara berterusan. Selepas 2 minit, jam randik
    dan pemanas rendam dimatikan. Suhu maksimum air kemudiannya dicatat.(Rajah
   tidak mengikut skala)*
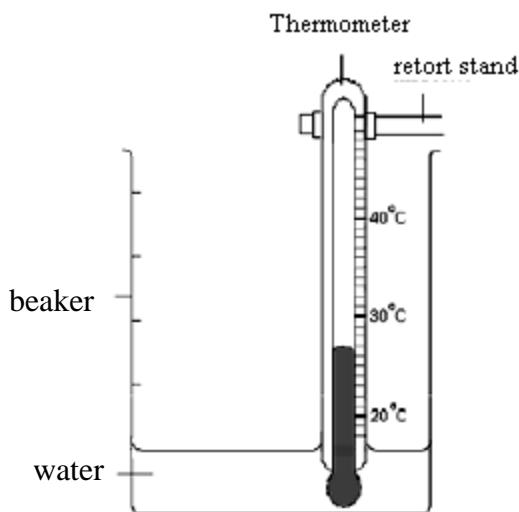
Diagram 1.1

Rajah 1.1

The experiment is repeated using mass of water 200 g, 300 g, 400 g and 500 g.
Diagram 1.2, 1.3, 1.4 ,1.5 and 1.6 shows the result from the experiment.
Eksperimen diulangi dengan menggunakan jisim air 200 g, 300 g, 400 g dan 500 g.
Rajah 1.2, 1.3, 1.4 ,1.5 dan 1.6 menunjukkan keputusan yang didapati dari
*eksperimen.*
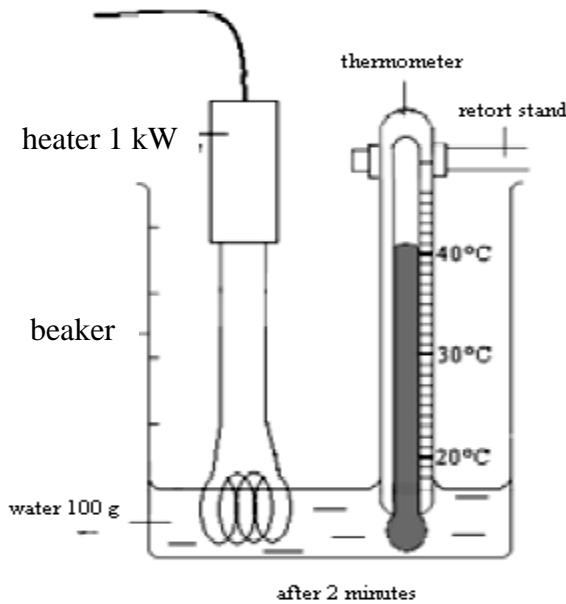
Diagram 1.2
*Rajah 1.2*
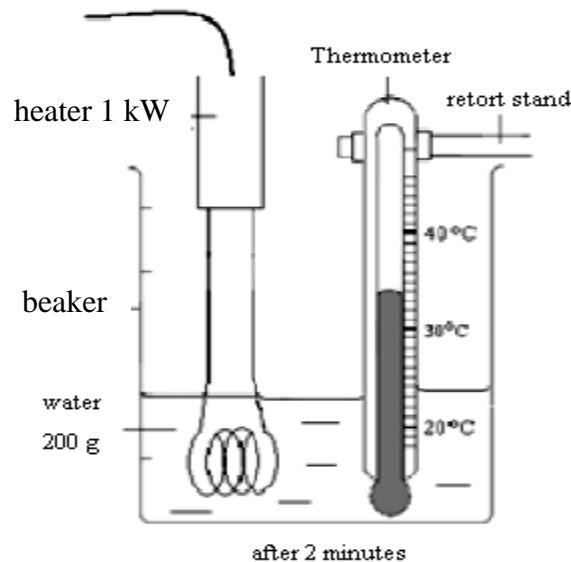
Diagram 1.3
Rajah 1.3
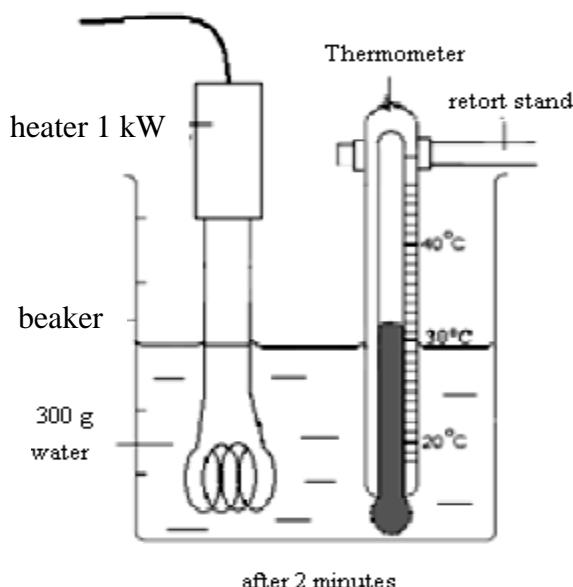
Diagram 1.4
Rajah 1.4
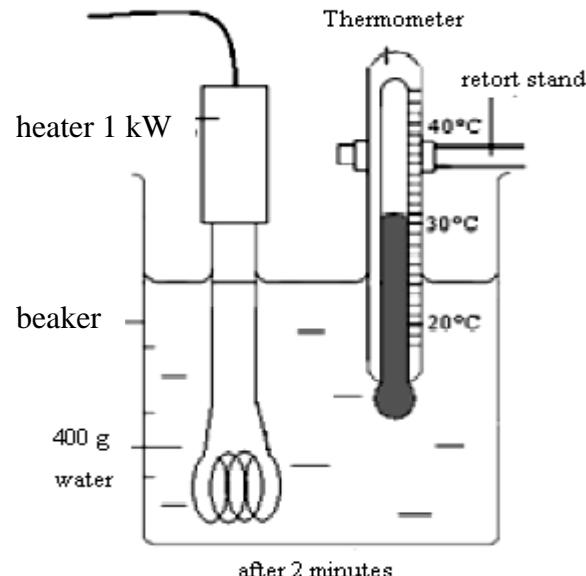
Diagram 1.5
Rajah 1.5
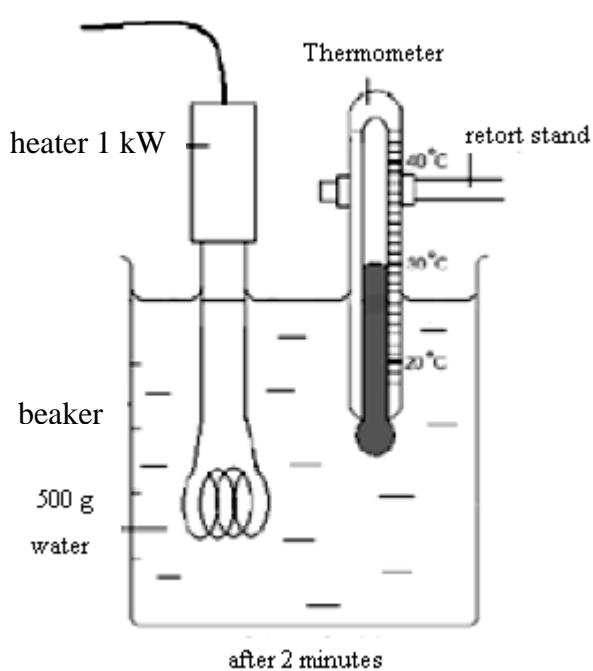
**Diagram 1.6**
Rajah 1.6

