

4531/1  
Physics  
Paper 1  
Sept  
2007  
1 ' hour



JABATAN PELAJARAN NEGERI SELANGOR

PROGRAM PENINGKATAN PRESTASI  
SAINS DAN MATEMATIK SPM

2007

|                                                          |                                                                                           |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------|
| PHYSICS                                                  |                                                                                           |
| Paper 1                                                  |                                                                                           |
| One hour and fifteen minutes                             |                                                                                           |
| <b>JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU</b> |                                                                                           |
| 1.                                                       | <i>Kertas soalan ini adalah dalam dwibahasa..</i>                                         |
| 2.                                                       | <i>Soalan adalah dalam Bahasa Inggeris dan diikuti dengan Bahasa Melayu yang sepadan.</i> |

This question paper consists of 23 printed pages.

[See overleaf

CONFIDENTIAL

## INFORMATION FOR CANDIDATES

[MAKLUMAT UNTUK CALON]

1. This question paper consists of 50 questions.  
[Kertas soalan *ini mengandungi 50 soalan*]
2. Answer **all questions**.  
[*Jawab semua soalan*].
3. Answer **each question** by blackening **the correct space on the answer sheet**.  
[*Jawab setiap soalan dengan menghitamkan ruangan yang betul pada kertas jawapan.*]
4. **Blacken only one space for each question**.  
[*Hitamkan satu ruangan sahaja bagi setiap soalan*].
5. If you wish to change your **answer**, **erase the blackened** mark that you **have made**.  
Then blacken **the space** for the new answer.  
[*Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang bare.*]
6. **The diagrams in the questions provided are not drawn to scale unless stated**.  
[*Rajah yang mengiringi soalan tidak dilukiskan mengikut Skala kecuali dinyatakan.*]
7. You **may use a non-programmable scientific calculator**.  
[*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*]
6. **A list of formulae is provided on page 3**  
[*Satu senarai rumus disediakan di halaman 3*]

The following information **may be** useful. The symbols have their usual meaning.  
Maklumat yang berikut mungkin berfaedah. Simbo/-limbo/ mempunyai makna yang biasa.

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

2.  $rt = ut + gas$

3.  $s = at^2 = at'$

4. Momentum =  $mv$

$T = ma$

Kinetic Energy =  $\frac{1}{2}mv^2$   
[Tenaga Kinetik]

Potential energy =  $mgh$   
[Energia Kenparaan]

8. Elastic potential energy =  $\frac{1}{2}kx^2$   
[Energia Keupayaan Kenya]

9.  $\ln V$

10. Pressure tekanan /  $p$   $hpg$

11. Pressure Tekanan /  $p$   $\frac{F}{A}$

12. Heat [J],  $Q = mc\Delta\theta$

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

14.  $E = mc^2$

15.  $r = f\lambda$

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

[Kuasas]  $P = \frac{\text{Tenaga}}{\text{Masa}}$

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

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

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

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

20.  $n = \frac{\text{Real depth}}{\text{Apparent depth}} = \frac{D}{d}$   
[Dalam, ketara]

21.  $Q = \frac{1}{2}kx^2$

22.  $V = IR$

23. Power [Kuasas],  $P = IV$

24.  $\frac{N}{V} = \frac{N}{V}$

25. Efficiency =  $\frac{\text{Output}}{\text{Input}} \times 100\%$   
[Kecekapan]

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

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

Setiap soalan diikuti o/eh sama ada **tiga, empat atau** lima pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang betu/ pada kertas jawapan anda.

1. Speed, acceleration and momentum **are** .....quantities.  
[Laju, pecutan dan momentum adalah kuantiti. ....J

A. **base** (alas]  
B. **derived** (terbitan]  
C. **scalar** (skalar]  
D. **vector** (vektor]

2. Which **of the following measurements of length is the longest?**  
[Antara nilai ukuran panjang yang berikut, yang manakah paling panjang?]

|    |            |
|----|------------|
| A. | 4530 cm    |
| B. | 0.453 km   |
| C. | 0.453 Gm   |
| D. | 0.00453 Mm |
| E. | 4530000 mm |

3. A technician **needs to measure the internal diameter of a water pipe as accurately as possible.** Which instrument should be used?  
(Seorangjuruteknik hendak mengukur diameter dalam sebatang paip air seberape jitu yang mungkin. Apakah alat yang patut digunakannya]

A. metre rule [pembans meter]  
B. **measuring** tape [pica pengukur]  
C. **vernier callipers** (angkup vernier]  
D. **micrometer screw gauge** [tolok skru mikmmeter]

4. Which of the following has the same unit as **work?**  
(Manakah antara berikut mempunyai unit yang sama dengan unit bagi kerja ?]

A. **mass x length' x time**  
[jisim x panjang ' x masa]

B. **mass x length x time**  
[jisim x panjang x masa]

C. **Mass x length x time'**  
[Jisim x Jarak x masa']

D. **Mass x len th'**  
Time

[Jisim x Pan an J  
Masa

5. Figure 1 shows the scale on a micrometer screw gauge.

(Rajah 1 menunjukkan skala pada sebuah tolak skru micrometer.)



FIGURE 1  
(RAJAH 1)

Which **reading is shown?**

[Berapakah **bacaaan yang ditunjukkan?**]

- A. 5.64 mm  
B. 7.14 mm  
C. 7.16 mm  
D. 7.64 mm
6. Figure 2 shows a ticker-tape strip of a trolley moving down a sloping runway. The ticker timer lodges dots on the ticker tape at the rate of 50 ticks per second.

(Rajah 2 menunjukkan sate keratan pita detik bagi sebuah troll bergerak menuruni sate landasan condong Jangkamasa detik menghasilkan 50 detik dalam masa sate saat)



FIGURE 2  
(RAJAH 2)

What is the time taken for the trolley to move from P to Q?

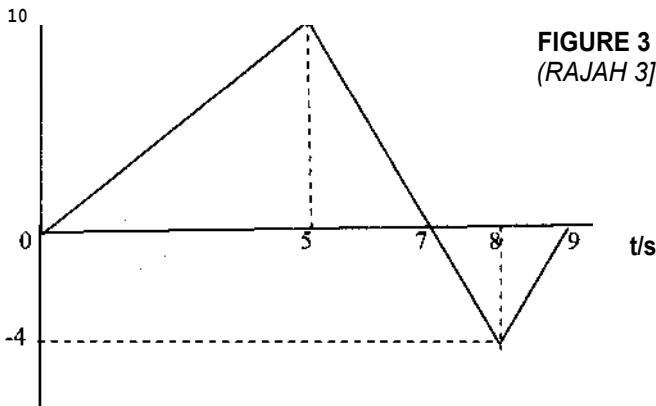
(Berapakah masa yang diambil oleh troll untuk bergerak dari P ke Q?)

- A. 0.20 s  
B. 0.22 s  
C. 1.8 s  
D. 2.0 s  
E. 2.2 s
7. Which of the **following statements will not reduce the effects of inertia in a car.**  
[Antara pernyataan berikut yang manakah tidak mengurangkan kesan inersia bagi sebuah karate?]
- A. Wearing a **seat belt.**  
[Memakai tali pinggang keledar]  
B. **Using the** air bag system.  
[Menggunakan sistem beg udara]  
C. Using bumpers of hard material.  
[Menggunakan bumper yang diperbuat daripada bahan yang keras]

8. **Figure 3 shows the graph velocity,  $v$  against time,  $t$  of a moving car.**

[Rajah 3 menunjukkan graf halaju,  $v$  lawan masa,  $t$  bagi sebuah kereta yang bergerak]

Velocity/ $v$   
(Halaju/ $N$ )

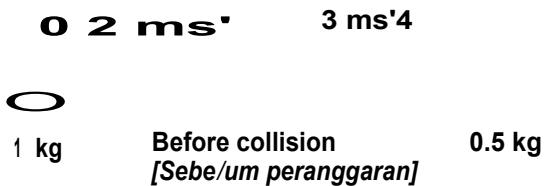


**Calculate the displacement of the car.**

[Hitungkan sesaran kereta itu.]

- A. 4 km  
**B. 31 km**  
 C. 35 km  
**D. 39 km**  
 E. 63 km
9. **Figure 4 shows two balls moving in opposite direction that collide. After collision, the balls get attached.**

[Rajah 4 menunjukkan dua bola bergerak berlawanan arah dan berlanggar. Selepas perlanggaran, kedua-dua **me/ekat**.]



**FIGURE 4**  
(RAJAH 4)

**Which statement is true for the balls after collision?**

(Antara pernyataan berikut yang manakah benar bagi kedua-dua bola selepas perlanggaran?)

- A. They move **to the right with 0.33 ms<sup>-1</sup>**  
 [Kedua-duanya bergerak ke kanan dengan halaju 0.33 ms<sup>-1</sup>]
- B. They move to the left with 0.33 ms<sup>-1</sup>**  
 (Kedua-duanya bergerak ke kiri dengan halaju 0.33 ms<sup>-1</sup>)
- C. They move **to the right with 2.33 ms<sup>-1</sup>**  
 (Kedua-duanya bergerak ke kanan dengan halaju 2.33 ms<sup>-1</sup>)
- D. They move to the left with 2.33 ms<sup>-1</sup>**  
 [Kedua-duanya bergerak ke kiri dengan halaju 2.33 ms<sup>-1</sup>]

10. A coin is placed on a cardboard as shown in Figure 5.  
 (Sekeping syiling diletakkan di atas kadbod seperti dalam Rajah b)

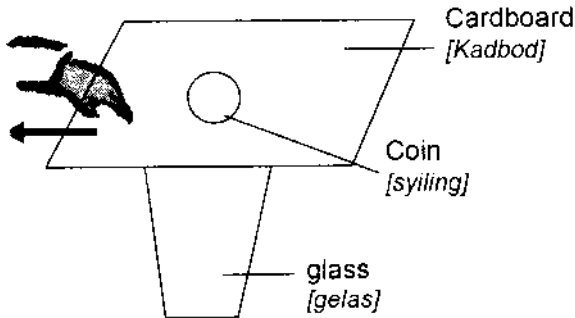


FIGURE 5  
 [RAJAH 5]

What happens to the coin when the cardboard is jerked to the left?  
 (Apakah yang berlaku pada syiling itu apabila kadbod disentak ke kin?)

- A. The coin remains at rest on the cardboard  
 [Syiling itu kekal pegun di atas kadbod]
  - B. The coin drops down into the glass  
 [Syiling jatuh ke dalam geaas]
  - C. The coin drops outside the glass  
 (Syiling jatuh di luar gelas]
  - D. The coin is momentarily pushed up from the cardboard.  
 [Syiling terangkat ke atas dad kadbod.]
11. Figure 6 shows the graph of force,  $F$  against extension,  $x$  of a spring.  
 (Rajah 6 menunjukkan graf daya,  $F$  melawan pemanjangan,  $x$  bagi satu spring.)

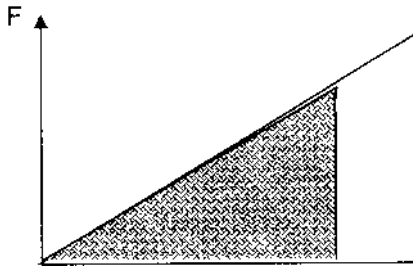


FIGURE 6  
 (RAJAH 6]

The area under the graph represents the  
 [Luas di bawah graf mewakili]

- A. spring constant [pemalar spring]
- B. stiffness of spring [kekenyalan spring]
- C. energy stored in the spring. (tenaga yang tersimpan di dalam spring]
- D. initial length of the spring. (panjang asal spring]

12. Figure 7 shows a simple mercury barometer. Which one shows the distance to be measured to find atmospheric pressure?

[Rajah 7 menunjukkan satu barometer merkuri ringkas. Antara jarak berikut yang manakah diukur untuk menentukan tekanan atmosfera?]

vacuum  
oakum

FIGURE 7  
(RAJAH 7)

B C A

mercury  
merkun

I

13. Figure 8 shows a simple hydraulic system.

[Rajah 8 menunjukkan satu sistem hidraulik ringkas.]

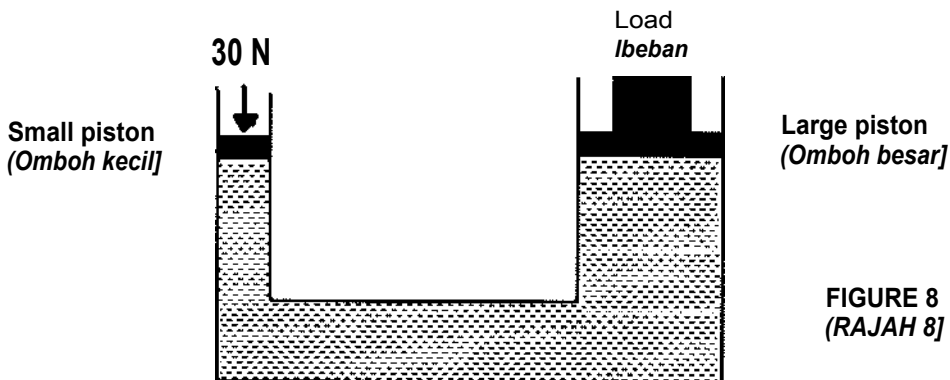


FIGURE 8  
(RAJAH 8)

A force of **30 N** is exerted on the small piston of area  $0.025 \text{ m}^2$ . The large piston has an area of  $0.50 \text{ m}^2$ . Calculate the force exerted by the large piston on the load.

[Satu daya  $30 \text{ N}$  dikenakan pada omboh kecil dengan luas permukaan  $0.025 \text{ m}^2$ . Omboh yang besar mempunyai luas permukaan  $0.50 \text{ m}^2$ . Hitungkan daya yang bertindak pada beban di omboh yang besar].

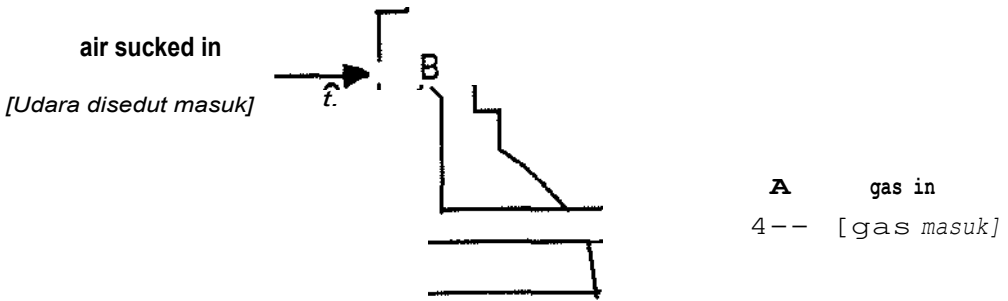
- A. 15 N
- B. 60 N
- C. 600 N
- D. 1200 N
- E. 2400 N

14. Figure 9 shows the structure of a bunsen burner. Which of the positions A, B, C or D is the region of the lowest pressure?

[Rajah 9 menunjukkan struktur sebuah penunu bunsen. Antara kedudukan A, B, C dan D yang manakah adalah kawasan yang tekanannya paling rendah?]

D

FIGURE 9  
(RAJAH 9)



15. Figure 10 shows a box on a raft floating in a river.

[Rajah 10 menunjukkan sebuah kotak di atas sebuah rakit yang sedang terapung di sungai]

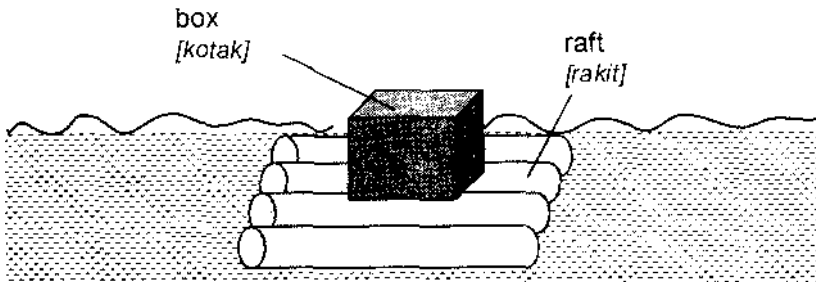


FIGURE 10  
(RAJAH 10)

Which of the following statement is true?

[Antara pernyataan berikut yang manakah benar?]

A. weight of water displaced = weight of the box + weight of the raft  
[berat air yang disesarkan = berat kotak + berat rakit]

B. weight of water displaced > weight of the box + weight of the raft  
[berat air yang disesarkan > berat kotak + berat rakit]

C. volume of water displaced = weight of the box + weight of the raft  
[Isipadu air yang disesarkan = berat kotak + berat rakit]

D. volume of water displaced > weight of the box + weight of the raft  
[Isipadu air yang disesarkan > berat kotak + berat rakit]

16. Some pure water is heated in a beaker until it boils at  $100^{\circ}\text{C}$ . After a few seconds, the temperature will

[Sedikit air tulen dipanaskan sehingga mendidih pada suhu  $100^{\circ}\text{C}$ . Selepas beberapa saat suhu air akan]

- A. increase. [bertambah]
- B. decrease. [berkurang]
- C. not change. [tidak berubah]

17. Which graph shows the relationship between the pressure and temperature of a fixed mass of gas at constant volume?

[Graf manakah menunjukkan hubungan antara tekanan dan suhu suatu gas berjisim tetap pada isipadu tetap?]

A.  $P/\text{Pa}$  

B.  $P/\text{Pa}$

$91^{\circ}\text{C}$

$0^{\circ}\text{C}$

C.  $P/\text{Pa}$

D.  $P/\text{Pa}$

eNC

BPC

18.

"The quantity of heat energy required to increase the temperature of 1 kg of a material by  $1^{\circ}\text{C}$ "

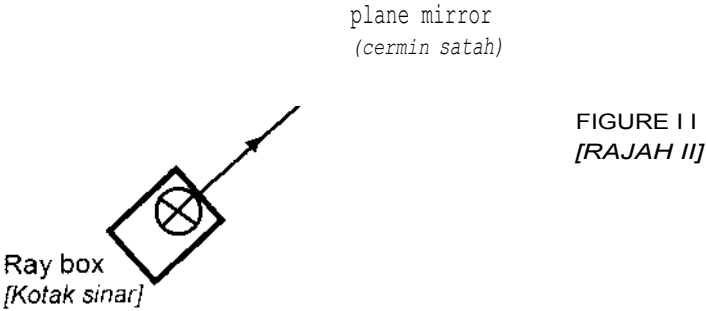
"Kuantiti haba yang diperlukan untuk menaikkan suhu 1 kg bahan sebanyak  $1^{\circ}\text{C}$ "

The statement above is a definition of a physical quantity. What is that physical quantity?

