

4531/1  
Fizik  
Kertas 1  
Ogos  
2010  
1¼ jam



**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA  
SEKOLAH MENENGAH  
CAWANGAN NEGERI SEMBILAN**

**PEPERIKSAAN PERCUBAAN BERSAMA  
SIJIL PELAJARAN MALAYSIA 2010**

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**PHYSICS (FIZIK)**

Paper 1

One Hour And Fifteen Minutes  
Satu Jam Lima Belas Minit

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.*

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Kertas soalan ini mengandungi 33 halaman bercetak

## MAKLUMAT UNTUK CALON

1. *Kertas soalan ini mengandungi 50 soalan.*
2. *Jawab **semua** soalan.*
3. *Jawab dengan menghitamkan ruangan yang betul pada kertas jawapan.*
4. *Hitamkan **satu** ruangan sahaja bagi setiap soalan.*
5. *Sekiranya anda hendak menukar jawapan, padamkan tanda yang telah dibuat. Kemudian hitamkan jawapan yang baru.*
6. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
7. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.*

### INFORMATION FOR CANDIDATES

1. *This question paper consists of 50 questions.*
2. *Answer **all** questions.*
3. *Answer each question by blackening the correct space on the answer sheet.*
4. *Blacken only **one** space for each question.*
5. *If you wish to change your answer, erase the blackened mark that you have made. Then blacken the space for the new answer.*
6. *The diagrams in the questions provided are not drawn to scale unless stated.*
7. *You may use a non-programmable scientific calculator.*

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

|     |  |     |   |
|-----|--|-----|---|
| 1.  | $a = \frac{v - u}{t}$                      | 15. | Power, $P = \frac{\text{energy}}{\text{time}}$              |
| 2.  | $v^2 = u^2 + 2as$                          | 16. | $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$                   |
| 3.  | $s = ut + \frac{1}{2}at^2$                 | 17. | $\lambda = \frac{ax}{D}$                                    |
| 4.  | Momentum = $mv$                            | 18. | $n = \frac{\sin i}{\sin r}$                                 |
| 5.  | $F = ma$                                   | 19. | $n = \frac{\text{real depth}}{\text{apparent depth}}$       |
| 6.  | Kinetic energy = $\frac{1}{2}mv^2$         | 20. | $Q = It$  |
| 7.  | Gravitational potential energy = $mgh$     | 21. | $V = IR$  |
| 8.  | Elastic potential energy = $\frac{1}{2}Fx$ | 22. | Power, $P = IV$   |
| 9.  | $\rho = \frac{m}{V}$                       | 23. | $\frac{N_p}{N_s} = \frac{V_p}{V_s}$                         |
| 10. | Pressure, $P = h\rho g$                    | 24. | Efficiency = $\frac{I_s}{I_p} \frac{V_s}{V_p} \times 100\%$ |
| 11. | Pressure, $P = \frac{F}{A}$                | 25. | $g = 10 \text{ ms}^{-2}$                                    |
| 12. | Heat, $Q = mc\theta$                       | 26. | $E = mc^2$  |
| 13. | $\frac{pV}{T} = \text{constant}$           | 27. | Linear magnification, $m = \frac{v}{u}$                     |
| 14. | $v = f\lambda$                             | 28. | Power of lens $P = \frac{1}{f}$                             |

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

*Setiap soalan diikuti dengan **tiga** atau **empat** pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan pada ruangan yang betul pada kertas jawapan anda*

- 1 Which of the following quantities does not consist of base quantity of time?  
*Manakah di antara kuantiti berikut tidak mengandungi kuantiti asas masa?*
- A Force  
*Daya*
  - B Impulse  
*Impuls*
  - C Pressure  
*Tekanan*
  - D Density  
*Ketumpatan*
- 2 Ali rides on his bicycle 5 km from his house to school. After school he rides back to his house. What is the displacement of Ali .  
*Ali menunggang basikalnya 5 km ke sekolah. Selepas tamat sekolah dia pulang balik ke rumahnya. Berapakah sesaran Ali ?*
- A 0 km
  - B 5 km
  - C 10 km
  - D 15 km

- 3 The graph in Diagram 1 shows the relationship between physical quantities  $y$  and  $x$ .  
*Graf dalam Rajah 1 menunjukkan hubungan di antara kuantiti fizikal  $y$  dan  $x$ .*

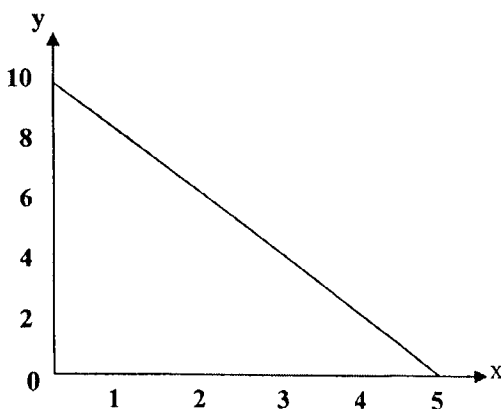


Diagram 1  
Rajah 1

Which of the following statements of the graph is **correct**?  
*Manakah di antara pernyataan berikut berkenaan graf adalah benar?*

- A  $y$  is inversely proportional to  $x$ .  
 *$y$  adalah berkadar songsang dengan  $x$ .*
- B The gradient of the graph is 2.  
*Kecerunan graf adalah 2.*
- C The  $x$ -intercept is equal to 10.  
*Pintasan- $x$  ialah 10.*
- D The equation of the graph is  $y = -2x + 10$   
*Persamaan graf adalah  $y = -2x + 10$*