(a) Based on the aim and the procedure of this experiment, state;

Berdasarkan tujuan dan prosedur eksperimen ini , nyatakan ;

(i) Manipulated variable

pemboleh ubah dimanipulasikan.

………………… ……………………………………………………………………

(ii) Rresponding variable

pemboleh ubah bergerakbalas

…………………………………………………………………………………… 1 (a)

(iii) Constant variable

pemboleh ubah yang dimalarkan

…… ………………………………………………………………………………

3

[3 *marks*]

[3 *markah*]

(b) By referring to the diagram 1.2 to 1.6, record the temperature of the water and determine the rise in temperature for each case.

Dengan merujuk pada Rajah 1.2 hingga 1.6 rekodkan suhu air dan tentukan kenaikan suhu untuk setiap kes.

(i) Calculate the reciprocal for each m [2 *marks*]

Hitungkan salingan bagi setiap m [2 *markah*]

(ii) Tabulate your result for mass of water, *m*, reciprocal mass of water, $\dfrac{1}{m}$ and rise in temperature, θ in the space below.

Jadualkan keputusan anda bagi jisim air, m, salingan jisim air , $\dfrac{1}{m}$, dan kenaikan suhu , θ , pada ruang di bawah .

[4 *marks*]

[4 *markah*]

(c)   Based on your table, draw a graph to show the rise in temperature θ against reciprocal of water, $\dfrac{1}{m}$ on the graph paper provided.