[Pernyataan di atas adalah definisi bagi suatu kuantiti fink. Apakah kuantiti fizik tersebut?]

- A. heat capacity [muatan haba]
- B. latent heat of fusion [haba pendam tentu pelakuran]
- C. specific heat capacity. [muatan haba tentu]
- D. latent heat of vaporization. [haba pendam tentupengewapan]

19. Figure 11 shows a ray of light from a ray box striking a plane mirror.  
(Rajah 11 menunjukkan sinar cahaya dari sebuah kotak sinar menuju ke satu cermin datar.)



Which of the following statement is true about the image formed by the mirror.

[Antara pernyataan berikut yang manakah benar tentang imej yang terbentuk oleh cermin satah tersebut.]

| Position of image<br>[Kedudukan imej] |   | Characteristic of image<br>[Ciri imej] |
|---------------------------------------|---|----------------------------------------|
| A                                     | S | Real nyata                             |
| B                                     | S | Virtual [mays]                         |
| C                                     | T | Real [nyata]                           |
| D                                     | T | Virtual [mays]                         |

20. Figure 12 shows an observer using a magnifying glass with a focal length,  $f$  to see a coin more clearly.

(Rajah 12 menunjukkan seorang pemerhati sedang menggunakan sebuah kanta pembesar dengan panjang fokus,  $f$  untuk melihat sekeping duit syiling dengan lebih jelas)

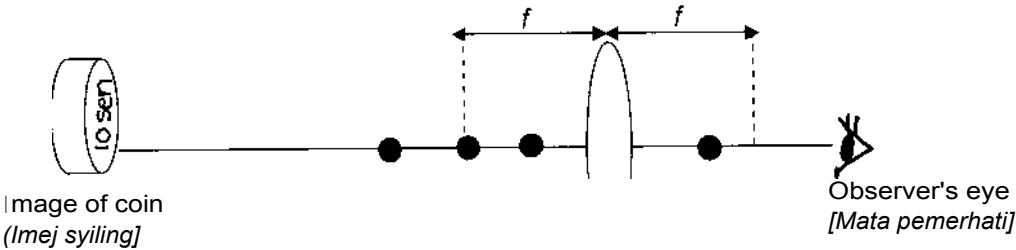


FIGURE 12  
[RAJAH 12]

Where should the observer place the coin so that the image formed is virtual, upright and magnified?

[Di manakah duit syiling itu perlu diletakkan oleh pemerhati supaya imej yang dihasilkan adalah mays, tegak dan diperbesarkan?]

21. Figure 13 shows a ray of light striking a square block of glass KLMN. The refractive index of glass is 1.50.

[Rajah 13 menunjukkan satu sinar cahaya dipancar kepada sebuah bingkai kaca, KLMN. Indeks biasan kaca ialah 1.50.]

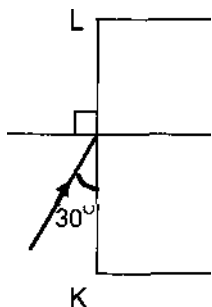


FIGURE 13  
(RAJAH 13J)

Calculate the angle of refraction of the ray.  
(Hitungkan sudut biasan sinar cahaya tersebut.)

- A. 200  
B. 300  
C. 35°  
D. 450  
E. 600
22. Figure 14 shows the image of a nail formed in liquid X as seen by an observer.

[Rajah 14 menunjukkan imej paku yang terhasil dalam cecair X apabila ditihat oleh seorang pemerhati.]

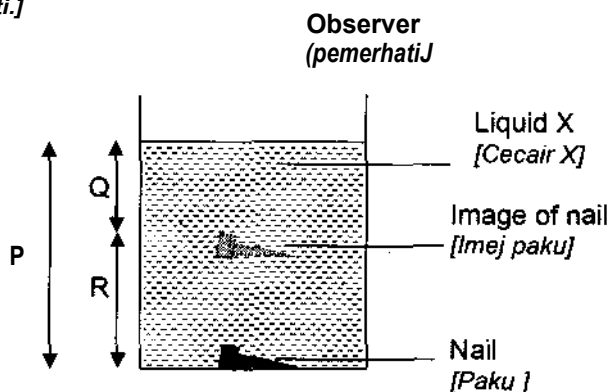


FIGURE 14  
[RAJAH 14I]

Which of the following shows the refractive index of liquid X?

[Antara yang berikut yang manakah adalah indeks biasan cecair X itu?]

- A.  $\frac{P}{Q}$   
B.  $\frac{P}{R}$   
C.  $\frac{Q}{P}$   
D.  $\frac{R}{P}$

23. Figure 15 shows the **arrangement** of two convex lenses P and Q of an **astronomical telescope** at normal adjustment. The power of lens P is 5 D **and lens Q is 25 D**.

[Rajah 15 menunjukkan susunan dua bush kanta cembung P dan Q pada **pelarasan normal** dalam sebuah teleskop astronomi Kuasa kanta P ialah 5 D dan kanta Q ialah 25 D]

FIGURE 15  
[RAJAH 15]



Calculate the distance between lenses P and Q.  
[Hitungkan jarak antara dua kanta P dan Q itu.]

- A. 5 cm  
B. 20 cm  
C. 24 cm  
D. 30 cm  
E. 125 cm
24. Figure 16 shows the fringe pattern produced in a Young's double slit experiment using a monochromatic red light source.  
(Rajah 16 menunjukkan corak pinggir-pinggir yang dihasilkan melalui eksperimen dwicelah Young menggunakan sumber cahaya merah monokromatik)

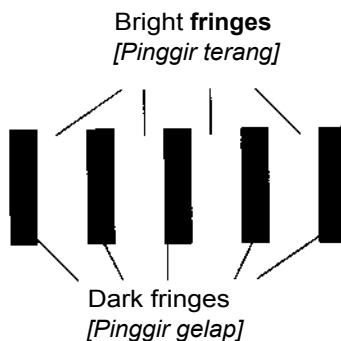
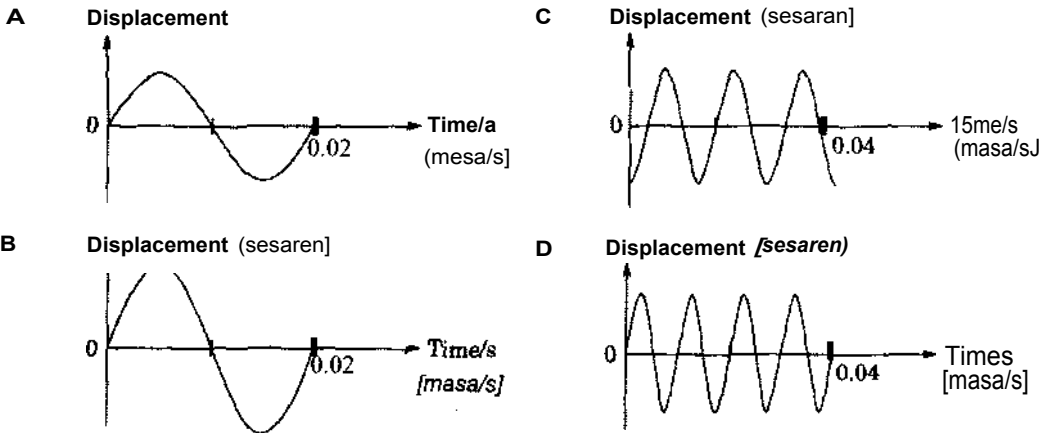


FIGURE 16  
(RAJAH 16)

What happens to the fringe pattern if a monochromatic violet light source **is used**?  
[Apakah perubahan pada corak pinggir jika sumber cahaya ungu monokromatik **digunakan**?]

- A. The **bright fringes are wider** than the dark fringes.  
(Pinggir terang menjadi lebih lebar daripada pinggir gelap).  
B. The **dark fringes are wider** than the bright fringes.  
(Pinggir gelap menjadi lebih lebar daripada pinggir terang)  
C. The distance between consecutive **fringes decreases**.  
(Jarak antara pinggir-pinggir berturutan berkurang )  
D. The distance between consecutive **fringes increases**.  
(Jarak antara pinggir-pinggir berturutan bertambah.)

25. Which graph represents sound waves with the highest pitch?  
 [Graf yang manakah mewakili gelombang bunyi dengan kelangsingan paling tinggi?]



26. Ahmed shouts in front of a high wall. He hears the echo of his voice 1.2 seconds later. The velocity of sound in air is 340 m s<sup>-1</sup>. What is the distance between Ahmed and the wall?

[Ahmad menjerit di hadapan sebuah tembok yang tinggi. Dia mendengar gema suaranya selepas 1.2 saat kemudian. Halaju bunyi di dalam udara ialah 340 m s<sup>-1</sup>. Berapakah jarak di antara Ahmed dengan tembok itu?]

- A. 204 m  
 B. 283 m  
 C. 340 m  
 D. 408 m  
 E. 816 m
27. What is the common property of all electromagnetic waves?  
 [Apakah sifat yang sepunya bagi semua gelombang electromagnetic?]
- A. Propagates with the same velocity in vacuum  
 [Merambat dengan halaju yang sama dalam vakum]  
 B. They have the same frequency  
 [Mempunyai frekuensi yang sama]  
 C. They have the same wavelength  
 [Mempunyai panjang gelombang yang sama]  
 D. Requires medium for propagation  
 [Memerlukan medium untuk merambat]
28. An audio signal generator produces sound with constant speed. When the frequency of the sound increases, its wavelength
- [Sebuah penjana audio menghasilkan bunyi dengan halaju yang sekata. Jika frekuensi bunyi itu bertambah, panjang gelombang]
- A. increases [bertambah]  
 B. decreases [berkurang]  
 C. remains constant [tidak berubah]

29. Figure 17 shows a water wave moving from a shallow to a deep area.

[Rajah 17 menunjukkan gelombang air bergerak dari kawasan air cetek ke kawasan air lebih dalam.]

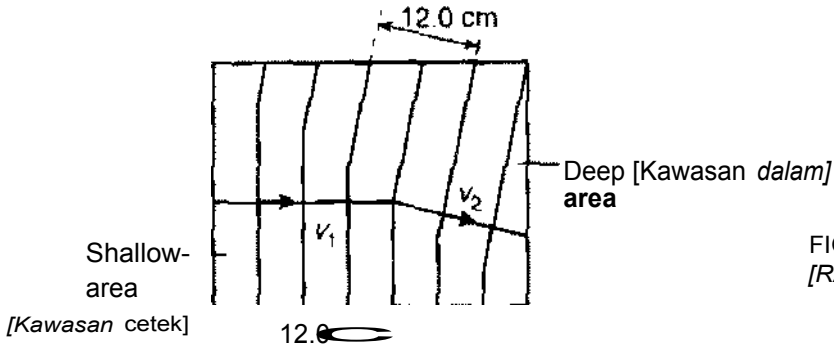


FIGURE 17  
[RAJAH 17]

Determine the ratio of  $v_1:v_2$  if  $v_1$  and  $v_2$  are the velocities of the water waves in the shallow and in the deeper area respectively.

[Tentukan nisbah  $v_1:v_2$  jika  $v_1$  dan  $v_2$  adalah masing-masing halaju gelombang air di kawasan air cetek dan di kawasan air dalam.]

- A. 1 : 1  
B. 2 : 3  
C. 3 : 2  
D. 2 : 1
30. A loaded spring vibrates and finally stops due to damping. What happens to the frequency of the spring?  
[Satu spring terbeban berayun dan akhirnya berhenti disebabkan oleh pelembapan. Apakah yang berlaku kepada frekuensi spring tersebut?]
- A. Remains constant [tidak berubah]  
B. Decreases [berkurang]  
C. Increases [bertambah]
31. Which graph shows the relationship between potential difference,  $V$ , and current,  $I$  for an Ohmic conductor?  
[Graf manakah menunjukkan hubungan di antara beza keupayaan,  $V$  dan arus,  $I$  bagi sebuah konduktor Ohm?]

A  $V$

C  $V$

$-I$

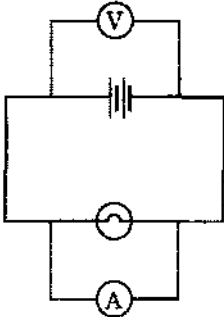
B  $V$

D  $V$

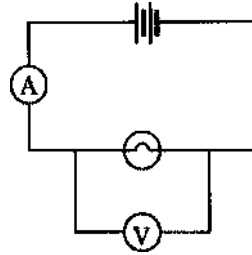
0 **E.1**

32. Which circuit can be **used** to determine **the resistance** of a bulb?  
 [Litar manakah yang boleh digunakan untuk menentukan rintangan sebuah mentol lampu?]

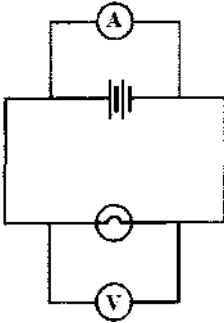
A



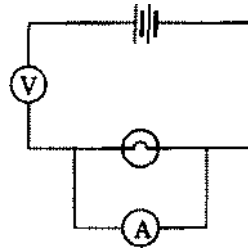
C



B



D



33. Figure 18 shows a circuit containing four bulbs, A, B, C and **D**, that **light** up at normal brightness. Which bulb, when faulty **will cause all the other bulbs not** to light up?

[Rajah 18 menunjukkan sebuah litar yang mengandungi empat mentol, A, B, C dan D yang menyala pada kecerahan biasa. Mentol manakah, jika rosak menyebabkan semua mentol lain juga tidak boleh menyala?]

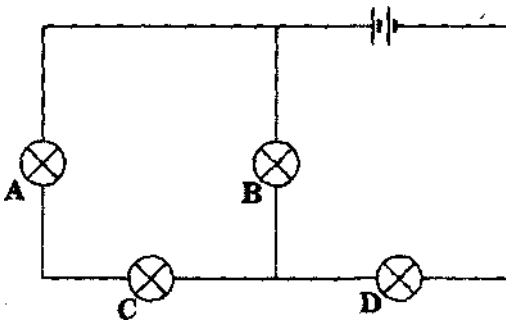


FIGURE 18  
 (RAJAH 18)

34. Which two **electrical quantities** are **measured** in volts?  
 (Manakah di antara kuantiti-kuantiti elektrik berikut diukur dalam unit volt ?)

- A. **current and e.m.f.** [arus dan d.g.e.]
- B. **current and resistance** [arus dan rintangan]
- C. **e.m.f. and potential difference** [d.g.e dan beza keupayaan]
- D. **potential difference and resistance** [beza keupayaan dan rintangan]

35. Which of the following pieces of copper wire has the greatest electrical resistance?  
 [Manakah di antara jalur dawai kuprum berikut mempunyai rintangan yang paling besar?]

|    | length /m<br>[Panjangm] | Diameter lmm |
|----|-------------------------|--------------|
| A. | 5.0                     | 0.05         |
| B. | 5.0                     | 0.10         |
| C. | 50                      | 0.05         |
| D. | 50                      | 0.10         |

36. A 20  $\Omega$  resistor and a 10  $\Omega$  resistor are connected in a parallel circuit. What is their combined resistance?

[Perintang 20  $\Omega$  dan perintang 10  $\Omega$  disambung secara selari dalam satu litar. Berapakah rintangan berkesan gabungan perintang ini?]

- A. 0.15  $\Omega$   
 B. 6.67  $\Omega$   
 C. 10  $\Omega$   
 D. 20  $\Omega$   
 E. 300
37. Figure 19 shows a circuit with three ammeters, X, Y and Z.  
 (Rajah 19 menunjukkan sebuah litar yang mengandungi tiga ammeter. X, Y dan Z)

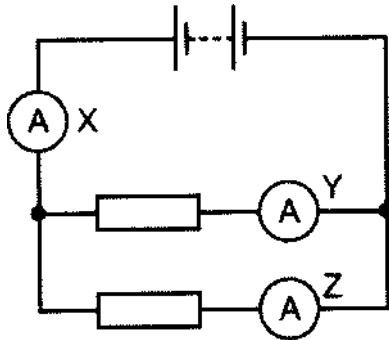


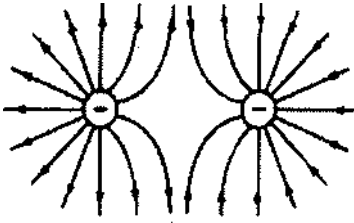
FIGURE 19  
(RAJAH 19)

Which set of readings is possible?  
 [Set bacaan manakah yang betul?]

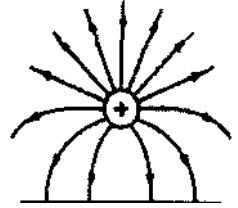
|    | X  | Y  | Z  |
|----|----|----|----|
| A. | 2A | 3A | 5A |
| B. | 3A | 2A | 6A |
| C. | 3A | 3A | 3A |
| D. | 5A | 2A | 3A |

38. Which diagram shows the correct electric field pattern?  
 [Rajah manakah menunjukkan corak medan elektrik yang betul?]

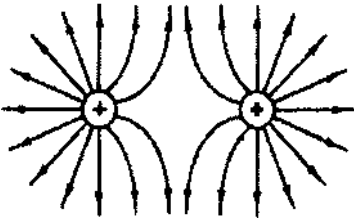
A



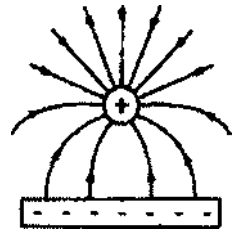
B



C



D



39. Two circuits are set up as shown in Figure 20. The iron rods are placed close together and are free to move.  
 [Dua litar disusun seperti Rajah 21. Rod besi diletak berdekatan dan bebas bergerak].