- 4 Diagram 2 shows a boy walking, thrown forward when he accidentally kicked a stone.  
*Rajah 2 menunjukkan seorang budak yang sedang berjalan terjatuh terhumban ke depan bila tersepak sebuah batu.*

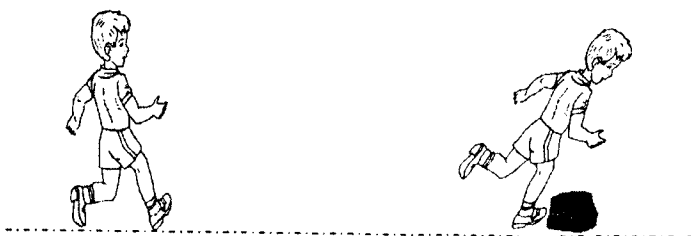


Diagram 2  
*Rajah 2*

- Which of the following physics concepts is responsible for the boy thrown forward ?  
*Di antara konsep fizik yang berikut, yang manakah menyebabkan budak itu terhumban kedepan ?*
- A Momentum  
*Momentum*
  - B Inertia  
*Inersia*
  - C Impulse  
*Impuls*
  - D Energy  
*Energy*
- 5 A fixed mass of a gas at constant pressure has a volume,  $V$  at  $30^{\circ}\text{C}$ . Find the new temperature if the gas will expand to a volume of  $2V$ .  
*Suatu gas berjisim tetap pada tekanan malar mempunyai isipadu  $V$  pada  $30^{\circ}\text{C}$ . Kira suhu baru, jika gas itu akan mengembang ke isipadu  $2V$ .*
- A  $60^{\circ}\text{C}$
  - B  $303^{\circ}\text{C}$
  - C  $333^{\circ}\text{C}$
  - D  $606^{\circ}\text{C}$

- 6 Based on the diagram 3, state the relationship between mass and acceleration.  
*Berdasarkan kepada Rajah 3, nyatakan hubungan di antara jisim dan pecutan.*

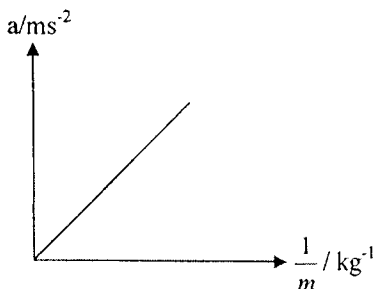
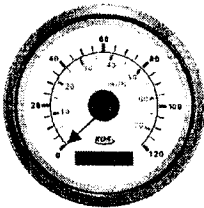


Diagram 3  
*Rajah 3*

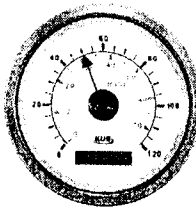
- A. Acceleration is inversely proportional to mass  
*Pecutan berkadar songsang dengan jisim*
- B. Acceleration is directly proportional to mass  
*Pecutan berkadar terus dengan jisim*
- C. Acceleration is inversely proportional to  $\frac{1}{m}$   
*Pecutan berkadar songkang dengan  $\frac{1}{m}$*
- 7 What is the concept used in the measurement of human body temperature using a thermometer?  
*Apakah konsep yang digunakan dalam pengukuran suhu badan manusia menggunakan termometer?*
- A. Specific heat capacity  
*Muatan haba tentu*
- B. Specific latent heat  
*Haba pendam tentu*
- C. Thermal equilibrium  
*Keseimbangan terma*
- D. Thermal convection  
*Perolakan terma*



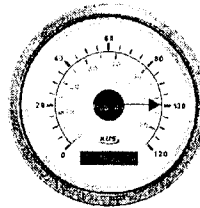
- 8 Diagram 4 shows reading of a speedometer of a car in an hour.  
*Rajah 4 menunjukkan bacaan 'speedometer' bagi sebuah kereta dalam sejam.*



$t = 0$   
 $t = 0$



$t = 0.5 \text{ hour}$   
 $t = 0.5 \text{ jam}$



$t = 1 \text{ hour}$   
 $t = 1 \text{ jam}$

Diagram 4  
*Rajah 4*

Which of the following quantities are unchanged during the hour ?  
*Kuantiti yang manakah tidak berubah dalam masa sejam itu ?*

- A Displacement  
*Sesaran*
- B Velocity  
*Halaju*
- C Acceleration  
*Pecutan*
- D Momentum  
*Momentum*

- 9 Diagram 5 shows extension of a spring.  
*Rajah 5 menunjukkan regangan satu spring.*

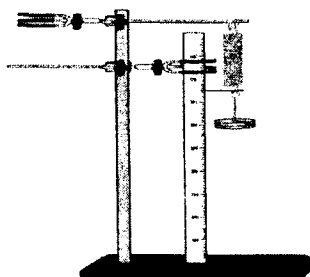


Diagram 5  
*Rajah 5*

The extension of the spring can be increased by  
*Regangan spring tersebut dapat ditambah dengan*