Berdasarkan jadual anda, lukiskan graf kenaikan suhu , θ, melawan salingan jisim air, $\dfrac{1}{m}$, pada kertas graf yang disediakan.

[5 *marks*]

[5 *markah*]

1 c

5

(d)   From your graph, state the relationship between θ and $\dfrac{1}{m}$

*Daripada graf anda, nyatakan hubungan diantara θ dengan $\dfrac{1}{m}$.*

....

[2 *marks*]

[2 *markah*]

1 d

2

Graph of θ against $\dfrac{1}{m}$

Graf θ melawan $\dfrac{1}{m}$
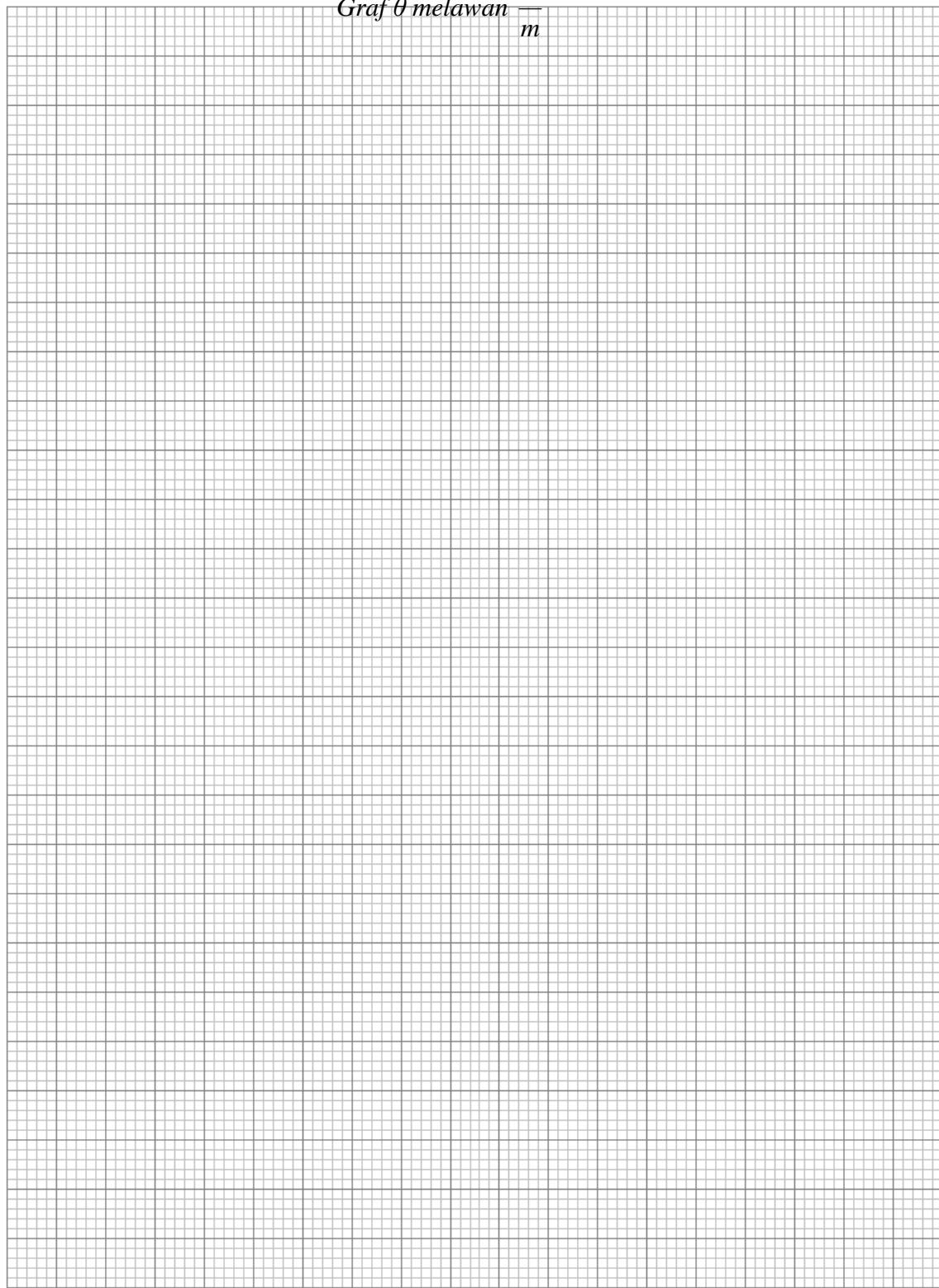
2. A student carried out an experiment to investigate the relationship between potential difference, *V*, across the terminal battery and the current, *I*. The student carried out this experiment by using the circuit shown in Diagram 2.1. The result of the experiment is shown in the graph of *V* against *I* in Diagram 2.2.