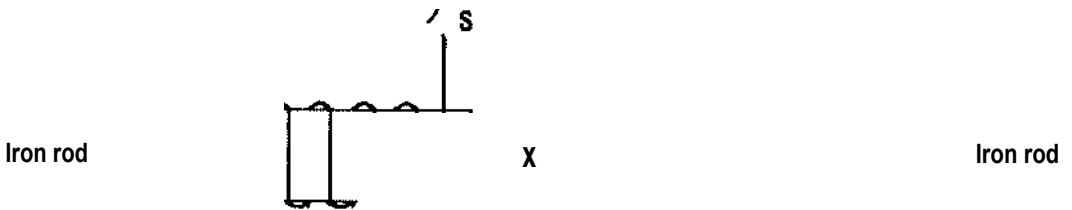


FIGURE 20  
 (RAJAH 201)

What happens to the size of the gap at X when S is switched on?  
 [Apakah yang berlaku kepada saiz ruang X apabila suis S ditutup?]

- A. It increases. [bertambah]  
 B. It decreases. [berkurang]  
 C. It does not change. [tidak berubah]

40. A transformer has 500 turns on its primary coil and 100 turns on its secondary coil. An a.c voltage of 25 V is connected across the primary coil. What is the voltage across the secondary coil?

(Sebuah transformer mempunyai 500 lilitan pada gegelung primer dan 100 lilitan pada gegelung sekunder. Satu bekalan a.c 25 V disambung merentasi gegelung primer. Berapakah beza keupayaan merentasi gegelung sekunder?)

- A. 5.0 V
- B. 12.5 V
- C. 50.0 V
- D. 175.0 V
- E. 200.0 V

41. A student carries out an experiment to see the effect of a magnetic field on a current carrying conductor. The conductor moves up as shown in Figure 21.

(Seorang pelajar menjalankan eksperimen untuk mengkaji kesan medan magnet terhadap satu dawai berarus. Dawai bergerak ke atas seperti ditunjukkan dalam Rajah 21.)

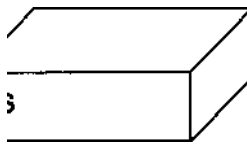
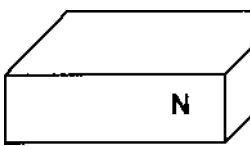


FIGURE 21  
(RAJAH 21)

Current carrying conductor  
[Dawai berarus]

What should the student do to make the wire move downwards?

[Apakah yang patut dilakukan oleh pelajar tersebut supaya dawai itu bergerak ke bawah?]

- A. Use stronger magnets  
[Gunakan magnet yang lebih kuat.]
- B. Change the direction of the current  
(Menukar arah arus)
- C. Moves the poles of the magnet closer together  
[Merapatkan kutub-kutub magnet itu.]
- D. Send a smaller current through the wire.  
(Mengurangkan arus dalam dawai.)

42. Which of the following **statements is correct?**  
 [Pernyataan berikut yang manakah benar?]

- A. In a step down transformer, the output voltage is higher than the input voltage.**  
 [Vahan output melebihi voltan input bagi sebuah transformer injak turun.]
- B. The output power of a transformer can be greater than the input power.**  
 [Kuasa output sebuah transformer boleh melebihi kuasa inputnya.]
- C. A transformer uses electromagnetic induction to produce e.m.f. in its secondary coil.**  
 [Sebuah transformer menggunakan aruhan elektromagnet untuk menghasilkan d.g.e. dalam gegelung sekunder.]
- D. Energy loss in a transformer due to eddy currents can be reduced by using a soft iron core.**  
 [Kehilangan renege dalam transformer yang disebabkan oleh arus pular dapat diatasi dengan menggunakan texas besi lembut.]

43. Figure 22 shows a direct current (d.c) motor.  
 (Rajah 22 menunjukkan sebuah motor arus terus (a.t.))

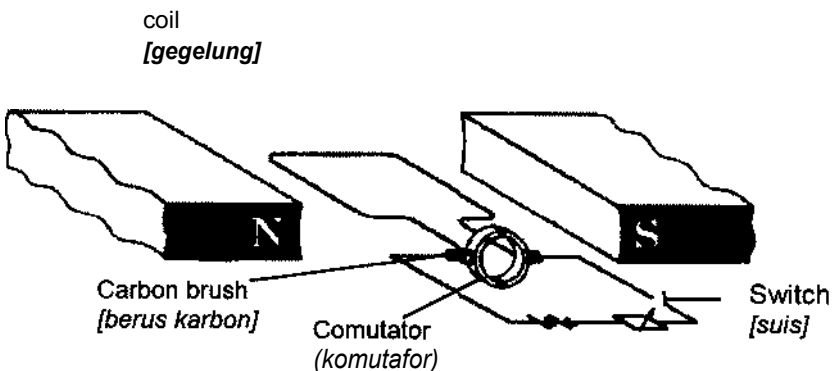


FIGURE 22  
 (RAJAH 221)

Which of the **following statement is true about the d.c motor?**  
 (Antara pemyataan berikut yang manakah benar tentang sebuah motor arus terus?)

- A. Carbon brushes are used to increase the speed of rotating coil.**  
 [Berus karbon digunakan untuk menambahkan kelajuan putaran gegelung.]
- B. Comutators are used to ensure the coil keeps rotating in the same direction.**  
 [Komutator digunakan untuk mengeka/kan arah putaran gegelung.]
- C. The speed of the coil can be increased by using thinner coil wire.**  
 [Kelajuan gegelung boleh ditambah dengan menggunakan gegelung dawal yang lebih halus.]
- D. The direction of the rotating coil is determined by using Fleming 's right hand rule.**  
 [Arch putaran gegelung ditentukan dengan menggunakan peraturan tangan kanan Fleming.]

44. Figure 23 shows the output on the screen of a CRO when its Y-input is connected to a microphone which is exposed to a sound.

[Rajah 23 menunjukkan output pada skrin OSK apabila input -Y disambungkan kepada satu mikrofon yang terdedah kepada bunyi]

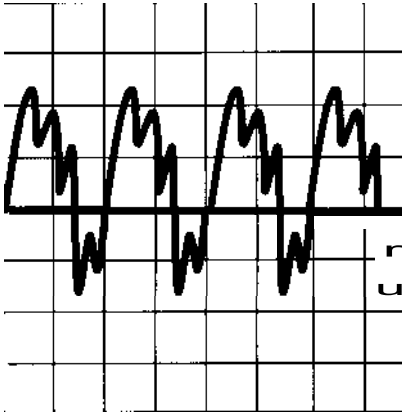


FIGURE 23  
[RAJAH 231]

If the time-base is set at 10 ms per division, what is the frequency of the sound?

(Jika dasar masa ditetapkan pada 10 ms per bahagian, berapakah frekuensi bunyi tersebut?)

- A. 80.0 Hz
  - B. 50.0 Hz
  - C. 20.0 Hz
  - D. 12.5 Hz
  - E. 10.0 Hz
45. Figure 24 shows a logic circuit with gates represented by their standard symbols. The inputs at M and N produce the output at P.

[Rajah 24 menunjukkan litar get logik yang diwakili dengan simbol-simbol standard Input M dan N menghasilkan output di P]



FIGURE 24  
(RAJAH 24)

What is the output P?  
[Apakah output bagi P?]

- A. 0110
- B. 0111
- C. 1001
- D. 0101

46. An n-type semiconductor is produced when germanium are doped with  
[Semikonduktorjenis-n dihasilkan apabila germanium didopkan dengan]

A. divalent atoms.[atom divalen]  
B. trivalent atoms . [atom trivalen]  
C. tetravalent atoms .[atom tetravalen]  
D. pentavalent atoms .[atom pentavalen]

47. Figure 25 shows a semiconductor diode connected to voltage supply.  
[Rajah 25 menunjukkan diod semikonduktor disambung kepada bekalan voltan].

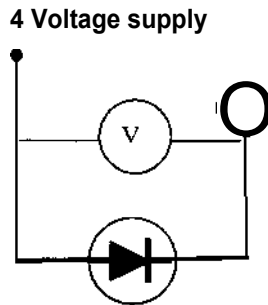


FIGURE 25  
[RAJAH 25]

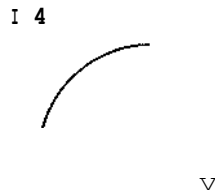
Which of the following graphs shows the correct relationship between current and voltage.

[Graf yang manakah menunjukkan hubungan antara arus dengan voltan yang betul.]

A



C



B

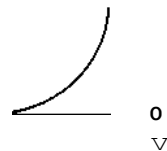
I

1 2

V

D

1 4



48. The thick tracks of alpha particles in a cloud chamber show that alpha particles have  
[Runt tebal yang dihasilkan oleh zarah alfa dalam kebuk awan menunjukkan bahawa alfa mempunyai]

A. high penetrating power (kuasa penembusan yang tinggi)  
B. high ionising power, [kuasa pengionan yang tinggi]  
C. large mass [jisim yang besar]  
D. high speed . [kelajuan yang tinggi]

49. Which one of the following is **most appropriate** for use as a medical tracer to detect the **presence** of a tumour?

*[Antara yang berikut yang manakah paling sesuai untuk digunakan sebagai penyurih untuk mengesan kehadiran tumor?]*

- A. **Radon-222; a emitter; half-life = 3.6 days**  
*[Radon-222; membebaskan a; separuh hayat = 3.6 hari]*
  - B. **Sulfur-35; (i emitter; half-life = 97 days**  
*[Sulfur-35; membebaskan i; separuh hayat = 97 days]*
  - C. Cobalt-60; yemitter; half-life = 5.3 tahun  
*[Cobalt 60, membebaskan y; separuh hayat = 5.3 years]*
  - D. Technetium-99; y emitter; half-life = 6 jam  
*[Technetium-99; membebaskan y; separuh hayat = 6 jam]*
50. A laboratory stores 20 g of a radioisotope that has a half-life of 30 minutes. How much of the isotope will remain after an hour?
- [Sebuah makmal menyimpan 20 g bahan radioisotop yang separuh hayatnya 30 mint Berapakah baki yang tinggal selepas satu jam?]*
- A. 20 g
  - B. 15g**
  - C. 10g
  - D. 5 g
  - E. 2.5 g

**END OF QUESTION PAPER**  
**(KERTAS SOALAN TAMAT)**



4531/2

4531/2

Physics

Paper2

Sept

2007

2= hours

Name : ..... Tingkatan:.....

JABATAN PELAJARAN NEGERI SELANGOR

PROGRAM PENINGKATAN PRESTASI

SAINS DAN MATEMATIK

2007

**PHYSICS**

Paper2

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 |
|---------|----------|-----------|----------------|
|         | 1        | 4         |                |
|         | 2        | 5         |                |
|         | 3        | 6         |                |
| A       | 4        | 7         |                |
|         | 5        | 8         |                |
|         | 6        | 8         |                |
|         | 7        | 10        |                |
|         | 8        | 12        |                |
| B       | 9        | 20        |                |
|         | 10       | 20        |                |
| C       | 11       | 20        |                |
|         | 12       | 20        |                |
| Total   |          |           |                |

This question paper contains 23 printed pages

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.  $v = u + at$

3. ***s-ut+ 'at'***

4. **Momentum - *my***

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.  $p = \frac{F}{A}$

10. Pressure [Tekanan],  $p = h\rho g$

11. Pressure [Tekanan],  $p = \frac{F}{A}$

12. Heat [Haba],  $Q = mc\Delta\theta$

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

14.  $E = mc^2$

15.  $v = f\lambda$

16. Power,  $P = \frac{\text{Energy}}{\text{Time}}$   
 [Kuala],  $P = \frac{\text{Tenaga}}{\text{masa}}$

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

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

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

20.  $\frac{\text{Real Depth}}{\text{Apparent Depth}} = \frac{n_2}{n_1}$   
 [Da'am Nvata] / [Da'am ketara]

21.  $Q = It$

22.  $V = IR$

23. Power [Kuala],  $P = IV$

24.  $N = \frac{V}{P}$

25. Efficiency =  $\frac{I_f I_s}{I_i I_s} \times 100\%$   
 [Kecekapan] / PVP

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

**Section A**  
**[Bahagian A]**

[60 marks]

Answer all the questions in this section.

[Jawab **semua** soalan dalam bahagian ini.]

Suggested time for this section is 90 minutes.

[Masa yang dicadangkan untuk menjawab bahagian ini ialah 90 minit]

Q

R

P

**Figure 1.1**  
[Rajah 1.1]

Ahmad walks 300 m to the north from P to Q. He then **walks east to R as shown in Figure 1.1**. The distance travelled from P to R is 700 m and **the displacement** is 500 m.

[Ahmad berjalan 300 m ke arah utara dari P ke Q. Dia kemudian berjalan ke arah timur menuju ke R seperti ditunjukkan pada Rajah 1.1. Jarak dilalui dari P ke R ialah 700 m dan sesarannya ialah 500 m.]

**(a) What is displacement?**

[Apakah maksud sesaran?]

[ 1 mark]

**(b) What type of physical quantity is displacement?**

[Apakah jenis kuantiti fizik bagi sesaran?]

[ 1 mark]

**(c) Show on Figure 1.1 Ahmed's displacement.**

[Tunjukkan sesaran bagi Ahmad pada Rajah 1.1]

[ 1 mark]

**(d) If Ahmad takes 500 s to walk from P to R, determine Ahmed's velocity.**

[Jika Ahmad mengambil masa 500 s untuk berjalan dari P ke R, tentukan halajunya.]

[t mark]

2. Figure 2.1 shows how the speed of a cyclist varies for a 600 s duration during the Le Tour de Langkawi competition.

[Rajah 2.1 menunjukkan bagaimana laju penunggang basikal berubah dalam masa 600 semasa pertandingan Le Tour de Langkawi]

Speed /ms'  
[Laju]

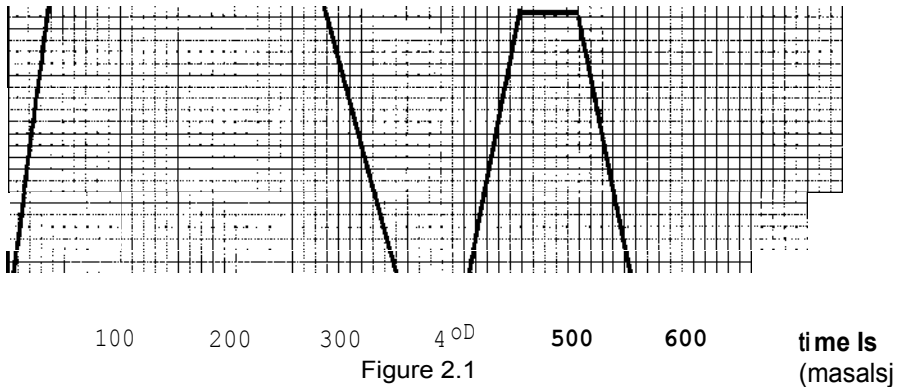


Figure 2.1

[Rajah 2.1]

- (a) What is speed?

[Apakah yang dimaksudkan dengan laju?]

[1 mark]

- (b) State the motion of the cyclist between points S and T.

[Nyatakan jenis gerakan antara titik S dan T bagi penunggang basikal tersebut.]

[1 mark]

- (c) State which parts of the graph show the cyclist moving with constant velocity.

[Nyatakan pada bahagian mana graf yang menunjukkan penunggang basikal itu bergerak dengan halaju malar.]

[1 mark]

- (d) Calculate the distance travelled by the cyclist in the first 350 s.

[Hitungkan jarak yang dtlalui oleh penunggang basikal itu dalam masa 350 s yang pertama.]

[2 marks]

3. Figure 3.1 shows the structure of a hydraulic jack. The cross-sectional area of pistons, P and Q are  $15 \text{ cm}^2$  and  $500 \text{ cm}^2$  respectively. A force of  $150 \text{ N}$  is exerted on piston P.  
 [Rajah 3.1 menunjukkan struktur jek hidraulik. Luas keratan rentas omboh P dan Q suntan  $15 \text{ cm}^2$  dan  $500 \text{ cm}^2$  masing-masing. Daya  $150 \text{ N}$  bertindak pada omboh P.]

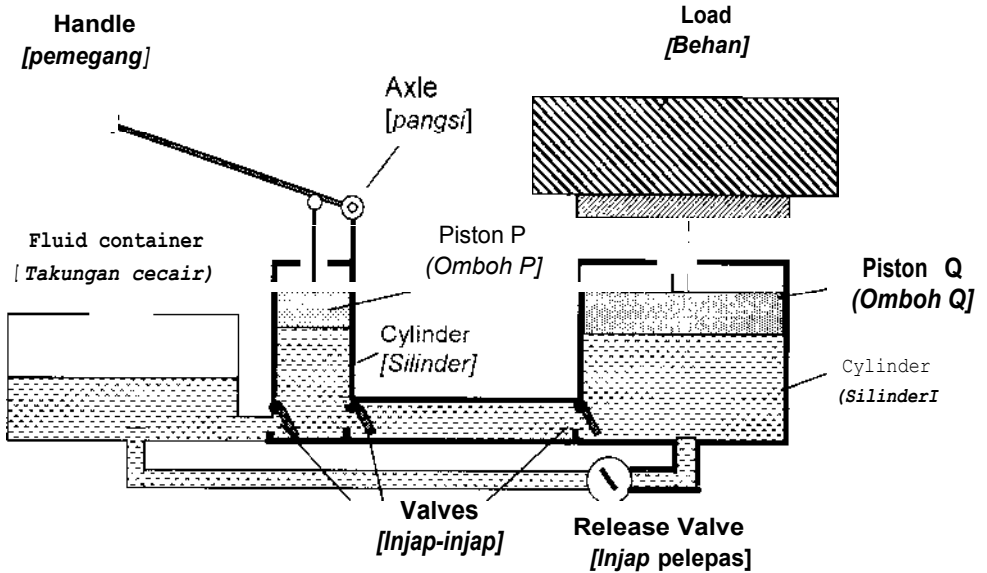


Figure 3.1  
 [Rajah 31]

- (a) Name the physics principle applied in the hydraulic jack.  
 [Namakan prinsip fizik yang digunakan dalam jek hidraulik.]

[1 mark]

- (b) Compare the pressure at piston P and the pressure at piston Q.  
 [Bandingkan tekanan pada piston P dengan tekanan pada piston Q]

[1 mark]

- (c) Calculate the weight of the load that can be lifted by the piston Q.  
 [Hitungkan berat beban yang boleh diangkut oleh piston P.]