- A using a shorter spring  
*menggunakan spring yang lebih pendek.*
  - B using a thicker spring wire  
*Menggunakan wayar spring yang lebih tebal*
  - C using a bigger diameter spring  
*menggunakan spring yang mempunyai diameter besar.*
  - D using stiffer spring  
*menggunakan spring yang lebih keras.*
- 10 A balloon is rising vertically in the air. This is due to  
*Sebuah belon sedang naik menegak di udara. Ini adalah disebabkan oleh*
- A the balloon is filled with a light gas.  
*belon tersebut telah diisi dengan gas yang ringan.*
  - B the gas in the balloon is cold.  
*gas di dalam belon adalah sejuk.*
  - C the density of the balloon is more than the density of air.  
*ketumpatan belon lebih besar berbanding ketumpatan udara.*
  - D the upthrust on the balloon is more than the weight of the balloon.  
*tujahan ke atas belon lebih besar berbanding berat belon tersebut.*

- 11 Diagram 6 shows head-on collision of two cars.  
*Rajah 6 menunjukkan perlanggaran antara dua buah kereta.*



Diagram 6  
*Rajah 6*

Which of the following statements is **wrong** explaining the situation in Diagram 6  
*Kenyataan berikut yang manakah salah menerangkan keadaan dalam Rajah 6*

- A A large force acts over a long period time.  
*Suatu daya yang besar bertindak dalam masa yang panjang.*
- B Rate of change of momentum is big  
*Kadar penukaran momentum adalah besar.*
- C The impulsive force is very large.  
*Daya impuls adalah sangat besar*
- 12 Which of the following statements about a gas is **not** true with the Kinetic Theory of gases?  
*Pernyataan yang manakah tidak benar mengenai Teori Kinetik gas?*
- A The gas molecules are in constant motion.  
*Molekul-molekul gas bergerak dengan tetap.*
- B The gas molecules move in random direction.  
*Molekul-molekul gas bergerak secara rawak .*
- C The pressure in a gas is caused by collisions between the molecules.  
*Tekanan dalam gas disebabkan oleh perlanggaran antara molekul-molekul.*
- D The collision between the gas molecules and the walls of the container are elastic.  
*Perlanggaran antara molekul-molekul gas dan dinding bekas adalah elastik.*

13

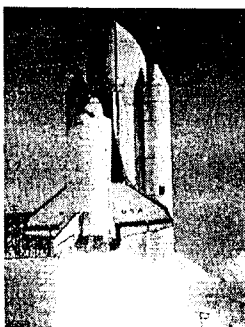


Diagram 7  
*Rajah 7*

Which of the following concept is used in launching a rocket in Diagram 7.  
*Konsep yang manakah digunakan dalam pelancaran sebuah roket pada Rajah 7.*

- A The concept of momentum  
*Konsep momentum*
- B The concept of inertia  
*Konsep inersia*
- C The concept of pressure  
*Konsep tekanan*
- D The concept of energy  
*Konsep tenaga*

14 Which of the following statement is the reason for using water as a coolant in the radiator of a car engine?  
*Pernyataan manakah merupakan sebab air digunakan sebagai agen penyejuk di dalam radiator sebuah enjin kereta?*

- A. Water is colourless.  
*Air tidak berwarna.*
- B. Water is a good solvent.  
*Air adalah pencair yang baik.*
- C. Water is a conductor of electricity.  
*Air adalah konduktor elektrik.*
- D. Water has a high specific heat capacity.  
*Air mempunyai muatan haba tentu yang tinggi.*

- 15 Diagram 8 shows a woman pushing a trolley .  
*Rajah 8 menunjukkan seorang wanita menolak sebuah trolri.*

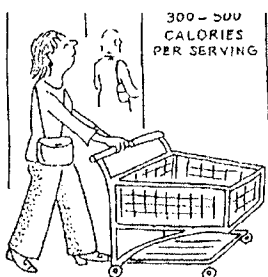


Diagram 8  
*Rajah 8*

If the woman applied force 30 N on the trolley, it will accelerate  $2 \text{ ms}^{-2}$ . If she add 5 kg of sugar in the trolley and apply 40 N of force on trolley, calculate the acceleration of the trolley. (Ignore frictional forces)

*Bila wanita mengenakan 30 N ke atas trolri itu ia bergerak dengan pecutan  $2 \text{ ms}^{-2}$ . Jika dia menambah 5 kg gula dalam trolri dan mengenakan daya 40 N untuk menolak trolri itu, hitung pecutan trolri itu sekarang. (Daya geseran dikecualikan)*

- A 0  
B  $1 \text{ ms}^{-2}$   
C  $2 \text{ ms}^{-2}$   
D  $4 \text{ ms}^{-2}$
- 16 A 5 kW immersion heater is used to heat water for a bath. It takes 40 minutes to heat up the water. How much electrical energy has been converted into thermal energy?  
*Suatu pemanas rendam 5 kW digunakan untuk memanaskan air. Ia mengambil masa 40 minit untuk dipanaskan. Berapa banyakkah tenaga elektrik yang telah ditukarkan kepada tenaga haba?*
- A  $2.0 \times 10^2 \text{ J}$   
B  $1.2 \times 10^4 \text{ J}$   
C  $2.0 \times 10^5 \text{ J}$   
D  $1.2 \times 10^7 \text{ J}$

- 17 Diagram 9 shows two springs hang on retort stand with a load.  
*Rajah 9 menunjukkan sebuah spring digantung pada kaki retort dengan beban.*

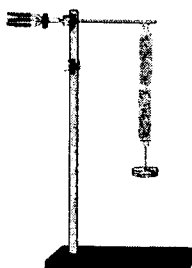


Diagram 9  
*Rajah 9*

The original length of the spring is 20 cm. If the load is 50g added, the length of the spring is 30 cm. Calculate the length of the spring system, if we add another identical spring in series to the spring.