Seorang pelajar menjalankan eksperimen untuk mengkaji hubungan antara beza keupayaan, V, yang merentasi terminal bateri dengan arus, I. Pelajar itu menjalankan eksperimen ini dengan menggunakan litar seperti yang ditunjukkan pada Rajah 2.1. Keputusan eksperimen itu ditunjukkan oleh graf V melawan I seperti pada Rajah 2.2.
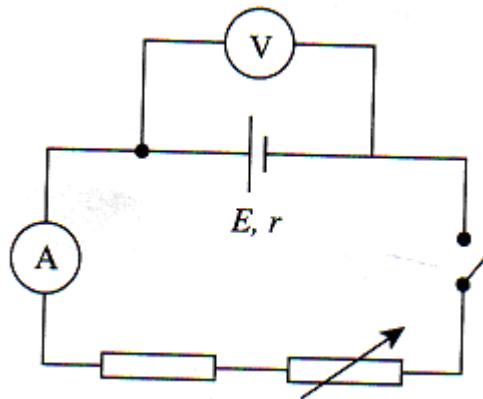

Diagram 2.1

Rajah 2.1
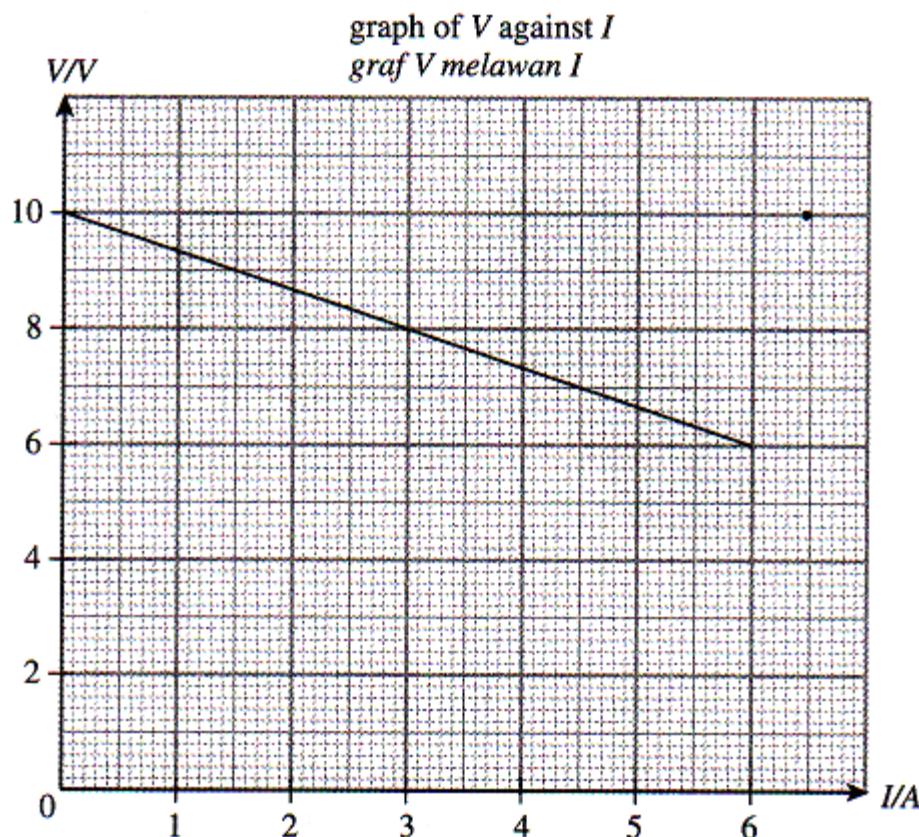
Diagram 2.2

Rajah 2.2

(a) State the relationship between *V* and *I*.

Nyatakan hubungan antara V dengan I.

_____

[1 *mark*]

[1 *markah*]

(b) The potential difference, *V*, which across the terminal of the battery can be related with the current, *I*, by the formula $V = -Ir + E$. Show on the graph how would you determine the electromotive force, *E*, and state its value.

Beza keupayaan, V, yang merentasi terminal bateri boleh dihubungkaitkan dengan arus, I oleh rumus $V = -Ir + E$. Tunjukkan pada graf itu bagaimana anda menentukan daya gerak elektrik, E, dan tentukan nilai itu.