[2 marks]

- (d) State the function of the release valve.  
 [Nyatakan fungsi injap pelepas]

[1 mark]

- (e) State one suitable characteristic of the fluid used in the hydraulic jack.

[Nyatakan satu ciri yang sesuai bagi cecair yang digunakan di dalam jek hidraulik]

[1 mark]

[See Overleaf]

CONFIDENTIAL

4

Evaporation is a cooling process. Condensation, on the other hand, is a warming process.

*[Penyejatan ada/ah satu proses penyejukan. Sebaliknya, kondensasi adafah proses pemanasan.]*

Figure 4.1

*[Rajah 4.1]*

(a) **State the phase change during**

*[Nyatakan perubahan keadaan jnm bags]*

(i) **Evaporation** : .....

*[Penyejatan]*

(ii) **Condensation** : ..... [ 1 mark ]

*[Kondensasi]*

(b) **Name the physics concept used to explain both processes mentioned in Figure 4.1.**

*[Namakan konsep fizik yang digunakan untuk menjelaskan kedua-dua proses dalam Rajah 4.1]*

[ 1 mark ]

(c) **Explain how**

*[Jelaskan bagaimana]*

(i) **evaporation causes a liquid to cool down.**

*[penyejatan menyejukan sesuatu cecair]*

[ 1 mark ]

(ii) **condensation causes surrounding to warm up.**

*[kondensasi memanaskan persekitaran.]*

[ 1 marks ]

(d) **Which would require more heat energy ; completely boiling 1 kg of water at 100°C into steam or allowing 1 kg of water to totally evaporate at any temperature?**

*[Yang mans satukah, memedukan lebih banyak tenaga ; untuk mengubahkan 1 kg air kepada stim sepenuhnya pada 100°C atau dengan membiarkan 1 kg air sernuanya tersejat pada sebarang suhu.]*

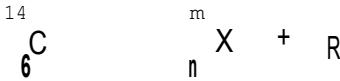
[ 1 mark ]

(e) **Cal-ulate the amount of heat required to evaporate 50 g of sweat . (Latent heat of evaporation for sweat is  $3.2 \times 10^6 \text{ J kg}^{-1}$ )**

*[Hitungkan kuantiti haba yang digerlukan untuk menyejat 50 g peluh (Haba pendam pengewapan peluh adalah  $3.2 \times 10^6 \text{ J kg}^{-1}$ )]*

[2 marks]

5.



The equation shows a certain radioactive decay.

[Persamaan di atas menunjukkan satu pereputan radioaktif]

(a) What is a beta particle, p?

[Apakah zarah beta 3?]

[ 1 mark]

(b) **State the** nucleon number, m and proton number, n for X.

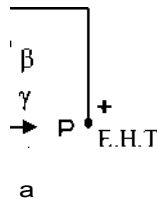
[Nyatakan nombor nukleon, m dan nombor proton, n bagi X.]

m : ..... n : .....

..... [ 2 marks ]

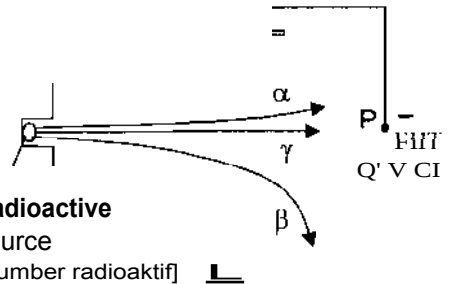
(c) Figures 5.1 and 5.2 show three different rays emitted by a radioactive source. The rays are directed through a strong electric field.

[Rajah 5.1 dan 5.2 menunjukkan tiga sinar yang dipancarkan daripada satu sumber radioaktif melalui medan elektrik yang kuat.]



**Radioactive source**  
[sumber radioaktif]

Figure 5.1  
[Rajah 5.1]



**Radioactive source**  
[Sumber radioaktif]

Figure 5.2  
[Rajah 5.2]

(i) In Figure 5.1, P is connected to the positive terminal and Q to the negative terminal. In Figure 5.2, the connection of P and Q is **reversed**. Describe the path of the rays when they pass through the electric field.

[Dalam Rajah 5.1, P disambungkan ke terminal positif dan Q ke terminal negatif. Dalam Rajah 5.2, sambungan P dan Q diterbalikan. Huraikan lintasan sinar-sinar itu apabila melalui medan elektrik.]

gamma ray,  $\gamma$  : .....  
[sinar gamma]

beta ray,  $\beta$  : .....  
[sinar beta]

alpha ray,  $\alpha$   
[sinar alfa]

[ 2 marks ]

- gamma ray, Y .....  
[sinar game]  
beta ray, P .....  
[sinar beta]  
alpha ray, a :...\_.....\_ .....\_.....\_ .....\_.....\_ .....  
[sinar &fa] [ 1 mark]

(i) compare the degree of deflection for a and  
[bandingkan derajat pemesonan a dan /1..]

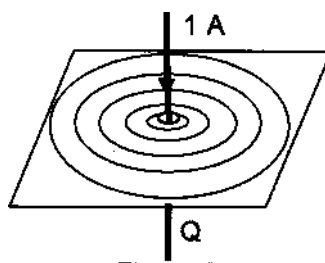
**[ 1 mark]**

- (ii) explain your answer in (d)(i).**  
***gelaskan jawapan ands di (d)(t)]***

**[ 1 mark]**

A diagram showing a rectangular plate with a central hole. A vertical wire passes through the hole, with an upward arrow and the label  $0.5\text{ A}$ . Concentric circles are drawn around the hole, representing magnetic field lines. A label  $P$  is at the bottom of the wire.

**Figure 6.1**  
[Rajah 6.1]



**Figure 6.2**  
[Rajah 6.2]

- (a) (i) Mark the direction of the magnetic field around wire P and wire Q in Figure 6.1 and 6.2.**

[Tandakan arah medan magnet disekeliling dawai P dan Q dalam Rajah 6.1 dan 6.2]

[ 1 mark ]

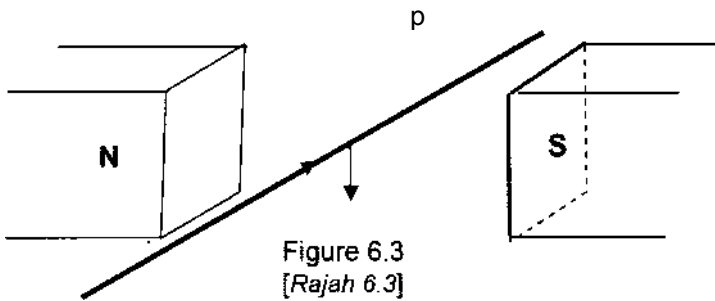
- (ii) State the rule **that is used to determine** the direction of **the magnetic field** in (a).  
*[Nyatakan petua yang digunakan untuk menentukan arch medan magnet pada soalan (a)O]*

**[ 1 mark]**

- (b) Observe Figure 6.1 and Figure 6.2, state the relationship between the electric current, the density of magnetic lines and the strength of the magnetic field?  
 [Perhatikan Rajah 6.1 dan Rajah 6.2, hubungkan antara arus dengan kepadatan garis medan magnet dan kekuatan medan magnet.]

[ 2 marks ]

- (c) A pair of magnets is placed over the current carrying wire P as shown in Figure 6.3. Wire P was observed to move downward.  
 [Sepasang magnet diletakkan meunrasi dawai P yang membawa arus seperti ditunjukkan dalam Rajah 6.3. Dawai P kelihatan bergerak ke bawah ]



- (i) Sketch the magnetic field pattern formed between the North and South pole of the magnets in Figure 6.4.  
 [Lakarkan corak medan magnet di antara kutub Utara dan Selatan magnet itu dalam Rajah 6.4.]

N

S

Figure 6 .4  
 [Rajah 64]

- (ii) Sketch the resultant magnetic field pattern around wire P.  
 (Lakarkan corak medan magnet yang terbentuk di sekeliling dawai P.J)

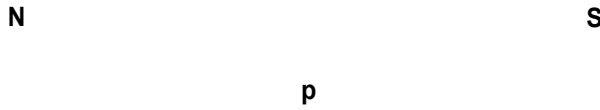


Figure 6.5  
 (Rajah 6.5)

- [ 2 marks]  
 (iii) Explain how wire P moves downward in the magnet magnetic field shown in Figure 6.3  
 [Jelaskan bagaimana dawai P bergerak ke bawah dalam medan magnet seperti dalam Rajah 6.3]

[ 2 marks]

7 Figure 7.1 shows a set of fringes formed when light passes through a single slit.

[Rajah 7.1 menunjukkan corak pinggir yang dihasilkan apabila cahaya melalui satu celah halus.]

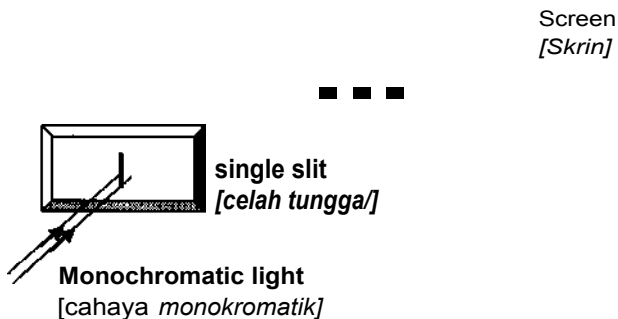


Figure 7.1  
 [Rajah 7.11]

- (a) Explain how fringes are formed on the screen?  
 [Jelaskan bagaimana pinggir-pinggir dihasilkan di atas skrin.]

[ 2 marks]

(b) Name the wave phenomenon that explains the formation of the fringes.

[Namakan fenomena gelombang yang menerangkan penghasilan pinggir-pinggir tersebut.]

[1 mark]

(c) The **single slit** in Figure 7.1 is enlarged considerably.

( Lebar celah dalam Rajah 7.1 ditambahakan]

(i) Draw the pattern observed on the screen in Figure 7.2

[Lukiskan corak yang diperhatikan pada skrin dalam Rajah 7 2]

[1 mark]

**Figure 7.2**

[Rajah 72]

(ii) **Explain your observation in (c) (i).**

[Terangkan pemerhatian anda di (c) (i).]

[2 marks]

(d) **Figure 7.3 shows water waves approaching a jetty. A protective wall is built around the jetty. A gap in the wall allows boats and waves to pass through.**

[Rajah 7.3 menunjukkan gelombang air mendekati sebuah jeti. Suatu tembok pelindung dibinakan mengelilingi jeti itu Suatu bukaan pada tembok membenarkan hothot dan gelombang air melaluinya.]

Direction of  
incident waves  
[Arah gelombang  
tuju]

map  
Bukaan

Jetty  
(Jet']



**Figure 7.3**

[Rajah 73]

(i) Draw the water waves after they have passed through the gap.

(Lukis gelombang air selepas melalui bukaan]

[ 2 marks ]

[See Overleaf]

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- (ii) By referring to Figure 7.3 explain why the condition of the sea is much calmer near the jetty than before the gap.  
 [Merujuk kepada Rajah 7.3 jelaskan mengapa keadaan laut lebih tenang berhampiran jeti dibandingkan dengan kawasan sebelum bukaan.]

[ 2 marks ]

8. Figure 8 shows a circuit used to switch on lights automatically when it is dark. The resistance of the light dependent resistor (LDR),  $X$ , varies from  $1\text{ k}\Omega$  to  $11\text{ k}\Omega$  as the light intensity changes. The transistor functions when the potential across BC is more than  $4\text{ V}$ .

[Rajah 8 menunjukkan satu litar digunakan untuk menyalakan lampu secara automatik dalam keadaan gelap. Rintangan bagi perintang peka cahaya (PPC),  $X$  berubah antara  $1\text{ k}\Omega$  dengan  $11\text{ k}\Omega$  apabila keamatan cahaya berubah. Transistor akan dihidupkan jika beza keupayaan merentasi BC melebihi  $4\text{ V}$ ]

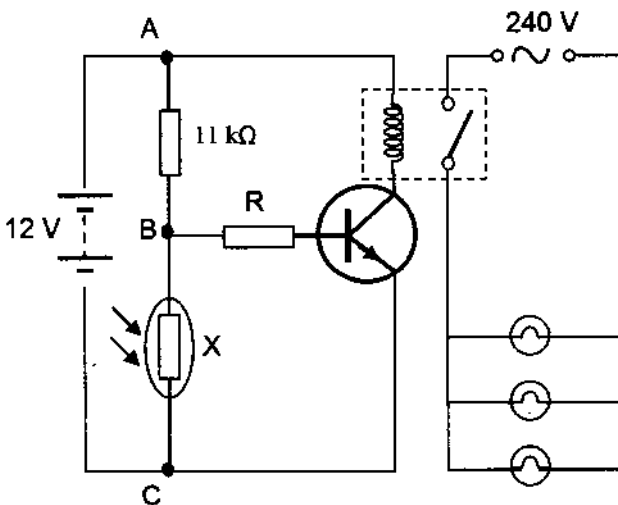


Figure 8.1  
 [Rajah 8.1]

- (a) (i) What is the function of the resistor,  $R$ ?  
 [Apakah fungsi perintang,  $R$ ?]

[ 1 mark ]

- (ii) How does the resistance of the LDR,  $X$ , change with light intensity?  
 [Bagaimana rintangan PPC berubah dengan keamatan cahaya]

[1 mark ]

- (iii) How does the potential difference across BC depend on the resistance of X?  
[Bagaimana beza *keupayaan merentasi* BC berubah dengan *rintangan* X.]

[ 1 mark]

(b) Under darkness,  
[Dalam keadaan gelap,]

- (i) what is the potential difference across AC?  
[berapakah *bezakeupayaan merentasi* AC?]

[1 mark]

- (ii) what is the potential difference across BC?  
[berapakah *bezakeupayaan* merentasi BC?]

[ 2 marks]

- (iii) would the lights turn on?  
[adakah lampu akan menyala?]

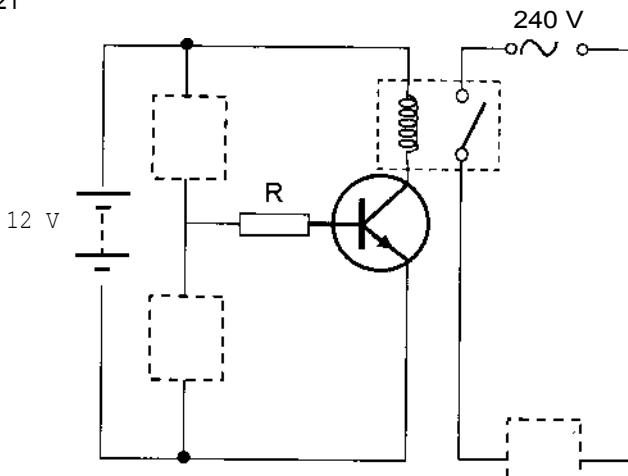
[ 1 mark]

- (iv) Explain your answer in b (iii)  
(Jelaskan jawapan anda di b (iii))

[ 2 marks]

- (c) The circuit in Figure Si is modified to be used as a heat controlled switch. The modification is done to the circuit so that an alarm sounds when the surrounding temperature increases. Using a thermistor and an alarm, complete the circuit in Figure 8.2. to show the modification.

[Liter dalam Rajah 8.1 ingin diubahsuai sebagai suis kawalan haba. Beberapa pengubahsuaian perlu dilakukan untuk membunyikan penggera apabila keadaan suhu sekitar meningkat. Dengan menggunakan termistor dan penggera, lengkapkan litar dalam Rajah 8.2]



[ 3 marks]

Figure 8.2  
[Rajah 8.2]

**Section B**  
**[Bahagian B]**

**[ 20 marks ]**

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

The time suggested to answer this section is 30 minutes.  
**(Anda dinasihatkan memperuntukkan 30 mint untuk bahagian ini).**

9. (a) Figure 9.1, Figure 9.2 and Figure 9.3 show a fisherman pulling out of the river. In Figure 9.1, the fisherman finds it easy to pull up the fishing net while most of his catch is in the water, due to the buoyant force. However as more and more of the catch is out of the water it gets harder to pull up the net as shown in Figure 9.2 and 9.3.

*[Rajah 9.1, Rajah 9.2 dan Rajah 9.3 menunjukkan seorang nelayan sedang menarik faring ikannya. Dalam Rajah 9.1 nelayan itu mendapati mudah untuk menarik faring ikan apabila kesemua faring itu berada di dalam air disebabkan oleh tujah ke atas. Namun begitu, nelayan itu merasa semakin sukar untuk menarik faring ikan dan permukaan air seperti yang ditunjukkan dalam Rajah 9.2 dan Rajah 9.3.]*



**Figure 9.1**  
**[Rajah 9.1]**



**Figure 9.2**  
**[Rajah 9.2]**



**Figure 9.3**  
**[Rajah 9.3]**

(i) What is *buoyant force*?

| Apakah yang dimaksudkan dengan *tujah ke atas*?]

[1 mark]

(ii) Using Figures 9.1, 9.2 and 9.3, compare the mass of the catch as well as the volume of the catch while still immersed in the water.

Relating the amount of force required to lift the catch, the weight of water displaced and the buoyant force, deduce a relevant physics concept.

[Menggunakan Rajah 9.1, 9.2 and 9.3, bandingkan jisim faring berisi ikan dan isipadu ikan yang masih terendam or dalam air

Hubungkan di antara daya yang diperlukan untuk mengangkat faring, berat air yang disesarkan dan *tujah ke atas* untuk menyimpulkan satu konsep fizik yang relevan.]

[5 marks]

(b) A hydrometer is used to measure the density of acid in a car battery. Using a suitable physics principle, explain how the hydrometer works.

[Sebuah *hidrometer* digunakan untuk menentukan ketumpatan asid dalam bateri kereta. Dengan menggunakan prinsip fizik yang sesuai jelaskan bagaimana sebuah *hidrometer* berfungsi.]

[4 marks]

(c) The manager of a carnival near your home seeks your advice on designing and handling a hot air balloon. The balloon should be able to; rise to about the height of a five-storey building, carry up to three people and can be brought down to the same spot after a certain time.