*Panjang asal spring ialah 20 cm. Bila beban ditambah 50g, panjang spring adalah 30 cm. Hitungkan panjang bagi sistem spring itu bila ditambah satu lagi spring yang serupa secara siri dengan spring itu.,*

- A. 30 cm  
B. 50 cm  
C. 60 cm  
D. 70 cm
- 18 Diagram 10 shows a wooden block on a horizontal floor. What is the pressure acting on the floor by the wooden block if its mass is 7.0 kg?  
*Rajah 10 menunjukkan suatu bongkah kayu yang terletak di atas lantai mengufuk. Apakah tekanan yang dikenakan oleh bongkah kayu tersebut jika jisimnya 7.0 kg?*

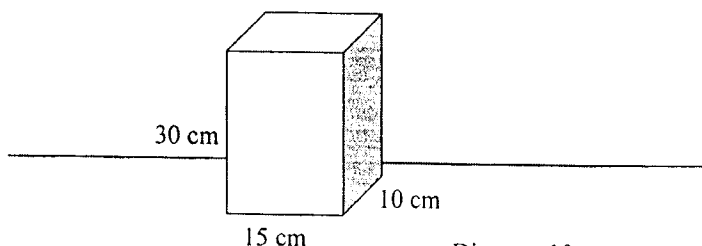


Diagram 10  
*Rajah 10*

- A  $1.56 \times 10^{-1}$  Pa  
B  $1.56 \times 10^{-4}$  Pa  
C  $4.67 \times 10^{-1}$  Pa  
D  $4.67 \times 10^3$  Pa

- 19 Diagram 11 shows a manometer is fitted to gas Y.  
*Rajah 11 menunjukkan manometer yang disambungkan dengan gas Y.*

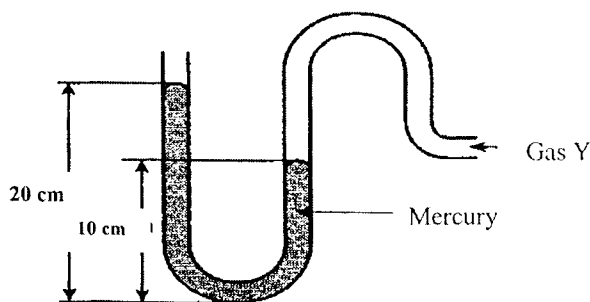


Diagram 11  
*Rajah 11*

What is the pressure of gas Y if the atmospheric pressure is at 76 cm Hg?  
*Apakah tekanan gas Y jika tekanan atmosfera ialah 76 cm Hg?*

- A 66 cm Hg  
B 86 cm Hg  
C 96 cm Hg  
D 106 cm Hg
- 20 Diagram 12 shows a hydraulic jack in equilibrium. Calculate the value of  $F$ .  
*Rajah 12 menunjukkan jek hidraulik dalam keseimbangan. Hitungkan nilai  $F$ .*

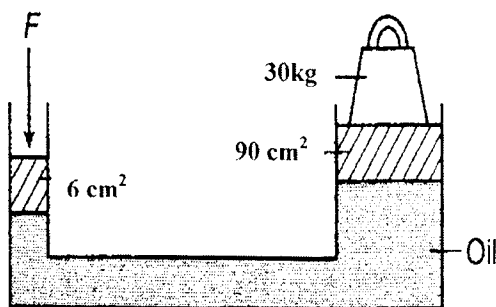


Diagram 12  
*Rajah 12*

- A 10 N  
B 20 N  
C 30 N  
D 40 N

- 21 Diagram 13 shows water is flowing in through P and flowing out from Q. This will affect the level of water in each tube. Which of these tubes will experience the **highest** pressure?

*Rajah 13 menunjukkan aliran air masuk melalui P dan keluar melalui Q. Hal ini memberi kesan kepada paras air dalam setiap tiub. Tiub yang manakah akan mengalami tekanan yang paling tinggi?*

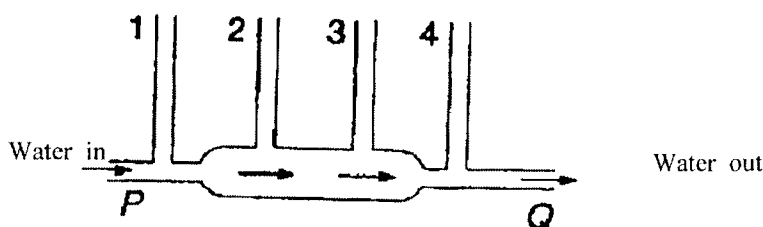


Diagram 13  
*Rajah 13*

- A Tube 1  
*Tiub 1*
- B Tube 2  
*Tiub 2*
- C Tube 3  
*Tiub 3*
- D Tube 4  
*Tiub 4*
- 22 Which of the following optical instruments use the principle of total internal reflection of light?  
*Yang manakah di antara berikut adalah peralatan optik yang menggunakan prinsip pantulan dalam penuh?*
- A Car rear view mirror  
*Cermin pandang belakang kereta*
- B Prism binoculars  
*Binokular prisma*
- C Simple microscope  
*Mikroskop ringkas*
- D Astronomical telescope  
*Teleskop astronomi*