_____

[2 *marks*]

[2 *markah*]

2 a

1

2 b

2

(c) By using the formula $V = -Ir + E$ in (a).

Dengan menggunakan formula $V = -Ir + E$ di (a).

(i) calculate the gradient of the graph of V against I. Show on the graph how you would determine the gradient of the graph.

hitungkan kecerunan bagi graf V melawan I. Tunjukkan pada graf itu bagaimana anda menentukan kecerunan itu.

[3 *marks*]

[3 *markah*]

2 c (i)

3
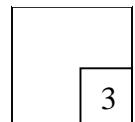
(ii) calculate the internal resistance of the battery that is used in the experiment.

*kirakan rintangan dalam bagi bateri yang digunakan dalam eksperimen itu.*

2 c (ii)

[2 *marks*]

[2 *markah*]

2
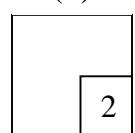
(d) By using the formula $V = -Ir + E$ and with the help of the graph, determine the total energy supplied by the battery when 3A of current flows through it for 5 minutes.

Dengan menggunakan rumus $V = -Ir + E$ dan bantuan graf, tentukan jumlah tenaga yang dibekalkan oleh bateri kepada litar itu apabila arus 3.0 A mengalir melaluinya selama 5 minit.

2 d

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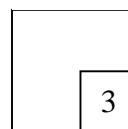
3

(e) State a precaution that should be taken when the experiment is being carried out.

Nyatakan satu langkah berjaga-jaga yang perlu diambil semasa eksperimen ini dijalankan.

2 e

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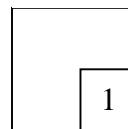
1

Section B
Bahagian B
[12 *marks*]
[12 *markah*]
Answer any **one** question from this section
*Jawab mana-mana **satu** soalan daripada bahagian ini*
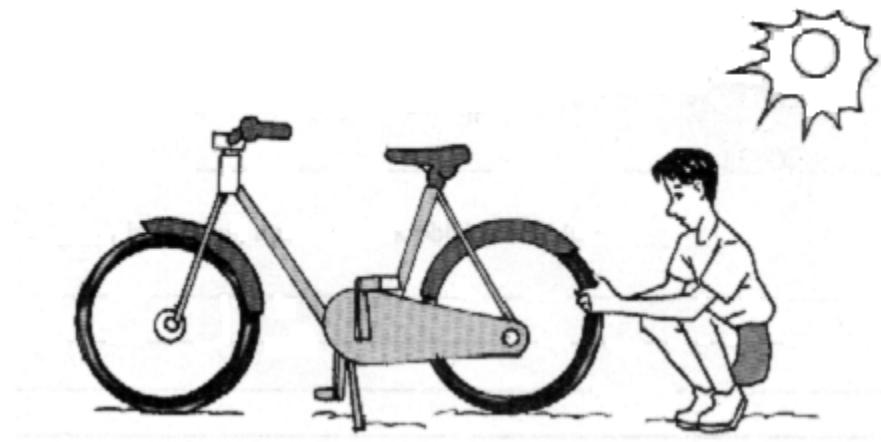
Diagram 3
Rajah 3

3. A boy found that his bicycle tyre expanded after he put under the hot sun as shown in diagram 3.

Seorang budak mendapati bahawa tayar basikalnya menjadi lebih keras selepas basikal itu diletakkan di bawah matahari yang panas terik seperti dalam rajah 3.

Based on the observation above:

Berdasarkan pemerhatian di atas:

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

Nyatakan satu inferens yang sesuai [1 *markah*]

(b) State the suitable hypothesis for investigation. [1 *mark*]

Nyatakan satu hipotesis yang sesuai untuk suatu penyiasatan. [1 *markah*]

(c) With the use of round bottom flask, Bourdon gauge and others, describe one experiment framework to investigate your hypothesis.

Dengan menggunakan radas seperti kelalang dasar bulat, tolok Bourdon dan lain-lain, terangkan satu rangka kerja eksperimen untuk menguji hipotesis anda.

 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

   pemboleh ubah 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 pemboleh ubah dimanipulasikan dan satu kaedah mengukur pemboleh ubah bergerak balas

(vi) the way you tabulate the data

   cara anda akan menjadualkan data

(vii) the way you analyse the data

   cara anda menganalisis data

[10 *marks*]

4. Diagram 4.1 shows a girl try to turn on the tv using infra red waves remote control but she fails because blocking by her naughty brother. Diagram 4.2 shows she could open the gate using radio waves remote control even though blocking by her naughty brother. Radio waves have longer wavelength compare to infra red.