Explain your suggestion taking into account

- (i) the materials and other equipment required
- (ii) safety aspects,
- (iii) the best times in a day to launch the balloon

[Pengurus sebuah karnival berdekatan rumah anda meminta *khidmat* nasihat anda untuk mereka bentuk dan mengendalikan sebuah *balon udara panas*. *Belon udara panas* itu mestilah dapat naik sehingga ke ketinggian bangunan lima tingkat, membawa tiga orang dan boleh di bawa turun semula ke tempat permulaan selepas suatu masa tertentu.

Setiap cadangan anda hendaklah diterangkan dengan mengambil kira;

- (i) bahan-bahan dan peralatan lain yang diperlukan
- (ii) aspek keselamatan,

(ii) masa yang terbaik untuk menaikkan *balon udara panas* itu.]

[10 marks]

10. Figure 10.1 (a) and Figure 10.2 (a) show two circuits used to investigate the relationship between potential difference and electric current.  
Figure 10.1(b) and Figure 10.2(b) show the potential difference against electric current graph respectively for Figure 10.1(a) and Figure 10.2(b).

[Rajah 10.1(a) dan Rajah 10.2(a) menunjukkan dua susunan litar untuk mengkaji hubungan antara beza keupayaan dan arus.]

Rajah 10.1(b) dan Rajah 10.2(b) menunjukkan graf beza keupayaan melawan arus yang sepadan bagi Rajah 10.1(a) dan Rajah 10.2 (a) masing-masing].

V



Figure 10.1(a)  
[Rajah 10.1(a)]

0

Figure 10.1(b)  
Rajah 10.1 (b)

V

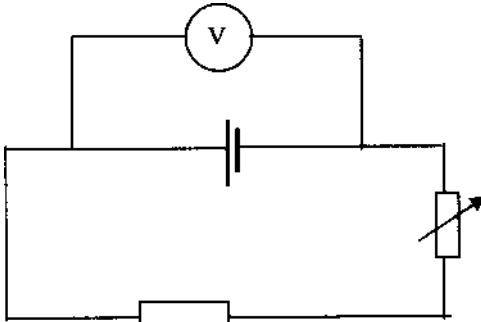


Figure 10.2(a)  
[Rajah 10.2(a)]

0

0

Figure 10.2(b)  
[Rajah 10.2(b)]

- (a) What is meant by electric current?  
[Apakah yang dimaksudkan dengan arus?]

[1 mark]

- (b) Compare the placement of the voltmeter in Figure 10.1(a) and Figure 10.2(a). Then compare the relationship between potential difference and current for both graphs. Explain the results shown in both graphs. Hence state the related physics law and concepts applicable in each situation.

[Bandingkan kedudukan voltmeter dalam Rajah 10.1(a) dan Rajah 10.2(a)]

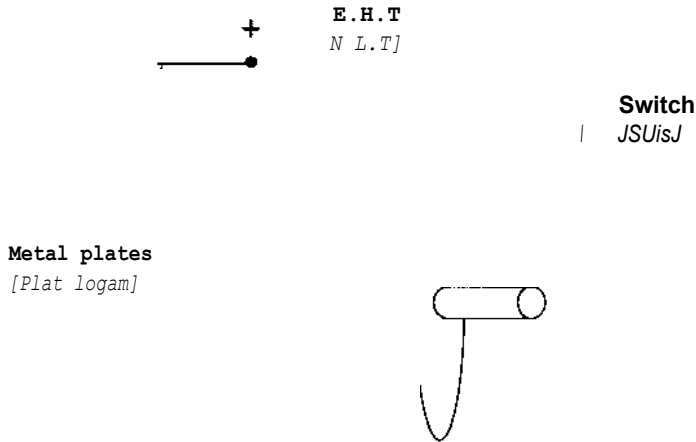
Seterusnya bandingkan hubungan antara beza keupayaan dan arus bagi kedua-dua graf dan bial penjelasan tentang kedua-dua graf tersebut. Nyatakan hukum dan konsep fizik yang berka(tan dalam setiap situasi di area anda.]

[ 5 markah ]

- (c) Figure 10.3 shows the burning candle placed between a pair of parallel metal plates. What will happen to the candle flame when the extra high voltage supply (E.H.T) is switch on? Explain your answers.

[Rajah 10.3 menunjukkan sebatang Jilin yang menyala diletakkan diantara dua plat selan yang disambung kepada bekalan voltan lampau tinggi (V.L.T). Apakah yang berlaku kepada nyalaan lilin apabila bekalan kuasa voltan tinggi disambung kepada litar. Jelaskan jawapan anda.]

[ 4 marks ]



**Figure 10.3**  
[Rajah 10.3]

- (d) Figure 10.4 shows an electric kettle.  
[Rajah 10.4 menunjukkan sebuah cerek electack]



arm

- (i) Using the appropriate physics concepts, suggest and explain suitable designs for an electric kettle that has the following characteristics:
- Able to maintain the temperature of the hot water
  - Has high efficiency
  - Easy to handle
  - Has safety features

[Menggunakan konsep fink yang sesuai, cadang dan terangkan rekabentuk sebuah cerek elektik yang mempunyai ciri-ciri berikut:

- Dapat **mengekalkan** suhu air panas.
- Mempunyai **kecekapan yang tinggi**.
- Mudah **dikendalikan**
- Mempunyai ciri-ciri **keselamatan**)

[ 8 marks]

Determine an appropriate fuis for a kettle that is marked 240V, 800W.  
( choice of fuis is 1A, 3A, **5A, 8A** atau 13A)

[Tentukan fuis yang sesuai bagi cerek bertanda 240V, 800W (Pilihan fuis adalah 1A, 3A, 5A, **8A** atau 13A)]

[ 2 marks].

### Bahagian C

[20 markah]

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

The time suggested to answer this section is 30 minutes.  
(Anda dinasihatkan memperuntukkan 30 minit untuk bahagian ini].

11 Figure 11.1 shows a stainless steel spoon. When you look at the spoon, you will see an upright and virtual image of your face on one side of the curved surfaces but an inverted image on the other side.

[Rajah 11.1 menunjukkan sebatang sudu ke/uli tahan karat. Apabila anda melihat di/nya pada satu permukaan sudu, kelihatan imej muka tegak dan maya tetapi jika permukaan sudu diterbalikkan imej yang kelihatan adalah imej yang terbalik.]



Figure 11.1  
(Rajah 11.1]

(a) (i) What is a virtual image?  
[Apakah dia imej maya?]

[1 mark ]

(ii) How does one side of the curved surface of the spoon formed an upright image, while the other side formed an inverted image? Use ray diagrams to explain your answer.

*[Bagaimana satu permukaan melengkung pada sudu boleh menghasilkan imej muka yang tegak dan permukaan belakangnya menghasilkan imej yang songsang?Gunakan rajah sinar untuk menjelaskan jawapan anda.]*

[ 6 marks ]

(b)

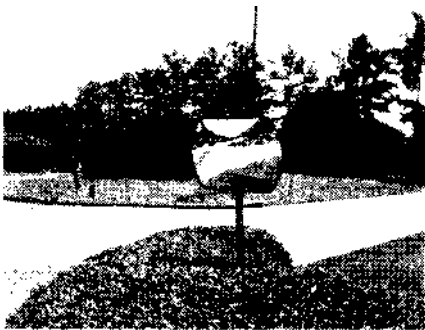


Figure 11.2  
[Rajah 11.2]

Traffic safety mirrors as in Figure 11.2 are often installed outdoors, at comers and junctions of roads to prevent accidents . Table 11.3 shows the characteristics of five types of mirrors.

*Cermin keselamatan jalanraya seperti pada Rajah 11 2 selalunya dipasang di selekoh dan simpang jalanraya untuk mengelak kemalangan Jadual 113 menunjukkan ciri-ciri bagi lima jenis cermin.*

| Characteristics<br><i>(Giri-ciri]</i> |                            | Weather<br>resistance<br><i>[ketahanan<br/>terhadap<br/>cuaca]</i> | Impact<br>resistance of<br>material<br><i>[ketahanan<br/>terhadap<br/>hentaman]</i> | Reflectivity of<br>material<br><i>(Kebolehpantulan<br/>bahan]</i> |
|---------------------------------------|----------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Mirror<br><i>[Cermin]</i>             | Shape<br><i>(bentuk]</i>   |                                                                    |                                                                                     |                                                                   |
| P                                     | Concave<br><i>[cekung]</i> | Excellent<br><i>[sangat baik]</i>                                  | Excellent<br><i>[sangat baik]</i>                                                   | Greater than 90%<br><i>(melebihi 90%)</i>                         |
| Q                                     | Convex<br><i>[cembung]</i> | Excellent<br><i>(sangat baik]</i>                                  | Poor<br><i>[Lemah]</i>                                                              | 80%–90%                                                           |
| R                                     | Convex<br><i>(cembung]</i> | Excellent<br><i>[sangat baik]</i>                                  | Good<br><i>[Baik]</i>                                                               | Greater than 90%<br><i>[melebihi 90%]</i>                         |
| S                                     | Concave<br><i>[cekung]</i> | Good<br><i>(Baik]</i>                                              | Excellent<br><i>[sangat baik]</i>                                                   | 80%-90%                                                           |
| T                                     | Plane<br><i>(satah/</i>    | Excellent<br><i>[sangat baik]</i>                                  | Good<br><i>[Baik]</i>                                                               | Greater than 90%<br><i>[melebihi 90%]</i>                         |

Table 11.3  
*(Jadual 11.3]*

Explain the suitability of each characteristic of the mirrors to be used as an outdoor safety mirror and determine which mirror is the most appropriate . Give reasons for your choice.

*[Terangkan kesesuaian bag, setiap ciri di atas untuk digunakan sebagai cermin keselamatan dan tentukan cermin manakah yang paling sesuai digunakan . Beri alasan bagi pilihan anda.]*

[10 marks ]

[See Overleaf]

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c)

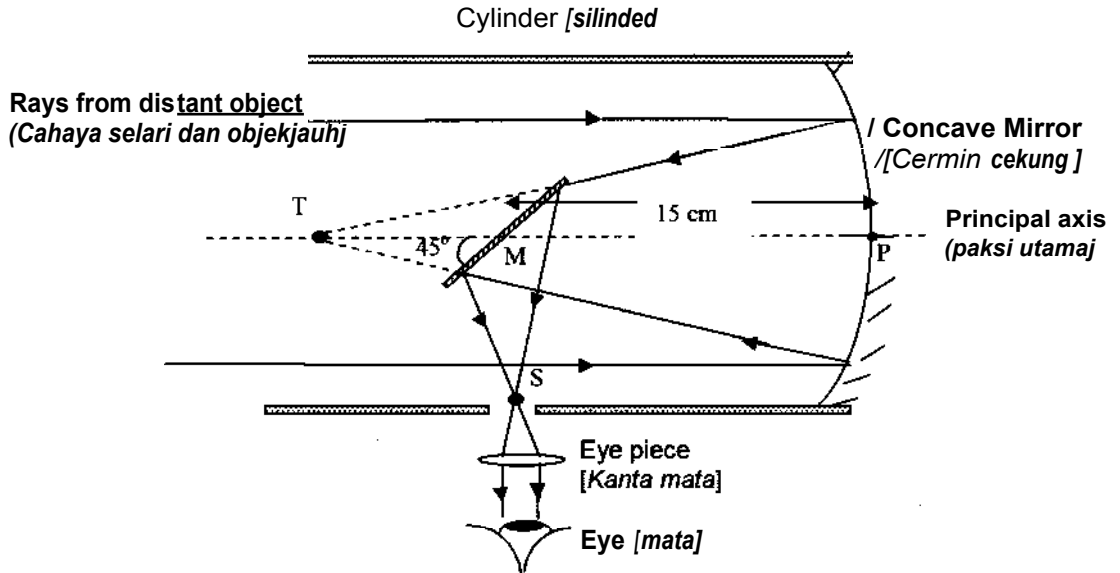


Figure 11.4  
[Rajah 11.4]

Figure 11.4 shows a reflecting telescope constructed with a concave mirror C, a plane mirror M and an eye piece K. Focal length of the concave mirror is 20 cm. Rays from a distant object is converged to form image at T without the plane mirror M. An image formed at S when the light rays are reflected by M. M makes an angle of  $45^\circ$  with the principal axis and is placed 15 cm from the pole, P of the concave mirror.

[Rajah 11.4 menunjukkan sebuah to/eskop pantu/an dibina dengan menggunakan cermin cekung C, cermin saraan M dan kanta mate K. Panjang fokus cermin cekung adalah 20 M. Cahaya dan objek jauh ditumpukan oleh cermin cekung dan membentuk imej di T apabila cermin satah M tidak diletakkan. Imej dihasilkan di S apabila sinar cahaya dipantu/kan oleh M. M membuat sudut 45 dengan paksi utama cemin cekung dan diletakkan 15 cm dan pusat P cermin cekung]

State the distance of image at T from the pole P, when the mirror M is not in place?

[Nyatakan jarak imej di T dari pusat P apabila cermin M tidak diletakkan di kedudukannya?]

[ 1 mark ]

State the characteristics of the image at S and find its distance from the centre of M.

[Nyatakan co-cur imej S dan tentukan jaraknya dan titik tengah M]

[ 2 marks]

12. (a) Figure 12.1 shows a girl on a recreational trampoline. The spring-action of the trampoline naturally makes the girl bounce up and down.

[Rajah 12.1 menunjukkan seorang kanak-kanak perempuan di atas sebuah trampolin rekreasi. Kesan keanjalan spring trampolin menyebabkan kanak-kanak itu melompat-lompat ke atas dan ke bawah.]



Trampoline  
Trampoline

Figure 12.1  
[Rajah 12.1]

- (i) State the type of energy stored by a stretched spring.  
[Nyatakan tenaga yang tersimpan di dalam spring yang teregang.]
- [ 1 mark]
- (ii) Explain how the spring-action of the trampoline can push **the girl** upward. Explain your **answer** in terms of the transformation of energy.  
[Terangkan bagaimana tindakan keanjalan spring trampolin ini membolehkan kanak-kanak itu melompat ke atas. Terangkan jawapan anda dari aspek perubahan tenaga yang terlibat.]
- [ 4 marks]
- (b) A trampoline has a strong frame. A taut **piece** of fabric is **stretched and connected to** the frame by coiled springs. Figure 12.2(a) and 12.2 (b) show the **springs** which hold the trampoline bed.

[Sebuah trampolin terdiri daripada sekeping fabrik yang diregangkan kepada rangka kukuh dengan menggunakan lingkaran spring. Rajah 12.2(a) dan 12.2(b) menunjukkan bagaimana spring itu memegang alas trampolin itu.]

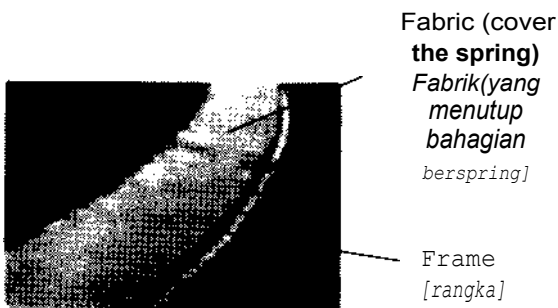


Figure 12.2 (a)  
[Rajah 12.2 (a)]



Figure 12.2 (b)  
[Rajah 12.2 (b)]

Coiled spring  
(Lingkaran spring)

You are asked to choose **a trampoline** for a competition. The trampoline should be strong **which is essential** for competitors **to make higher** jumps. The competitors are judged on both **height and style**.

[Anda dikehendaki memilih sebuah trampolin bagi satu pertandingan trampolin. Trampolin mestilah kuat supaya peserta pertandingan dapat membuat lompatan yang lebih tinggi. Peserta-peserta pertandingan dinilai dari aspek ketinggian dan gaya lompatan.]

Table 12.3 shows the characteristics **of the trampolines being considered for use**.  
[Jadual 12.3 menunjukkan on-ciri bagi setiap trampolin yang boleh digunakan.]

| Trampoline<br><i>Trampolin</i> | Spring constant<br>(pemalar spring)<br>(N m <sup>-1</sup> ) | Material for frame<br>[Kahan yang digunakan<br>untuk membuat rangka] | Number of coiled springs<br>connected to the frame<br>(bilangan lingkaran spring<br>yang disambungkan kepada<br>rangka] |
|--------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| P                              | 4.20 x 10 <sup>6</sup>                                      | Iron ( <i>best</i> )                                                 | 8                                                                                                                       |
| O                              | 2.90 x 10 <sup>7</sup>                                      | Steel ( <i>keluli</i> )                                              | 12                                                                                                                      |
| R                              | 1.50 x 10 <sup>6</sup>                                      | Steel (keluli)                                                       | 12                                                                                                                      |
| S                              | 3.00 x 10 <sup>6</sup>                                      | Iron [besi]                                                          | 5                                                                                                                       |
| T                              | 3.6 x 10 <sup>6</sup>                                       | Wood ( <i>kayu</i> )                                                 | 8                                                                                                                       |

Table 12.3  
[Rajah 12.31]

- (i) **Using the information Table 12.3 explain the suitability of each characteristic in Table 12.3 and hence, determine which trampoline is most suitable for the competition and give your reasons.**

[Dengan menggunakan maklumat pada Jadual 12.3, terangkan kesesuaian setiap ciri dalam Jadual 12.3 dan seterusnya, tentukan trampolin yang paling sesuai untuk pertandingan dan berikan sebab.]

[8 marks]

- (ii) **Explain briefly what the competitor should do to go higher up in the air.**

[Terangkan dengan ringkas apa yang perlu dilakukan oleh peserta supaya dia dapat menghasilkan lompatan yang lebih tinggi di udara]

[2 marks]

- (c) **You are required to use a spring which is able to launch a 100 g ball to a vertical maximum height of 5.0 m. The spring will be compressed 10.0 cm when it is loaded.**

[Anda dikehendaki menggunakan satu spring yang dapat melancarkan sebiyi bola 100 g tegak ke atas setinggi 5.0 m. Spring tersebut akan dimampatkan sebanyak 10.0 cm apabila beban diletakkan.]

- (i) **Calculate the speed of the ball speed as it is released from the spring.**  
[Hitungkan laju bola apabila dilepaskan dari spring]

- (ii) Calculate the kinetic energy of the ball when it is released from the spring  
*[Hitungkan tenaga kinetik bola du apabila is dilepaskan daripada spring.]*
- (iii) Determine the spring constant,  $k$ .  
*[Tentukan pemalar spring,  $k$ ]* [5 marks]

**END OF QUESTION PAPER**  
**KERTAS SOALAN TAMAT**

4531/3

Physics

Paper 3

Sept

2007

1 ; hours

Name ..... Tingkatan : .....