- 23 Diagram 14 shows the fast flowing water in the filter funnel. As a result the ping-pong ball sucked up. Which of the following statements is **correct**?  
*Rajah 14 menunjukkan aliran air yang laju dalam suatu corong turas. Kesannya telah menyebabkan bola ping pong disedut ke atas. Antara pernyataan berikut yang manakah benar?*

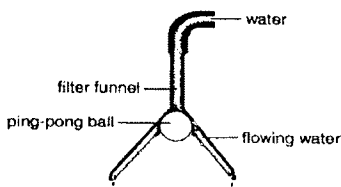


Diagram 14

*Rajah 14*

- A The ping-pong ball is stucked to the funnel by the water.  
*Bola ping pong tersangkut pada corong turas oleh air.*
- B The upthrust from air is less than the weight of the ping-pong ball.  
*Tujahan ke atas oleh udara lebih besar berbanding berat bola ping pong*
- C The flowing water has caused an apparent loss in weight of the ping-pong ball.  
*Aliran air telah menyebabkan kehilangan berat bola ping pong tersebut.*
- D There is a resultant force acting upwards to support the weight of the ping-pong ball.  
*Wujudnya daya paduan yang bertindak ke atas untuk menampung berat bola pingpong.*
- 24 Diagram 15 shows a process in which water is changed to steam  
*Rajah 15 menunjukkan satu proses air bertukar kepada stim.*

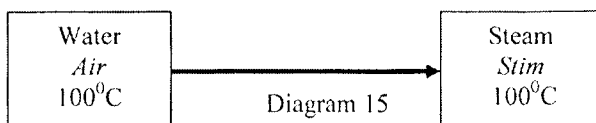


Diagram 15  
*Rajah 15*

The heat absorbed during the process is called ...  
*Haba yang diserap dalam proses itu dinamakan ...*

- A specific heat capacity of vapour  
*muatan haba tentu wap*
- B specific heat capacity of water  
*muatan haba tentu cecair*
- C latent heat of fusion  
*haba pendam pelakuran*
- D latent heat of vapourization  
*haba pendam pengewapan*

- 25 Diagram 16 is a graph shows the heating curve of a 500 g liquid **P** by a 60 W immersion heater.

*Rajah 16 merupakan satu graf menunjukkan pemanasan 500 g cecair P oleh pemanas rendam 60 W.*

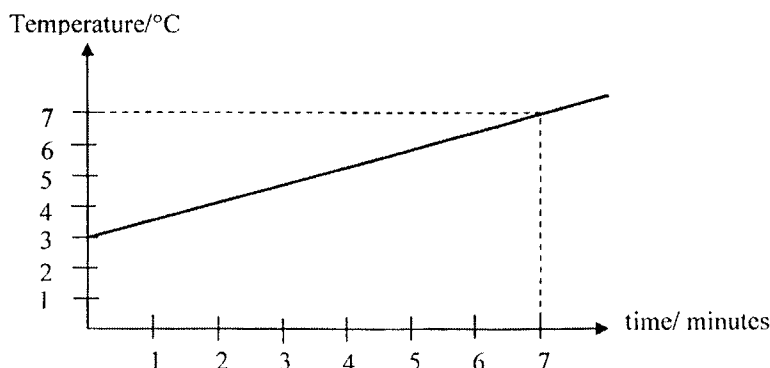


Diagram 16  
*Rajah 16*

The specific heat capacity of the liquid **P** is

*Muatan haba tentu cecair P ialah*

- A.  $2200 \text{ J kg}^{-1} \text{ } ^\circ\text{C}^{-1}$   
B.  $7200 \text{ J kg}^{-1} \text{ } ^\circ\text{C}^{-1}$   
C.  $12600 \text{ J kg}^{-1} \text{ } ^\circ\text{C}^{-1}$   
D.  $16800 \text{ J kg}^{-1} \text{ } ^\circ\text{C}^{-1}$
- 26 Diagram 17 shows a light ray passing through a glass prism.  
*Rajah 17 menunjukkan cahaya bergerak melalui satu prisma kaca.*

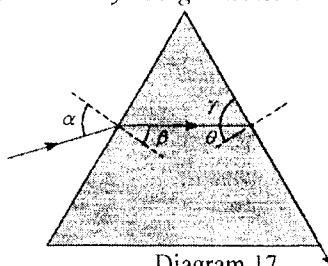


Diagram 17  
*Rajah 17*

Which angle is known as the critical angle of the prism?

*Sudut manakah dinamakan sebagai sudut genting prisma itu?*

- A  $\alpha$   
B  $\beta$   
C  $\theta$   
D  $\gamma$

- 27 Diagram 18 shows a light ray through an optical fibre. The optical fibre has a glass core,  $P$ , of density  $\rho_p$  and a glass cladding,  $Q$ , of density  $\rho_q$ .  
*Rajah 18 menunjukkan cahaya bergerak melalui fiber optik. Ketumpatan teras kaca,  $P$ , fiber optik itu ialah  $\rho_p$  dan ketumpatan sisi kaca  $Q$  itu ialah  $\rho_q$ .*