Rajah 4.1 menunjukkan seorang budak perempuan cuba untuk menghidupkan tv menggunakan alat kawalan jauh infra merah tetapi gagal disebabkan oleh halangan adik lelakinya yang nakal. Rajah 4.2 menunjukkan dia boleh membuka pintu pagar dengan menggunakan alat kawalan jauh gelombang radio walaupun dihalang oleh adik lelakinya yang nakal. Gelombang radio mempunyai panjang gelombang yang lebih panjang berbanding infra merah.
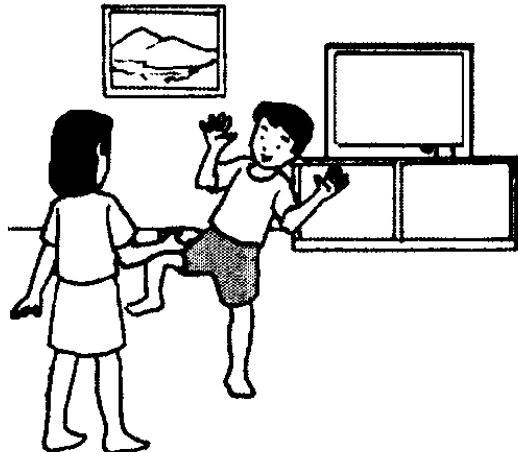
Diagram 4.1
Diagram 4.1
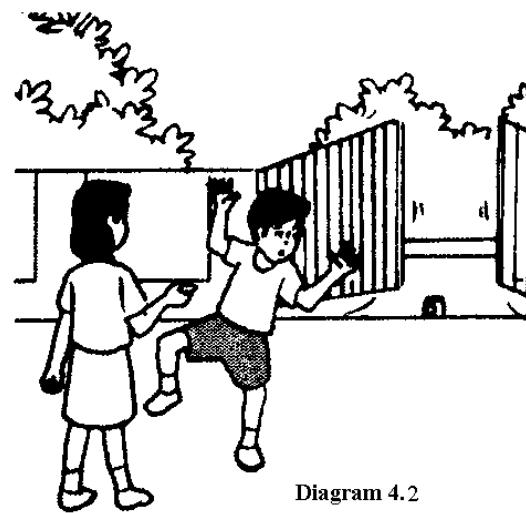
Diagram 4.2
Diagram 4. 2

Using your knowledge about wave.

Menggunakan pengetahuan anda tentang gelombang ;

(a) State the inference can be made.   [1 mark]

   Nyatakan inferens yang boleh dibuat.   [1 markah]

(b) State the suitable hypothesis for investigation.   [1 *mark*]

   Nyatakan satu hipotesis yang sesuai untuk suatu penyiasatan.   [1 *markah*]

(c) With uses of ripple tank, barrier and others apparatus, describe one experiment
framework to investigate your hypothesis.

Dengan menggunakan tangki riak, penghalang dan lain-lain radas,

terangkan satu rangka kerja eksperimen untuk menguji hipotesis anda

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

Pemboleh ubah 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 pemboleh

ubah dimanipulasikan dan satu kaedah mengukur pemboleh ubah bergerak

balas

(vi) The way you tabulate the data

Cara anda akan menjadualkan data

(vii) The way you analyse the data

Cara anda menganalisis data

[10 *marks*]

[10 *markah*]

End of the question

Soalan tamat

Skema Jawapan Fizik (kertas3) excel form 5, 2009

1.   i).MV: mass of water   1m
     ii) .RV: temperature   1m
     iii).CV: time for heating   1m

b)

$1/m$ kg^{-1}
10.0
5.0
3.3
2.5
2.0

2m

m / kg	$1/m$ kg^{-1}	θ ^{o}C
0.1	10.0	41
0.2	5.0	34
0.3	3.3	32
0.4	2.5	31
0.5	2.0	30

4m

c)   Graph θ against 1/m

θ [^{0}C]