**JABATAN PELAJARAN NEGERI SELANGOR**  
**PROGRAM PENINGKATAN PRESTASI**  
**SAINS DAN MATEMATIK SPM**  
**2007**

**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 dan Section B.**

*For examiner only*

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

| Bahagian I Soalan | Markah Penuh | Markah Diperoleh |
|-------------------|--------------|------------------|
| A                 | 1            | 16               |
|                   | 2            | 12               |
| B                 | 3            | 12               |
|                   | 4            | 12               |

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.*

**Jumlah**

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*

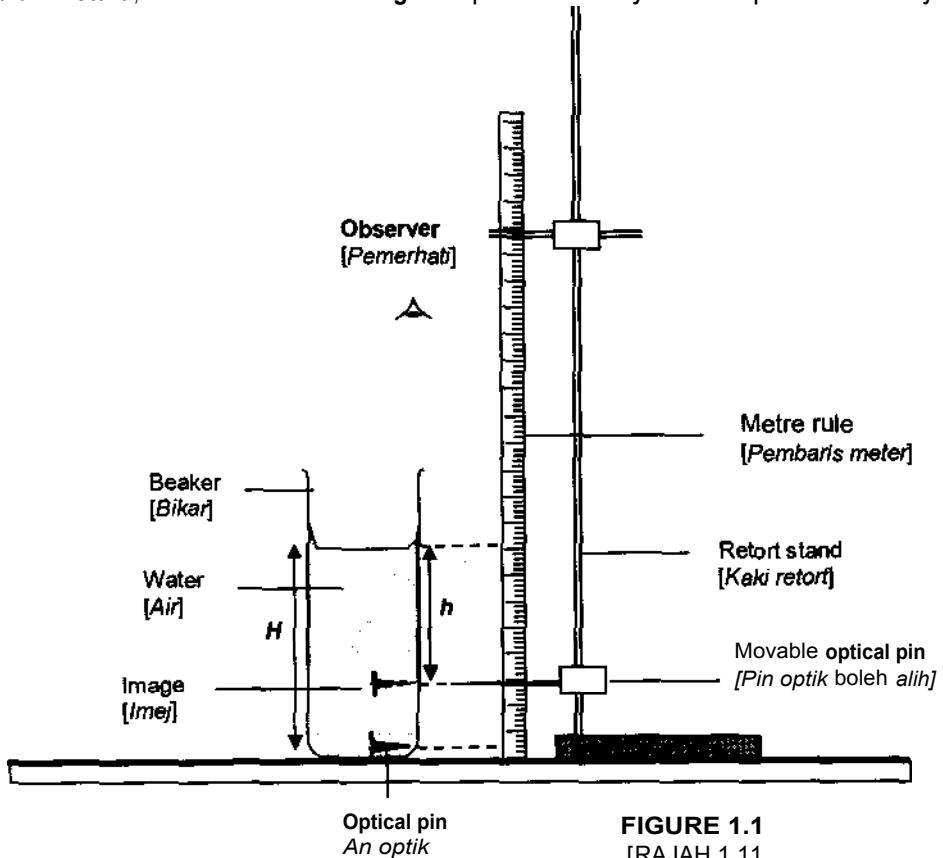
**Section A**  
**[BAHAGIAN A]**  
 [28 marks]  
 (28 markah)

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

Suggested time for this section is 60 minutes.  
 [Masa yang dicadangkan untuk menjawab bahagian ini ialah 60 minit].

1 An experiment is carried out to study the relationship between real depth,  $H$  and apparent depth,  $h$ . The arrangement of the apparatus for the experiment is shown as in Figure 1.1.

(Satu eksperimen dijalankan untuk mengkaji hubungan antara dalam nyata,  $H$  dan dalam ketara,  $h$ . Susunan radas bag! ekspedmen ditunjukkan seperd dalam Rajah 1.1.)



An optical pin placed in the beaker. Water is poured into the beaker so that the real depth,  $H$  of the optical pin is 4.0 cm.

Looking from above, an image of the optical pin is observed. The location of the image is determined using a movable optical pin, using the non-parallax method. In this way, apparent depth,  $h$  can be measured.

The experiment is repeated by adding water so that  $H$  is 6.0 cm, 8.0 cm, 10.0 cm and 12.0 cm.

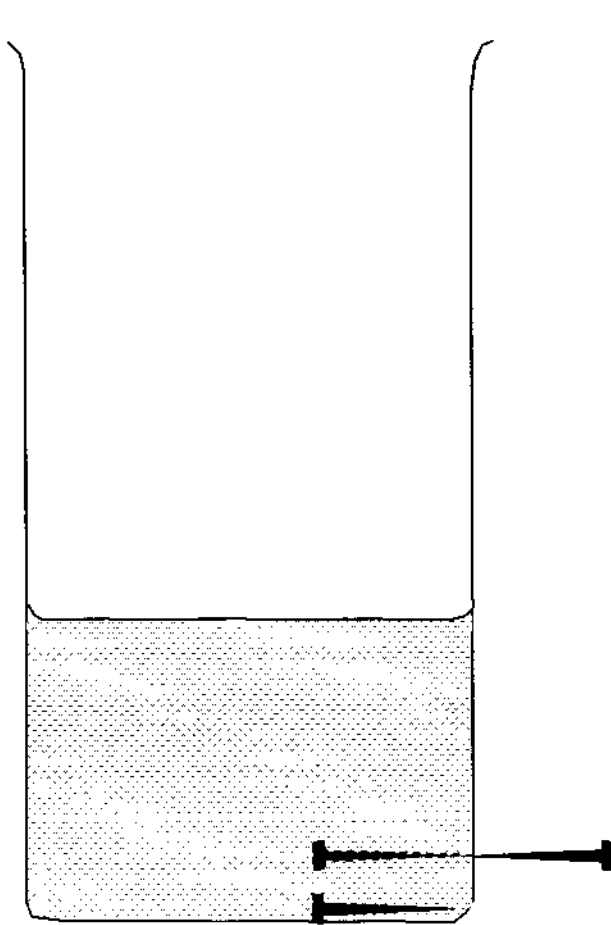
The corresponding apparent depth, it obtained is as shown in Figures 1.2, 1.3, 1.4, 1.5 and 1.6 on pages 4 and 5.

**Sebatang pin optik diletakkan ke dalam bikar. Air dituangkan ke dalam bikar sehingga dalam nyata,  $H$  bagi pin tersebut adalah 4.0 cm.**

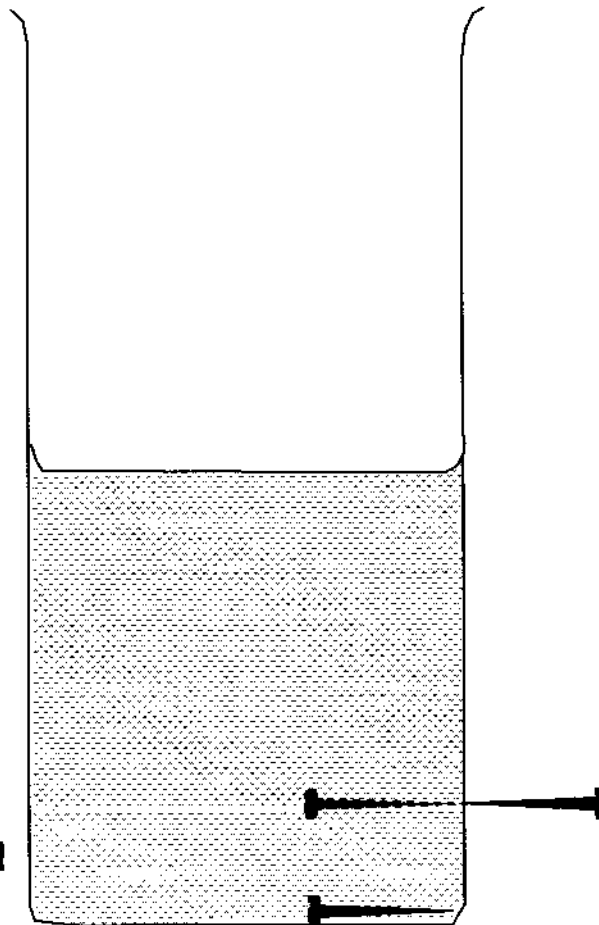
**Imej diperhatikan dad atas, satu imej bagi pin optik dapat diperhatikan. Kedudukan imej itu, ditentukan menggunakan pin optik boleh alth menggunakan kaedah tanpa paralaks. Oleh itu, dalam ketara dapat diukur.**

**Eksperimen diulangi dengan menambah air sehingga  $H$  adalah 6.0 cm, 8.0 cm, 10.0 cm dan 12.0 cm.**

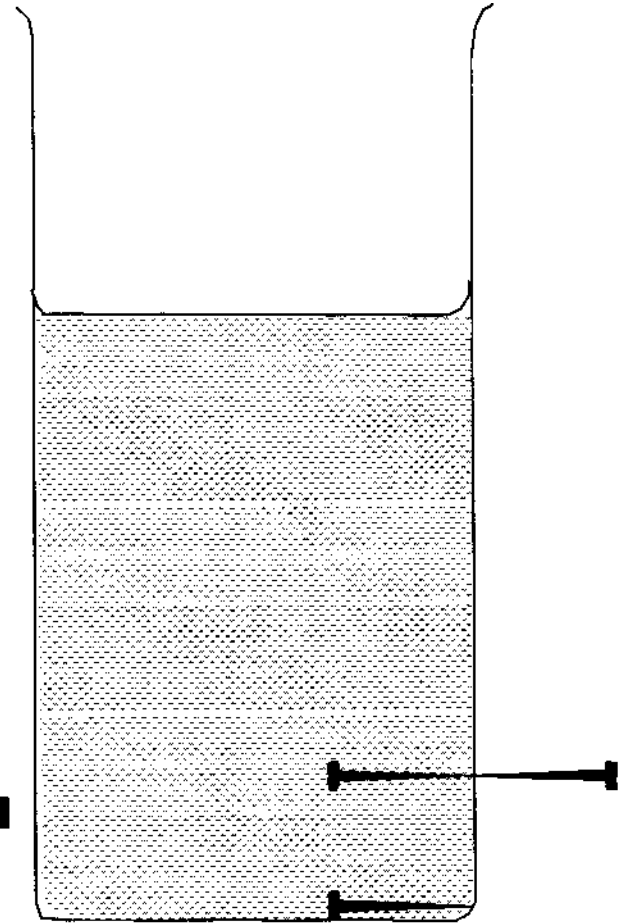
**Nilai dalam ketara,  $h$  yang sepadan masing-masing ditunjukkan pada Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 pada halaman 4 dan 5.**



**FIGURE 1.2**  
[RAJAH 1.21]



**FIGURE 1.3**  
RAJAH 1.31



**FIGURE 1.4**  
[RAJAH 1.4]

**FIGURE 1.5**  
*[RAJAH 1.51]*

**FIGURE 1.6**  
*[RAJAH 1.61]*

|                     |                                                                                                                          |                                                             |          |
|---------------------|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------|
| <b>CONFIDENTIAL</b> |                                                                                                                          | 6                                                           |          |
|                     |                                                                                                                          |                                                             | 4531/3   |
| (a)                 | <b>For the experiment described on page 2 , identify;<br/>Bagi ekspedmen yang diterangkan pada halaman 2, kenalpasti</b> |                                                             |          |
|                     | (i)                                                                                                                      | the manipulated variable,<br>[pembolehubah dimanipulasikan] |          |
|                     | (ii)                                                                                                                     | the responding variable,<br>[pembolehubah bergerakbalas]    | [1 mark] |
|                     |                                                                                                                          |                                                             | [1 mark] |

- (iii) a fixed variable.  
[satu pemboleh dimalarkan]

.....  
[1 mark]

Based on Figures 1.2, 1.3. 1.4 , 1.5 and 1.6 on pages 4 and 5 , measure apparent depth, h with your ruler.

Tabulate your results for H and h in the space below.

[Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 pada halaman 4 dan 5, ukur dalam ketara, h dengan menggunakan pembaris anda.

Jadualkan keputusan anda bagi H dan h dalam ruang di bawah.]

[5 marks]

- (d) Plot graph of h against H on page 7.  
[Lukiskan graf h melawan H, pada halaman 7] [6 marks]

- (e) Use your graph in (d), to state the relationship between real depth , H and apparent depth, h.  
[Menggunakan graf anda di (d), nyatakan hubungan antara H dan h.]

[1 mark]

- (f) State **one precaution** that should **be taken during** this experiment  
[Nyatakan satu langkah berjaga-jaga yang perlu diambil semasa eksperimen dijalankan]

[1 mark]

Graph of  $h$  against  $H$ .  
[Graf  $h$  *melawan*  $H$

2. A university student carried out an experiment to investigate the relationship between volume,  $V$  and absolute temperature,  $T$ , of a gas trapped inside a capillary tube. The results of the experiment is as shown in the  $V$  against  $T$  graph, as shown in Figure 2.1.

[Seorang mahasiswa menjalankan satu eksperimen untuk mengkaji hubungan antara isipadu,  $V$  dengan suhu mutlak,  $T$  bagi suatu gas yang terperangkap di dalam tiub kapilari. Keputusan eksperimen ditunjukkan pada graf  $V$  melawan  $T$ , seperti yang ditunjukkan dalam Rajah 2.1.1

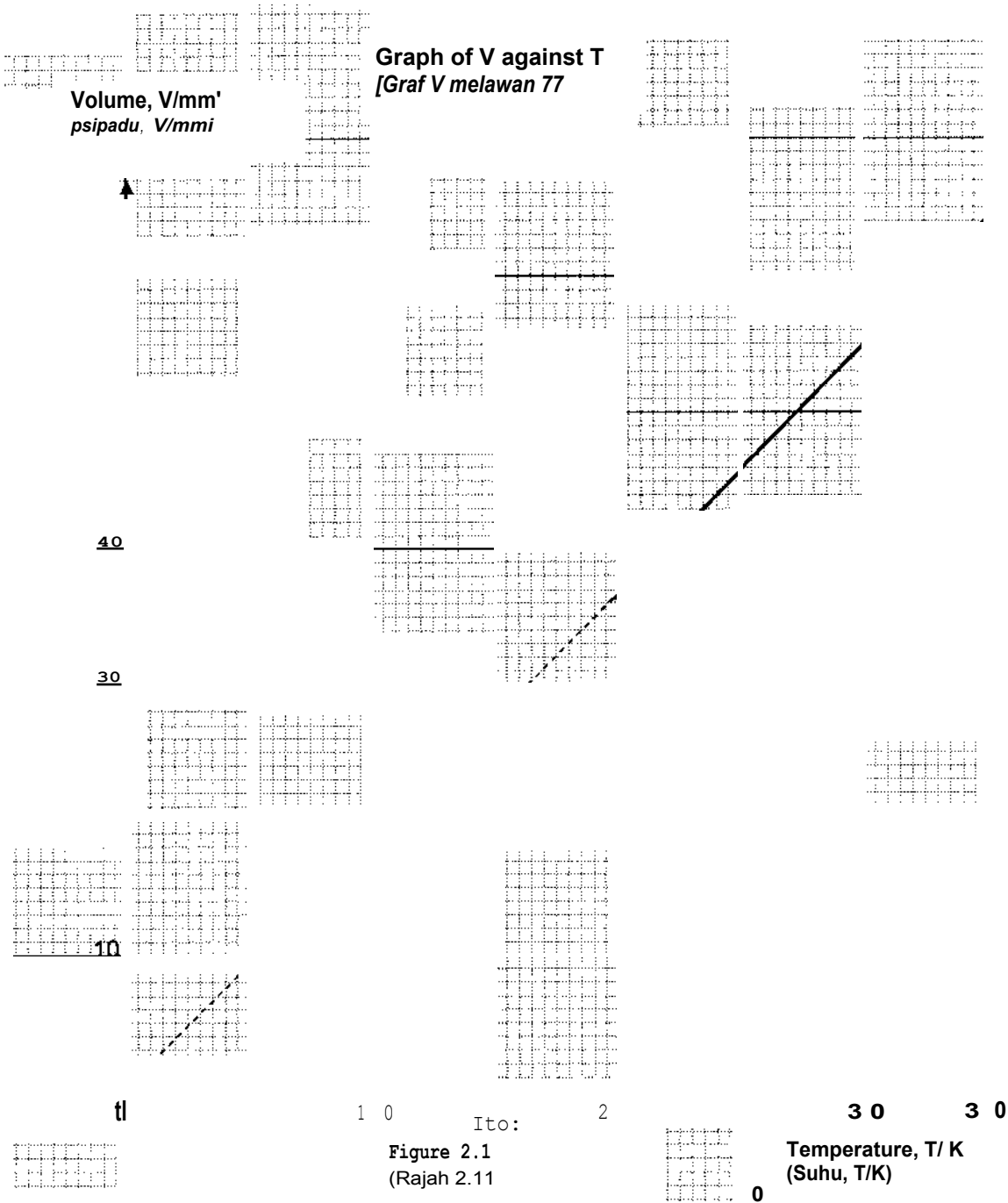


Figure 2.1  
(Rajah 2.11)

(a) **Based on** the graph of V against T on page 8,

*[Berdasarkan graf V melawan T pada halaman 8]*

(i) **state the relationship** between V and T.

*[Nyatakan hubungan antara V dan T]*

[1 mark]

(h) determine the volume of the gas trapped when the absolute temperature is 200K.

Show how you did this on the graph.

*[Tentukan isipadu gas terperangkap apabila suhu mutlak ialah 200 K]*

*Tunjukkan pada graf bagaimana anda memperolehnya]*

[2 marks]

(b) Given that the relationship between volume, V and **absolute temperature**, T of the trapped gas is

*[Diben, hubungan isipadu dan suhu mutlak gas terperangkap adalah]*

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

(i) Calculate **the gradient of** the graph

Show on the graph, how you determine **the gradient**.