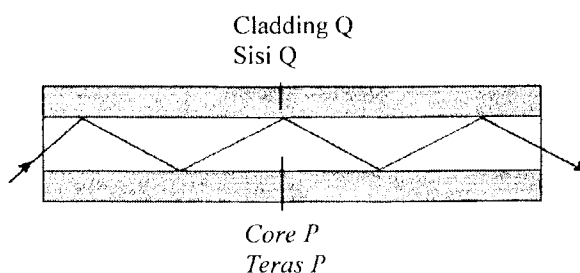


Diagram 18  
Rajah 18

Which of the following is correct?  
*Manakah di antara berikut adalah benar?*

- A  $\rho_p = \rho_q$   
B  $\rho_p > \rho_q$   
C  $\rho_p < \rho_q$   
D  $\rho_p < 1, \rho_q > 1$
28. Diagram 19 shows the formation of the image of an object by a convex lens.  
*Rajah 19 menunjukkan pembentukan imej dari objek menggunakan kanta cembung.*

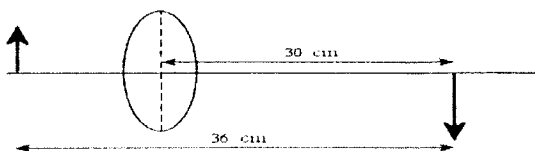
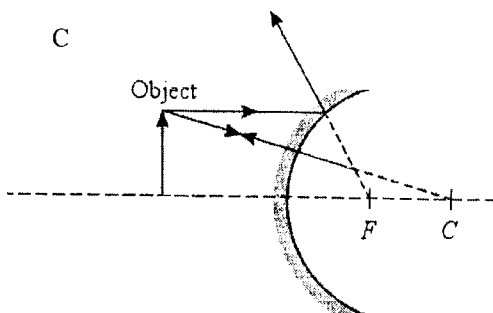
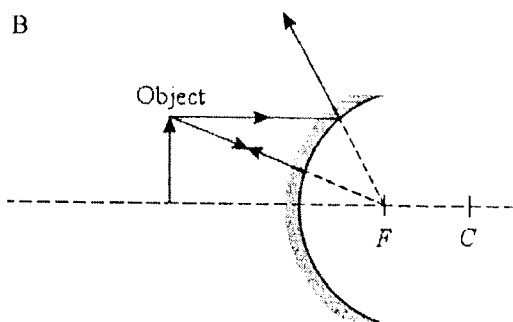
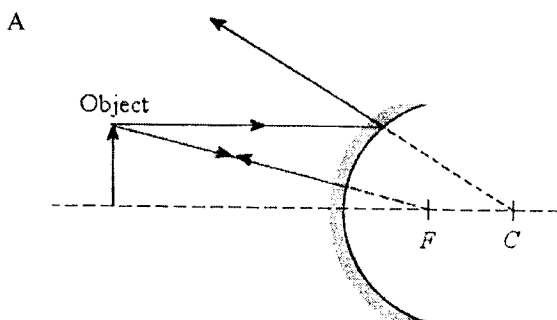


Diagram 19  
Rajah 19

If the height of the object is 3 cm, what is the height of the image?  
*Jika tinggi objek ialah 3 cm, berapakah tinggi imej itu?*

- A 8 cm  
B 15 cm  
C 23 cm  
D 45 cm

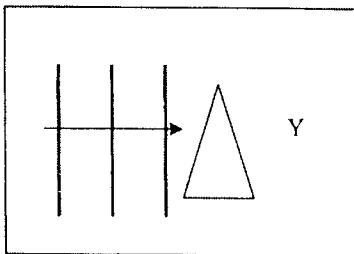
29. Which of the following ray diagrams is correct?  
*Manakah di antara rajah sinar berikut adalah benar?*



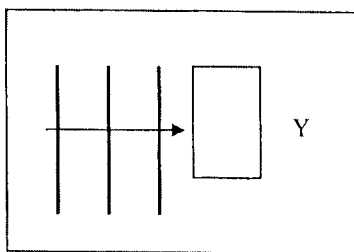
- 30 Diagrams below shows water waves propagates from deep area to shallow area. Which of the diagram will produce highest amplitude at Y?

*Rajah-raja di bawah menunjukkan gelombang air merambat dari kawasan dalam ke kawasan cetek. Antara berikut, rajah perambatan yang manakah menghasilkan amplitud gelombang air yang tertinggi di kawasan Y?*

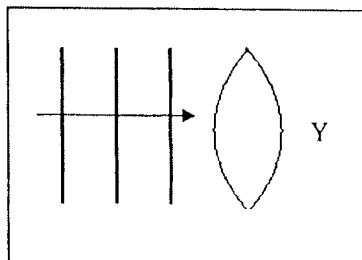
A.



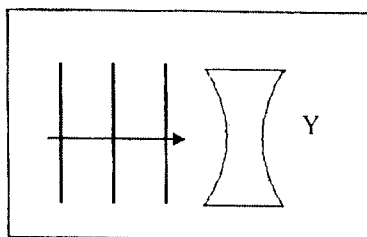
B.



C.



D.



31. Diagram 20 shows a pattern of water wave phenomenon.  
*Rajah 20 menunjukkan satu fenomena gelombang air.*



Diagram 20  
Rajah 20

Which of the statement is correct describing the phenomenon?  
*Manakah di antara pernyataan berikut menerangkan fenomena ini?*

- A. It is the bending of water wave round the corners of an obstacle.  
*Ita merupakan pembengkokan gelombang air di penjuru suatu halangan.*
- B. It is the meeting of two water waves at a point.  
*Ita merupakan pertemuan dua gelombang air pada satu titik.*
- C. It is the bending of water wave when wave travels from deep area to shallow area.  
*Ita merupakan pembengkokan gelombang air apabila bergerak dari kawasan dalam ke kawasan cetek.*
- D. It is the change in direction of propagation of water waves when it hits a barrier.  
*Ita merupakan perubahan arah pergerakan gelombang air apabila ia menghentam suatu penghadang.*

32. Diagram 21 shows two identical tuning forks side by side in a laboratory. When a student knocks on the first fork, the vibrations of the first fork have forced the second fork to oscillate with its maximum amplitude.