40

30

20

10

2.0   4.0   6.0   8.0   10.0   1/m [kg^{-1}]
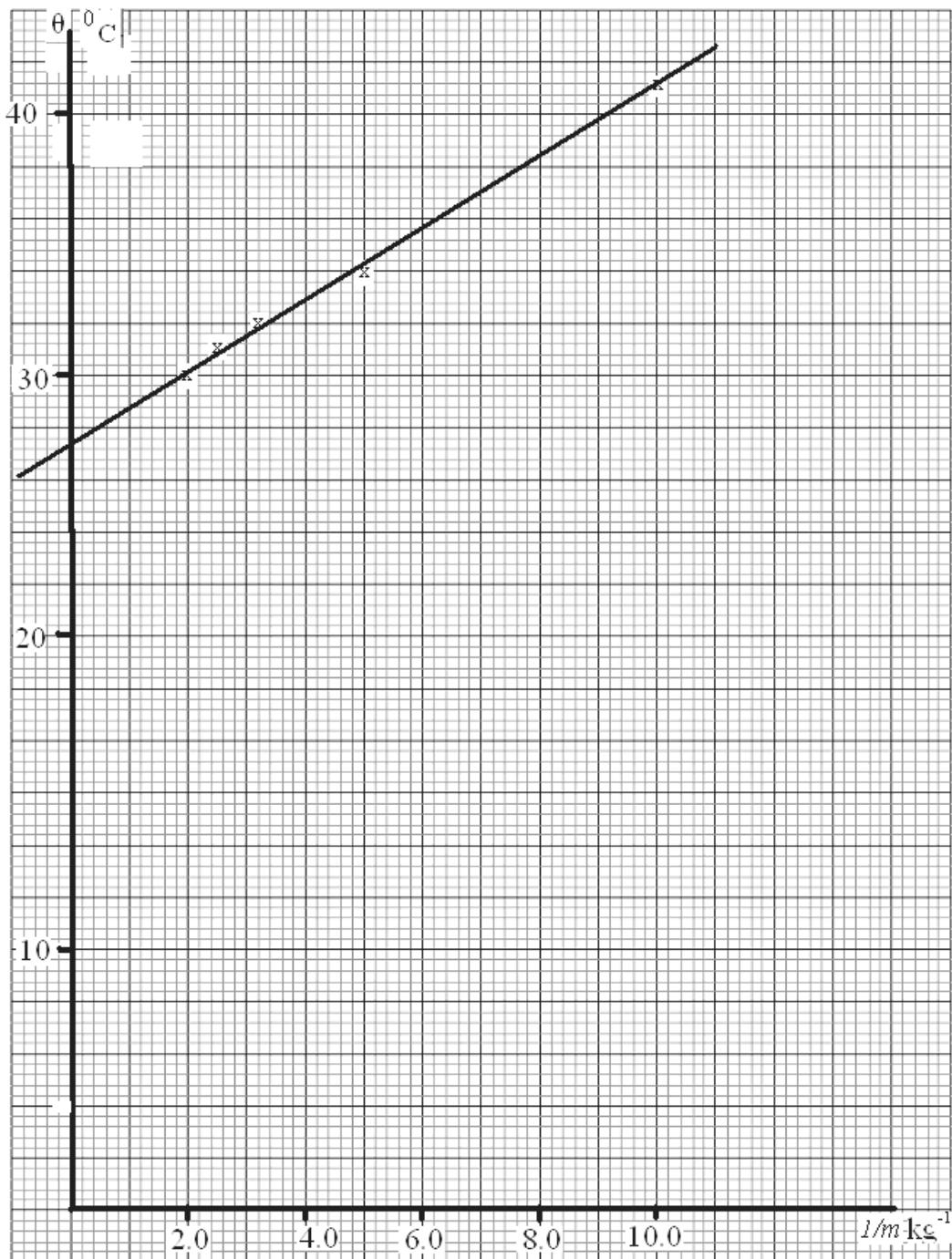
D) θ increase linearly to 1/m   2 m

2.

Questio n	Marking Scheme	Marks
2(a)	**State the relationship between *V* and *I*** If the current is bigger, the potential difference passing through the terminal of battery will be smaller.	1
2(b)	10V intercept at V axis	1 1
2 c (i)	 **State the correct value of the gradient with unit**	1 1 1
2 c (ii)	State internal resistance of battery = Gradient of graph **Substitute the gradient from b (i) correctly** **State the correct answer with unit** Internal resistance of battery = Gradient of graph $= -\dfrac{2}{3}$	1 1

2(d)	Charge that flows through the battery in battery in 5 minutes,	1
	From the graph E = 10 V	
	$Q = It = 3.0 \times 5 \times 60 = 900 C$	1
	Energy supplied by the battery $= QE = 900 \times 10 = 9000\,J$	1
2(e)	**State ONE correct precaution so as to produce an accurate result of the experiment** The current should be limited to a small value because a large current will give out a bigger heating effect.	1