*[Hitungkan kecerunan graf.]*

*Tunjukkan pada graf, bagaimana anda menentukan kecerunan]*

[3 marks]

- (ii) Based on the relationship given and your answer in b(i), determine the volume of the trapped gas when the temperature is 375 K.  
*[Berdasarkan hubungan yang diberi dan jawapan anda dalam b(i). tentukan isipadu gas terperangkap apabila suhunya ialah 375 K]*

- (c) The connection between absolute temperature, T Kelvin (K) and Celcius temperature, B °C is as follows:  
*[Hubungan suhu mutlak, T Kelvin (K) dengan suhu Celcius, B °C adalah seperti berikut:]*

$$B^{\circ}\text{C} = (T - 273)^{\circ}\text{C}$$

From the graph, determine the temperature, B °C of the trapped gas, when the volume is 55 mm'.  
*[Pada graf, tentukan suhu B °C bagi gas yang terperangkap, apabila isipadu adalah 55 mm']*

.....

.....

[ 3 marks]

## Section B

[ 12 marks]

Answer any one question

Suggested time for this section is 30 minutes

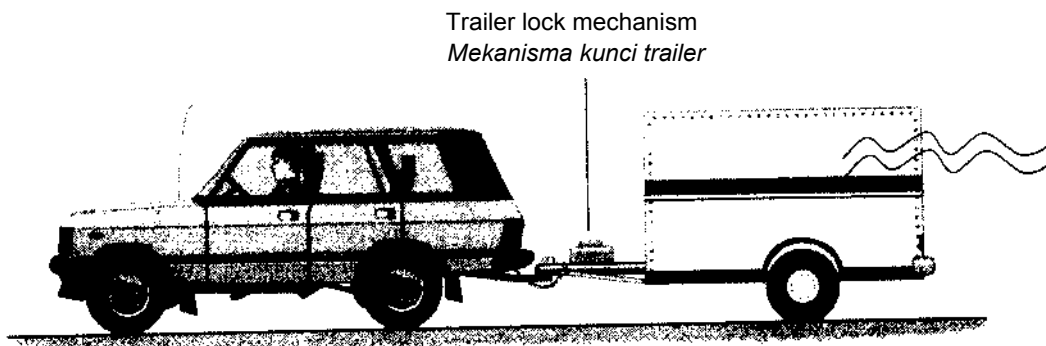


FIGURE 3.1

RAJAH 3.1

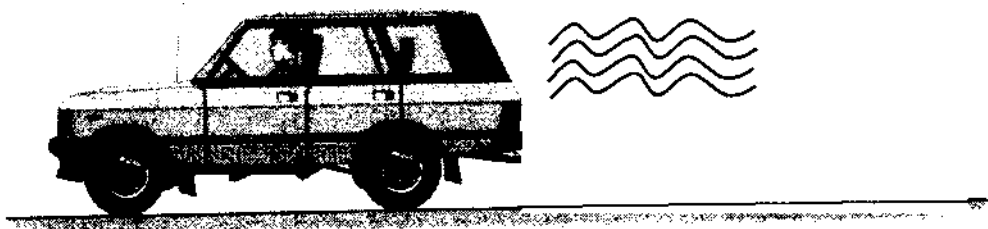


FIGURE 3.2

RAJAH 3.2

3. Figure 3.1 shows a car pulling a heavily packed trailer. The trailer is attached to the car with a locking mechanism. The car's engine is exerting a constant force that causes the car and the trailer to accelerate together.

Figure 3.2 shows what happens when the locking mechanism fails and the trailer is dislodged. The car lurches forward with an increased acceleration on its own.

[Rajah 3.1 menunjukkan sebuah kereta sedang menarik sebuah trailer yang penuh muatan. Suatu mekanisma kunci menghubungkan kereta dengan trailer. Enjin kereta mengenakan satu daya yang tetap menyebabkan kereta dan trailer mengalami pecutan yang sama.]

Based on the effect onto the car's acceleration;

*[Berdasarkan kesan ke atas pecutan kereta.]*

(a) **make an inference.**

*[buat satu inferens.]*

(b) **state an appropriate hypothesis that could be investigated**

*[nyatakan satu hipotesis yang sesuai yang boleh diasas]*

(c) **design an experiment to test the hypothesis, using dry cells, constantan wires and other suitable apparatus.**

*[Reka satu eksperimen untuk menguji hipotesis, menggunakan sel kering, wayar konstantan dan lain-lain radas yang sesuai]*

In your description, **state clearly the following;**

*[Dalam penerangan anda, jelaskan perkara berikut:]*

(i) **aim of the experiment,**

*[tujuan eksperimen,]*

(ii) **variables in the experiment,**

*[pembolehubah yang tedibat dalam eksperimen,]*

(iii) **list of apparatus and materials,**

*[senarai radar dan bahan,]*

(iv) **arrangement of the apparatus,**

*[susunan radas,]*

(v) **the procedure of the experiment, including the method of controlling the manipulated variable and the method of measuring the responding variable,**

*[prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasi dan kaedah mengukur pembolehubah bergerak balas,]*

(vi) **the way you would tabulate the data, and**

*[cara bagaimana anda akan menjadualkan data, dan ]*

(vii) **the way you would analyse the data.**

*[cara bagaimana anda akan menganalisis data.]*

4. Figure 4.1 shows an electric kettle use to boil water with a heating element. The heating coil that lies within the heating element (as shown in Figure 4.2 and in Figure 4.3) heats up when a current passes through. Two kettles with different heating coils inside the heating element are used to boil 1 liter of water. The length and material of both coils are the same. The kettle with the coil shown in Figure 4.2 will heat up water faster than the kettle with the coil shown in Figure 4.3.

*[Rajah 4.1 menunjukkan satu cerek elektrik untuk mendidihkan air menggunakan elemen pemanas. Gegeleung pemanas terletak di dalam elemen pemanas itu seperti yang ditunjukkan dalam Rajah 4.2 dan Rajah 4.3.*

*Dua cerek yang serupa dengangegeleung pemanas yang berbeza digunakan untuk mendidihkan 1 liter air Panjang dan bahan kedua-duagegeleung pemanas adalah serupa. Cerek yang menggunakangegeleung seperti yang ditunjukkan dalam Rajah 4.2 akan memanaskan air lebih cepat berbanding dengan menggunakangegeleung seperti yang ditunjukkan dalam Rajah 4.31*

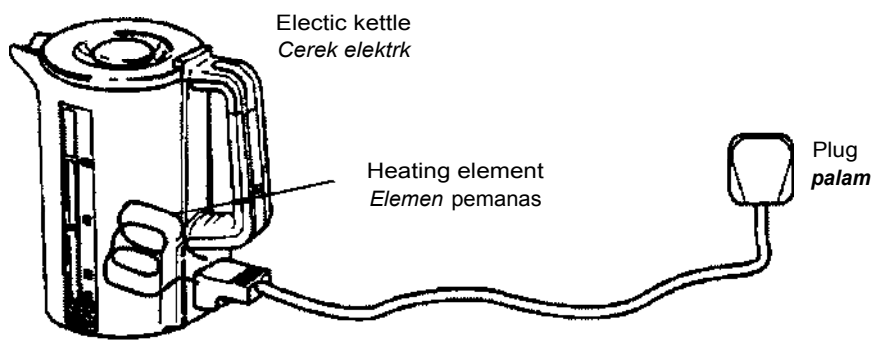


FIGURE 4.1  
[RAJAH 4.11]

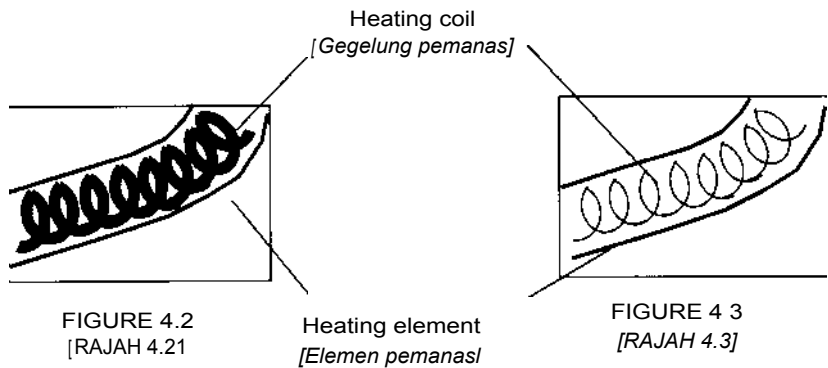


FIGURE 4.2  
[RAJAH 4.21]

Heating element  
[Elemen pemanas]

FIGURE 4 3  
[RAJAH 4.3]

Using your **knowledge** of electricity;

*[Menggunakan pengetahuan anda tentang keelektrikan;]*

- (a) **make an inference**  
*[bust satu inferens]*
- (b) **state an appropriate hypothesis that could be investigated**  
*[nyatakan satu hipotesis yang sesuai yang boleh disiasat]*
- (c) **design an experiment to test the hypothesis, using a trolley, ticker timer, ticker tape and other suitable apparatus.**  
*(Rake satu eksperimen untuk menguji hipotesis, menggunakan troll, jangka mass detik, pita detik dan lain-lain radas yang sesuar]*

In your description, state clearly the following;

*[Dalam penerangan anda, jelaskan perkara berikut:]*

- (i) **aim of the experiment**  
*[tujuan ekspedmen]*
- (ii) **variables in the experiment**  
*[pembolehubah yang terlibat deism ekspnenmen.]*
- (iii) **list of apparatus and materials**  
*[senarai radas dan bahan.]*
- (iv) **arrangement of the apparatus**  
*[susunan radas]*
- (v) **the procedure of the experiment, including the method of controlling the manipulated variable and the method of measuring the responding variable**  
*[prosedur eksperimen termasuk kaedah mengawal pembolehubah dimanipulasi dan kaedah mengukur pembolehubah bergerak bales.]*
- (vi) **the way you would tabulate the data, and**  
*[cam bagaimana ands akan menjadualkan data, dan]*
- (vii) **the way you would analyse the data**  
*[cars bagaimana ands akan menganalisis data]*

**END OF QUESTION PAPER  
KERTAS SOALAN TAMAT**

runr.idU^ PI  
1L'.V AN PP.AUpHKAV,il

P.1PI:R I

ANSWERS

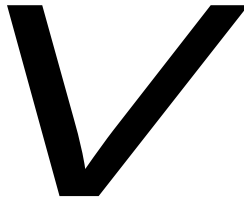
| NO | 1WP | NO  | 1WP | NO  | 1WP | NO  | 1WP | NO    | 1WP |
|----|-----|-----|-----|-----|-----|-----|-----|-------|-----|
| 1. | B   | 11  | C   | 31. | C   | 41. | B   | 41.   | B   |
| 2. | C   |     |     |     |     | 42. | C   | 42.   | C   |
| 3. | C   | 13  | C   | ^   | C   | 3z  | B   |       | B   |
| 4. | D   |     |     |     |     |     | B   |       | B   |
| 5. | D   | 1s  | oq  | D   | ^   |     |     |       |     |
| 6. | A   | 16  | (   | 6   | 1   | -   | 6   | 46.   | D   |
|    |     |     |     |     |     | -   | B   | $\pm$ |     |
|    |     | 1s. | C   | 28. | B   | s   |     | 49    | p   |
| 9  | A   | )   | B - | °9  | B   | +9  | -B  | X0..1 | -D  |
|    | B - | 0   | - C | 30. | A   | 40  | -   |       |     |

PROGRAM PENINGKATAN PRESTASI  
MATA PELAJARAN **SAINS DAN MATEMATIK**  
TAHUN 2007  
JABATAN PELAJARAN SELANGOR

**MARKING SCHEME**

**SECTION A**

|   | No.  | MARKING CRITERIA                                                                                    | MARKS      |
|---|------|-----------------------------------------------------------------------------------------------------|------------|
|   |      |                                                                                                     | SUB rTOTAL |
| 1 | L(a) | Displacement is distance travelled in a particular direction<br>Or shortest path between two points |            |
|   | (b)  | Displacement is a vector quantity / derived quantity                                                |            |



P

- (c) A straight line is drawn from P to R. with an arrow showing the direction

1

4

- (d)'. Velocity =  $\frac{500}{t}$  m.s  
500

2 (a) Speed is the rate of change of distance

bi Cvc sr ; nth uniform deceleration //velocity decreases

|       |    |                                                             |
|-------|----|-------------------------------------------------------------|
|       |    | Cccrey. substitution $x 7 \times 550 r 'G x / a (350 203 i$ |
|       |    | 1. Answer and units- 1925 m                                 |
| 3.(a) |    | Pascars principle                                           |
| (b)   |    | Pressure at P = Pressure at 0                               |
| (c)   | 1. | $150 \times 500$                                            |
|       |    | 15                                                          |
|       | 2. | 50D2 N answer with correct units                            |

Release valve is to drain (return) the fluid back to the container so that the load can return to the starting position.

- (e) Incompressible

- 4(a). (i) liquid - gas  
(ii) gas -> liquid

(b) Latent heat

1. (latent) heat is absorbed from the liquid to change its phase to gas 1  
2. (latent) heat is released when gas converts back to liquid 1

(d) (same

$$\begin{aligned} \text{Heat} &= ml \\ &= 50 \times 3.2 \times 10^{-3} / 0.05 \times 3.2 \times 10^6 \text{ (substitution)} \\ &= 1.6 \times 10^{-3} \text{ J} \quad \text{(answer + units)} \end{aligned}$$

7

5(a) (A stream of) (high energy) **electrons**. 1

(b)  $m = 14$  1  
 $n = 7$  1

(c)(i) 7. travel in straight line / **travel straight without** any deflection 1  
(5- moves/deflect towards **the positive terminal** 1  
moves/deflect towards **the negative terminal** 1  
2

**i neutral**

ii negatively charged

iii positively charged

d)(0 Degree of deflection **for alpha smaller than beta**

lu1) Mass of alpha is larger than **the mass of beta**

6(a)(i) Anti clockwise

Clockwise

(ii) **Right hand grip rule/corkscrew rule**

(b) When  $I$  increases, magnetic field lines **become closer** ! density of magnetic **field lines increase**.  
strength of magnetic **field increases** 1

ic)(i) Magnetic field lines pattern is correct  
Magnetic field lines pattern is correct

fill) 1. both fields at the top of wire P are in the same direction.: 8  
density of magnetic field lines is greater on top of P  
2. the resultant magnetic field is stronger at the top of wire P/resultant irregular magnetic field exerts a downward force on P.

- 7(a) 1. light passes through a narrow / small slit / gap  
2. light spread/ bends after passing through slit

(b) Diffraction

1

c (i)

Single bright fringe

1. the slit width is considerably **greater than** the wavelength of light.

2. diffraction of light is less.

2

1\_ draw diffraction/spreading of waves (slightly circular)

2. show that wavelength of waves before and after diffraction is the same.

2

1. The energy of the wave is spread beyond **the gap**.

2. The amplitude of the wave **decreases** (as it gets further away from the gap.)

2

10

8.(a)4 To limit the current through the **transistor**

(ii) As the brightness increases, resistance of X decreases.

(iii) The greater the resistance, the higher the potential difference across BC// potential difference across BC Increases with R,

(b)(i) **12V**

i-  $V_{...} = \frac{P}{I}$

2. 6 V ianswer and units

(iii) yes

(iv) !

1. **V. is greater than 4 V**

2 **Base current flows**

3. Transistor **is activated** //Collector current Flows// Relay will **switched on** lights

!Any two correct)

(c)

1. Resistor 11 kit is replaced by termistor

2. X replaced resistor

3. bulbs replaced by alarm

3

| FIZIK KERTAS 2<br>( Section B ) |                                                                                                                                                                                                                                                  |       |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| No..^                           | Marking Criteria / Answers                                                                                                                                                                                                                       | Marks |
| 9.(a)                           | Buoyant force is an upward force acting on an object immersed in d fluid                                                                                                                                                                         |       |
| (i1)                            | 1. <b>States that the actual mass/weight of the catch is the same in all three figures.</b><br>The mass of the catch does not change through out the whole act of lifting the net<br><b>Comparing the volume of the catch still under water.</b> |       |
|                                 | 3. <b>Comparing the force needed to lift the net</b><br>The volume of the catch still In the water is <b>getting smafer/is</b> the least in Figure 9.3 and the largest in Figure 9.1                                                             |       |
|                                 | 4. <b>Comparing the weight of water displaced</b><br>The force needed to lift the catch is getting bigger. / in Figure 9.3 is the greatest                                                                                                       |       |
|                                 | 5. <b>States that buoyant force is equal to weight of water displaced</b><br>The weight of water displaced <b>is getting smaller</b> / the greatest in Figure 9.1 and the least in 9.3                                                           |       |
|                                 | 6. <b>Relate the weight of water displaced with buoyant force</b><br>The greater the weight of water displaced the greater the buoyant force<br>(Any 5 correct)                                                                                  | 5     |
| (b) j                           | 1. <b>States that the related principle is the Archimedes ' Principle.</b><br>2. <b>Draw a diagram of the hydrometer correctly (small and long stem. with big bulb with lead or steel balls)</b>                                                 |       |
|                                 | 3. When a hydrometer heats in a liquid, the buoyant force is equal to the eight of the Hydrometer                                                                                                                                                |       |
|                                 | 4 Buoyant `brce depends on density of liquid                                                                                                                                                                                                     |       |
|                                 | The smairr the ceq, ; of the liquid, the more fquld it displaces and the aeepe the N, ronietec rHi sink.                                                                                                                                         |       |

iany 4 correct!