*Diagram 21 menunjukkan dua tala bunyi yang serupa diletakkan sebelah menyebelah di dalam makmal. Apabila tala bunyi yang pertama diketuk, getaran yang terhasil telah memaksa tala bunyi yang kedua bergetar dengan amplitud maksima.*

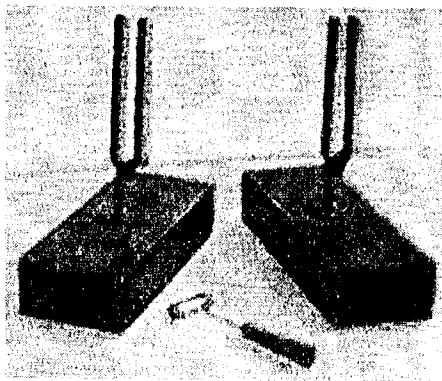


Diagram 21  
Rajah 21

Which phenomenon will **best** describe the situation?

*Situasi yang manakah paling tepat menerangkan fenomena tersebut?*

- A. Damping  
*Pelembapan*
- B. Resonance  
*Resonan*
- C. Modulation  
*Modulasi*
- D. Echo  
*Gema*

- 33 Diagram 22 shows a transmitting station for telecommunications.  
Diagram 23 shows the X-ray image of pelvis bones.  
*Rajah 22 menunjukkan stesen pemancar bagi telekomunikasi.*  
*Rajah 23 menunjukkan imej X-ray bagi tulang pelvis.*

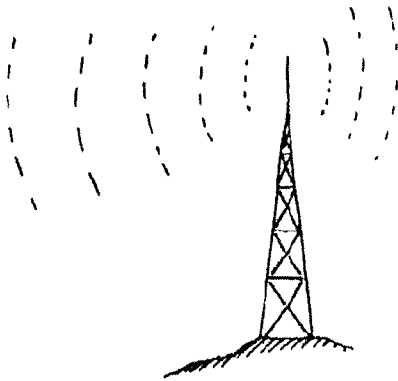


Diagram 22  
Rajah 22

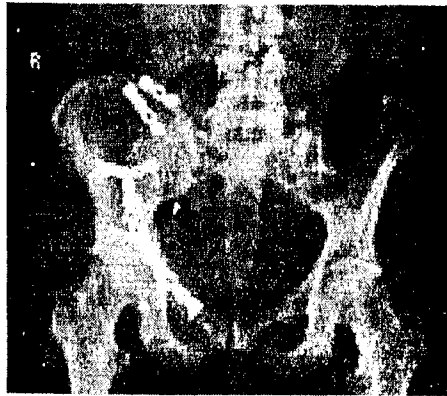


Diagram 23  
Rajah 23

Based on Diagram 22 and 23 above, what is a common characteristic between the two electromagnetic waves used?

*Berdasarkan Rajah 22 dan 23 di atas, apakah kriteria seponya antara kedua-dua gelombang elektromagnet yang digunakan?*

- A. Velocity  
*Halaju*
- B. Amplitude  
*Amplitud*
- C. Frequency  
*Frekuensi*
- D. Wavelength  
*Panjang gelombang*



- 34 Diagram 24 shows a displacement-distance graph of a wave.  
*Rajah 24 menunjukkan graf sesaran-jarak bagi suatu gelombang.*

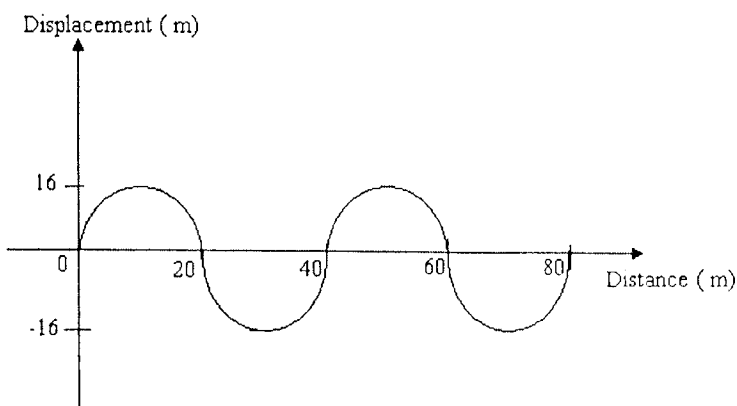


Diagram 24  
Rajah 24

What is the amplitude of the wave, in meter ?  
*Berapakah nilai amplitud gelombang tersebut dalam m ?*

- A 16  
B 20  
C 32  
D 40
- 35 When a torch light is switched on for 5 minutes, 720 C of charge flows through the bulb. Calculate the current in the bulb.  
*Apabila sebuah lampu suluh dihidupkan selama 5 minit, 720 C cas mengalir melalui mentol.*  
*Hitungkan arus yang mengalir melalui mentol.*
- A 0.42 A  
B 2.40 A  
C 14.40 A  
D 28.80 A

36. Diagram 25 shows a well at Kampung Benut. A sound wave of the frequency of 600 Hz and a wavelength of 0.5 m is used to determine the depth of a well. The wave takes 1.0 s to return.