Section B

Question	Marking Scheme	Marks
3.(a)	When temperature is low, the air pressure is low as well	1m
(b)	The higher the temperature is, the higher the pressure is.	1m
(c) (i)	*Aim*: To investigate the relationship between temperature and pressure	1m
	Variables:	
(ii)	M.V: temperature R.V: Pressure	1m
	F.V: volume of air	1m
	Apparatus and material:	
(iii)	round flask, thermometer, beaker, ice, water, Bourdon gauge, Bunsen burner.	1m
(iv)	*arrangement of apparatus*:	1m
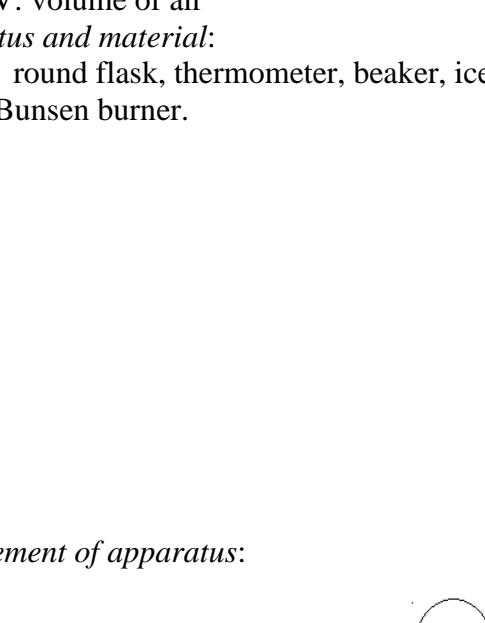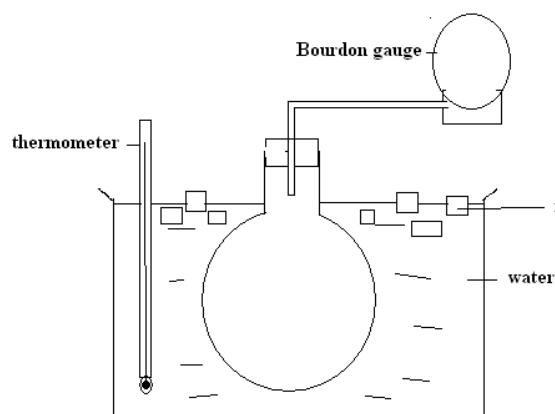
|		
(v)	*The procedure of the experiment which should include one method of controlling the manipulated variable*: Heat up the water until 40°C Repeat heating up at 45°C, 50°C, 55°C, 60°C	1m 1m
	and *one method of measuring the responding variable*: measure the pressure using Bourdon gauge for each temperature	1m
(vi)	*Tabulation of data*	

T (^{o}C)	P (Pa)
40	
45	
50	
55	
60	

1m

(vii)   *Analysing of data*

T (^{o}C)

1m

P (Pa) →

4 (a)	*Inference* The infra red waves are block by the boy but the radio waves can go around the boy	1m
(b)	*Hypothesis*: Longer wavelength can undergo diffraction better than shorter wavelength	1m
c(i)	*aim* : To investigate the variation of the amount of diffraction by waves with the wavelength	1m

(ii)	*Variables MV*: wavelength
	             RV: angle through which the wave bends due to diffraction through slit
	          CV: size of the slit
		1m
		 1m

(iii)	*Apparatus*: a ripple tank apparatus, barriers(slit), motor, stroboscope, white paper *Material*: water *Arrangement*	1m
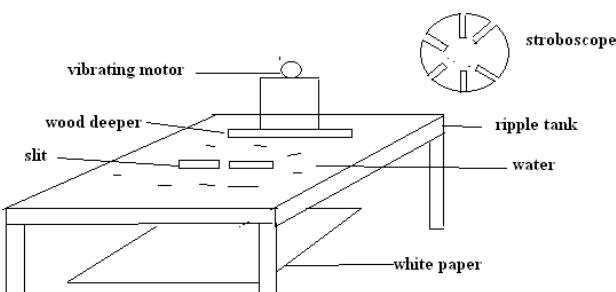
		1m

The procedure of the experiment which should include one method of controlling the manipulated variable: The speed of the motor can be adjusted by rheostat, until the plane waves of a certain wavelength are produced
and *one method of measuring the responding variable*: two ruler are placed on the screen, one along the outer edge of the diffracted wave on one side and another perpendicular to barrier at the corresponding . The angle between these two rulers
The step are repeated for three more different wavelength

1m

1m

1m

Tabulation of data

Wavelength λ(cm)	θ (^{0}C)
0.5	
1.0	
1.5	
2.0	

1m

Analysing of data
angle

$θ/ ^0$ C

Wavelength λ /cm

1m