→

### Rationale

- (cl r. Balloon should be lz^ge s. ce
- To create sufficient buoyant force due to greater weight of surrounding air displaced
2. **Balloon** m renal s n ! deaf ugh weight material like nylon
- The total weight of the balloon is less than the buoyant force//reduce weight
- 3 Balloon material should also na e high melting port
- 4 will not disintegrate r,vhec exposed to hot air
- a The part of the naiv,,n (the skirt; near the homer roust he P
- So that it doesn't catch fire easy
- mater &'
- 5 The burner bu-ns rl. uer, eo
- Warms up the air in the balloon
- propane/gas**
- b **A large fan** is needed Inifially
- To blow enough air into the balloon
- The basket must be made riff light and flexibiersafe material ieg.
- Probng the collision time between basket and groundd

rattan or cane woven )

reduce impulsive force when

brisket hits the ground

8. There must be a line or rope from the balloon to the ground

Prevents the balloon from being swept away from the carnival

10

9. Best times to launch the balloon are early morning and late afternoon

Cool air is denser, providing more buoyant force

1. when the air is cooler

Any 5 correct h

20

| No.   | Marking Criteria                                | Answers                                                                                                                                                             | Marks |
|-------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 10(a) | Electric current is the rate of flow of charge. |                                                                                                                                                                     | 1     |
| (b)   | 1.                                              | The voltmeter in Figure 10.1(a) is parallel to the resistor while in Figure 10.2(a) the voltmeter is parallel to the battery.                                       |       |
|       | 2.                                              | The graph in 10.1(b) shows that potential difference is directly proportional to current.                                                                           |       |
|       | 3.                                              | Obeys Ohm's law                                                                                                                                                     |       |
|       | 4.                                              | Graph in Figure 10.2(b) shows that the potential difference across the cell decreases when the current flowing through it increases. // V decreases linearly with I |       |
|       | 5.                                              | Voltage drops due to the internal resistance of the battery                                                                                                         |       |
|       |                                                 |                                                                                                                                                                     | 5     |
| (c)   | 1.                                              | The lighted candle . the heat from the candle causes the air molecules (surrounding it) to be moved                                                                 |       |
|       | 2.                                              | The positive charges would be attracted to the negative plate and/or the negative charges would be attracted to the positive plate                                  |       |

3. The flame of the candle would be dispersed (flattened) into top parts suitable diagram

4. More the flame is attracted to the negative plate // diagram

5. Positive charges are heavier than negative charges.

( any 4 correct)

(d)

1. The main body of the kettles made up of high specific heat capacity materials.

2. This is to make sure that the outer body does not heat up too fast.

3. The body of the kettle must be made from insulator-like materials

4. that reduces heat loss to the surroundings

5. The material should also have a low density

6. so that it's lighter to carry

7. The handle must be made of insulators

8. So that it does not get heated.

8

$$9. I = \frac{V}{R} = \frac{240}{0.72} = 333.33 \text{ A}$$

10. Most suitable 5 A fuse

| No.        | Marking Criteria/Answers                                                                                                                                                                                                                                                                        | Marks |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 1 I.(a)(i) | Image that cannot be formed on the screen.                                                                                                                                                                                                                                                      | 1     |
| ii         | 1. Concave surface gives inverted image                                                                                                                                                                                                                                                         |       |
| 2 & 3      | Sketch a ray diagram to show a diminished inverted real image                                                                                                                                                                                                                                   |       |
| 4.         | Convex surface gives upright image                                                                                                                                                                                                                                                              |       |
| 5 & 6.     | Sketch a ray diagram to show a diminished upright virtual image.                                                                                                                                                                                                                                | 6     |
| b)         | Mirror should be chosen based on:                                                                                                                                                                                                                                                               |       |
| 1.         | Shape should be convex                                                                                                                                                                                                                                                                          |       |
| 2.         | Gives wider field of view and upright image.                                                                                                                                                                                                                                                    |       |
| 3.         | Better weather resistance                                                                                                                                                                                                                                                                       |       |
| 4.         | So that mirror will not get blurred under heat, light and rain.                                                                                                                                                                                                                                 |       |
| 5.         | High impact resistance                                                                                                                                                                                                                                                                          |       |
| 6.         | Prevent damage due to strong force caused by accident or vandalism.                                                                                                                                                                                                                             |       |
| 7.         | High reflectivity                                                                                                                                                                                                                                                                               |       |
| 8.         | Produce brighter image under dim light.                                                                                                                                                                                                                                                         |       |
| 9.         | Mirror R is more appropriate.                                                                                                                                                                                                                                                                   |       |
| 10.        | Because it is convex. It is made from excellent weather-resistant material and has good impact resistance and high reflectivity. It is more important to have high [weather resistance than good impact resistance because it is constantly having to resist while rarely experiencing impact.] | 10    |
| cxi)       | Focal length. 20 cm                                                                                                                                                                                                                                                                             |       |
| 1          | Real and diminished.                                                                                                                                                                                                                                                                            |       |
| 2.         | $20 - 15 = 5 \text{ cm}$                                                                                                                                                                                                                                                                        | 2     |

| No. | Marking Criteria/Answers | 20 Marks |
|-----|--------------------------|----------|
|-----|--------------------------|----------|

Elastic potential energy

1

When the girl lands on the trampoline bed, the force of the jump stretches the springs.

As the springs are stretched, they store elastic potential energy.

At that point, the potential energy in the springs is converted to kinetic energy, and the spring begins to restore themselves to their initial position.

4. The kinetic energy provided by the springs pushes the girl up into the air and changes to potential energy.

4

Therefore, not extra energy is stored, and converted to kinetic energy. The trampoline then pushes the competitor higher up in the air.

Steel frame

Stronger, can support the competitor

7 More coiled springs

6. Allows for higher bounces and more complicated stunts.

Trampoline C

8. Os chosen because it has the highest spring constant, it is **made of steel and has the** most number of coiled spring.

8

(b)(u)

1. Jump harder/ push harder
2. **To increase reactive force ! to store more energy**

2

$$\begin{aligned}
 &= u^2 + 2as \\
 0 &= u' + 2(-10)(5) \\
 u &= 10\text{ms}^{-1}
 \end{aligned}$$

or

$$\begin{aligned}
 \frac{1}{2}mv^2 &= mgh \\
 \frac{1}{2}mv^2 &= 2gh \\
 v &= 10\text{ms}^{-1}
 \end{aligned}$$

2

$$\begin{aligned}
 E &= \frac{1}{2}mv^2 \\
 &= \frac{1}{2}(100/1000)(10)^2 \\
 &= 5\text{J}
 \end{aligned}$$

$$\begin{aligned}
 &= 5\text{J} \\
 k &= 1000 \text{ N m}^{-1}
 \end{aligned}$$

2

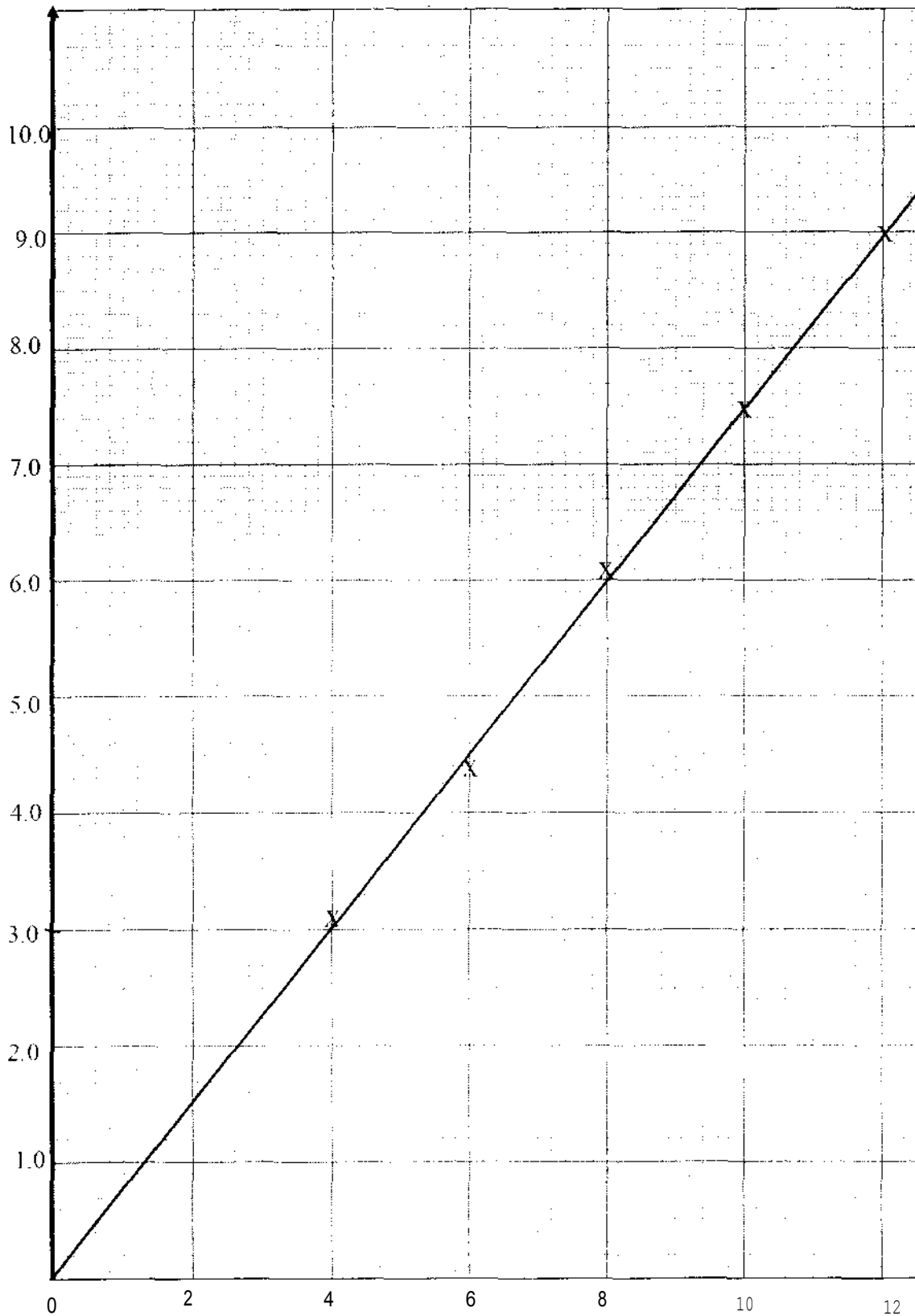
PAPER 3

SECTION A

| Question   | Marks      | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |            |            |            |            |            |            |          |            |            |
|------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------|------------|------------|------------|------------|------------|----------|------------|------------|
| (a)(i)     | 1          | <p><b>Stating the correct manipulated variable.</b></p> <p>Responding variable: <u>Volume of water</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |            |            |            |            |            |            |          |            |            |
| (ii)       | 1          | <p><b>Stating the correct responding variable.</b></p> <p>Manipulated variable: <u>depth // h</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |            |            |            |            |            |            |          |            |            |
| (iii)      | 1          | <p><b>Stating a correct fixed variable.</b></p> <p>Fixed variable: <u>Water density // refractive index</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |            |            |            |            |            |            |          |            |            |
| (b)        | 6          | <p><b>Tabulating results of the experiment</b></p> <ol style="list-style-type: none"> <li>Labels H and h are shown</li> <li>Correct units for H and h.</li> <li>NI in in two correct readings for h</li> <li>All h readings are correct</li> <li>All h readings are stated to 1 decimal place.</li> </ol> <table> <tr> <td>H cm</td> <td><u>3.1</u></td> </tr> <tr> <td><u>4.0</u></td> <td><u>3.1</u></td> </tr> <tr> <td><u>6.0</u></td> <td><u>4.4</u></td> </tr> </table><br><table> <tr> <td><u>10s</u></td> <td><u>5</u></td> </tr> <tr> <td><u>L U</u></td> <td><u>9.0</u></td> </tr> </table> | H cm | <u>3.1</u> | <u>4.0</u> | <u>3.1</u> | <u>6.0</u> | <u>4.4</u> | <u>10s</u> | <u>5</u> | <u>L U</u> | <u>9.0</u> |
| H cm       | <u>3.1</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |            |            |            |            |            |            |          |            |            |
| <u>4.0</u> | <u>3.1</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |            |            |            |            |            |            |          |            |            |
| <u>6.0</u> | <u>4.4</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |            |            |            |            |            |            |          |            |            |
| <u>10s</u> | <u>5</u>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |            |            |            |            |            |            |          |            |            |
| <u>L U</u> | <u>9.0</u> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |            |            |            |            |            |            |          |            |            |
| (c)        | 7          | <p><b>Plotting the h against H graph</b></p> <ol style="list-style-type: none"> <li>Responding variable h on the y-axis and manipulated variable H on the x-axis.</li> <li>Correct units for H and h shown on both axes.</li> <li>The scales on both axes are regular not an odd scale.</li> <li>5 points plotted correctly (mark not given if not in table).</li> <li>5 points plotted correctly (mark not given if not in table).</li> <li>Line of best fit.</li> </ol> <p>Graph size minimum of 5x4 (5 boxes on y-axis. 4 boxes on x-axis).</p> <p>Best fit line</p>                               |      |            |            |            |            |            |            |          |            |            |
| (d)        | 1          | <p><b>Stating the correct relationship</b></p> <p>Relationship: <u>directly proportional to h</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |      |            |            |            |            |            |            |          |            |            |
| (e)        | 1          | <p><b>Stating the correct precaution</b></p> <p>Read level of meniscus on the meter rule (to avoid parallax error) % Reading level is determined at the bottom of the meniscus.</p>                                                                                                                                                                                                                                                                                                                                                                                                                   |      |            |            |            |            |            |            |          |            |            |

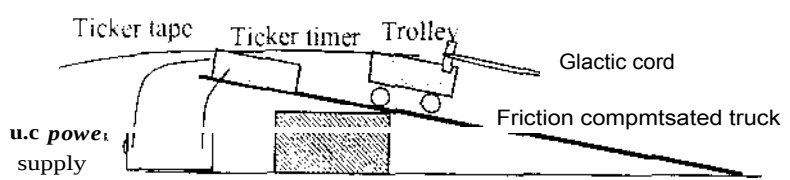
hi cm

Graf h law-an H



H/cm

| PROGRAM PENINGKATAN PRESTASI<br>JABATAN PELAJARAN SELANGOR 2007 |       |   |                                                                                                                                    | FIZIK SPM<br>KERTAS 7 |
|-----------------------------------------------------------------|-------|---|------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| SECTION B<br>Question 1                                         |       |   |                                                                                                                                    | Note                  |
|                                                                 | Marks |   | Answer                                                                                                                             |                       |
| fa)                                                             | 1     | 1 | LloAixtg the rrj pt n<br>h alo a non depends on mass                                                                               |                       |
| ^ (b)                                                           | 1     | 1 | Built/mg an appropriate Inpotxesxs                                                                                                 |                       |
|                                                                 |       |   | f h greater the mass. the greater the acceleration -                                                                               |                       |
| ric)(i)                                                         | 1     | 1 | Stating the aim of the experiment<br>To study the relationship between the acceleration and mass of an obj cl under constant force |                       |
| (ii)                                                            | 1     | 1 | Stating /ha come t variables<br>Manipulated variable _ Mass_ in<br>Responding variable _ Acceleration, a<br>Fixed variable : Fomc  |                       |
| (ii)                                                            | 1     | 1 | tic' t?/ /proprinle uppm this and material<br>lir. A L power supply, runwa                                                         |                       |
| (iv)                                                            | 1     | 1 | /)eceribing cet up of /lw apparatus                                                                                                |                       |



**T Stir/ia y the prnedmr of the eiperlment \_**

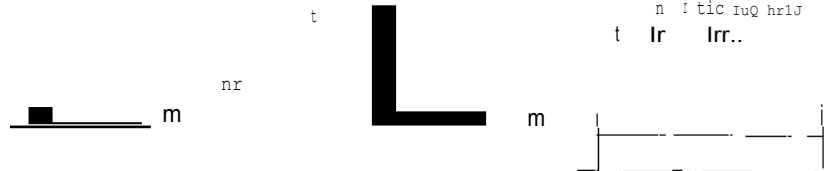
Set up it friction compensated track  
 A u.;ab. a ticker tape to the trolley and pass the tape thru the ticker timer.  
 1 ' a l l the l ka tl of lcv dorm the runway tchh the  
 la ...r pt stretched by the same antouixt of  
 (grey).  
 Calculate acceleration by analysing the ticker tape.  
 Repeat h^ adding weights to the trolley so that the  
 muss is L5 ka 3.0 k\_. JS kg and 3.0 ke  
 Record data  
 Plot an a auninst m vrtph Plot an a against m  
 graph

**// abula/inp data**

Shots table " n h m and a as hearings

.ana/t lug data

II i n rk ntNv be  
 n : tic ruQ hr1J  
 t lr lrr..



Question Marks

Ans.s Cr

a) I

**Linking the right inference**

Resistance depends on the thickness cross sectional area diameter of conductor

L

(b)

**Building an appropriate hypothesis**

The greater the thickness cross sectional area, diameter, the greater the

resistance of the conductor

(c)(i) I

**Stating the aim of the experiment**

To study the relationship between the thickness cross sectional area diameter and the resistance of the conductor /

(ii) I

**Stating the control variables'**

Manipulated variable : thickness/ cross sectional area, diameter, A

Responding variable : Resistance, R, Potential difference V

Fixed variables : Current, I, Length, Resistivity, Temperature

(iii) I

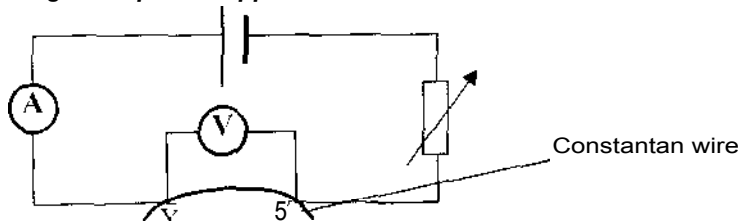
**List of appropriate apparatus and material**

ammeter, voltmeter, rheostat, connecting wires, constantan

wire (s.e.k. 4- s.w.g. 26, s.w.g. 2K, s.w.g. 30, s.w.g. 32)

(iv) I

**Describing set up of the apparatus**



1 s 1

**Following the procedure of the experiment**

1. Set up the electrical circuit as shown.

2. Connect a 50 cm constantan wire of size S.w.g. 26 between terminal A

3. Adjust the rheostat to get a current of  $I = 1.1 \text{ A}$  on the ammeter.

4. Read the value of current,  $I$  and potential difference  $V$ .

5. Calculate resistance,  $R$  of the wire where  $R = V/I$

6. Repeat the experiment using 50 cm constantan wires of size s.w.g. 24, s.w.g. 26, s.w.g. 28, s.w.g. 30, s.w.g. 32

7. Record data

8. Plot a graph of  $R$  against  $L$

9. Draw a line of best fit

(v) I

**Interpreting the graph**

Show a table with A, I, V and R as headings

(vi) I

**Interpreting data**

KT

—  $\triangle$  A or Sy

Total

H