*Rajah 25 menunjukkan sebuah telaga di Kampung Benut. Suatu gelombang bunyi dengan frekuensi 600 Hz dan panjang gelombangnya 0.5 m digunakan untuk mengukur kedalaman sebuah telaga. Gelombang tersebut mengambil masa 1.0 s untuk kembali.*

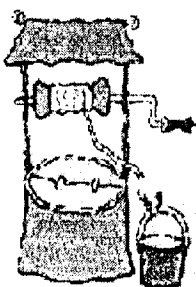


Diagram 25  
Rajah 25

Find the velocity of the wave and depth of the well.

*Kirakan halaju gelombang tersebut dan kedalaman telaga.*

|   | Velocity, $\text{m s}^{-1}$ / halaju, $\text{m s}^{-1}$ | Depth, m / kedalaman, m |
|---|---|-------------------------|
| A | 100   | 6.0                     |
| B | 200   | 100                     |
| C | 300   | 150                     |
| D | 400   | 200                     |

37. Diagram 26,  $I_1$  is the current supplied by a source.  $I_2$  and  $I_3$  are the current in each branch of the parallel arrangement shown.  
Rajah 26,  $I_1$  adalah arus yang dibekalkan oleh suatu sumber.  $I_2$  dan  $I_3$  adalah arus bagi setiap cabang ditunjukkan dalam susunan selari.

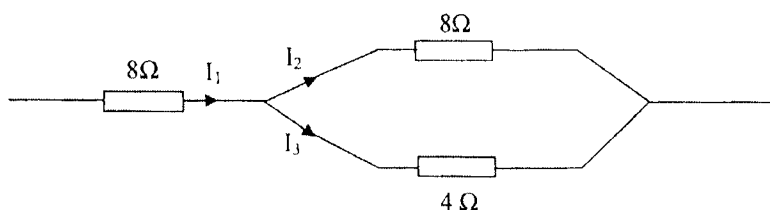


Diagram 26  
Rajah 26

Which of the following statements concerning  $I_1$ ,  $I_2$  and  $I_3$  is correct?  
Manakah di antara pernyataan berikut berkenaan  $I_1$ ,  $I_2$  dan  $I_3$  benar?

- A  $I_1$  is equal to  $I_2$ , but smaller than  $I_3$ .  
 $I_1$  sama dengan  $I_2$ , tetapi lebih kecil daripada  $I_3$ .
  - B  $I_2$  is bigger than  $I_3$  but smaller than  $I_1$ .  
 $I_2$  lebih besar daripada  $I_3$  tetapi lebih kecil daripada  $I_1$ .
  - C  $I_3$  is bigger than  $I_2$ , but smaller than  $I_1$ .  
 $I_3$  lebih besar daripada  $I_2$ , lebih kecil daripada tetapi  $I_1$ .
  - D  $I_3$  is equal to  $I_2$ , but smaller than  $I_1$ .  
 $I_3$  sama dengan  $I_2$ , tetapi lebih kecil daripada  $I_1$ .
- 38 The process of releasing electron from the heated metal surface area are called  
Proses yang membebaskan electron dari permukaan logam yang panas dipanggil
- A. Thermionic emission  
Pancaran termion
  - B. Infrared emission  
Pancaran Infrared
  - C. Electron induction  
Aruhan elektron
  - D. Molecule ionisation  
Pengionan molekul

- 39 Diagram 27 shows four identical bulbs, P, Q, R and S are connected to an electric circuit.

*Rajah 27 menunjukkan empat buah mentol yang serupa, P, Q, R dan S disambungkan pada sebuah litar elektrik.*

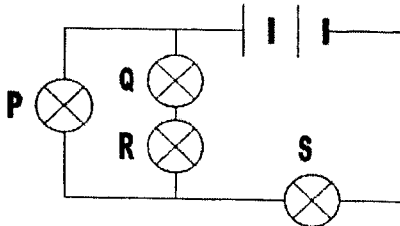


Diagram 27  
Rajah 27

Which of the bulbs in the diagram is the brightest ?  
*Manakah di antara mentol tersebut yang paling terang?*

- A P
- B Q
- C R
- D S

- 40 Diagram 28 shows a current-carrying conductor placed between two magnetic poles.  
*Rajah 28 menunjukkan satu konduktor berarus di antara dua kutub magnet.*

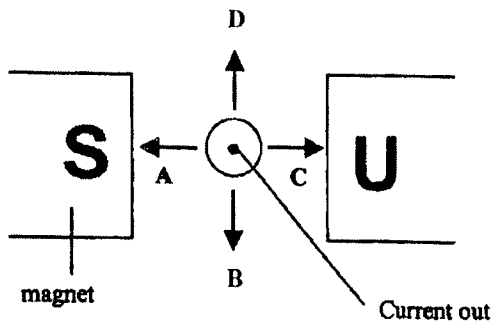


Diagram 28  
Rajah 28

Of the marked directions A, B, C and D, which shows the direction of motion of the conductor?

*Antara arah A, B, C and D, yang manakah arah gerakan bagi konduktor tersebut?*

41. Diagram 29 shows an electric bell circuit.  
*Rajah 29 menunjukkan litar suatu loceng elektrik.*

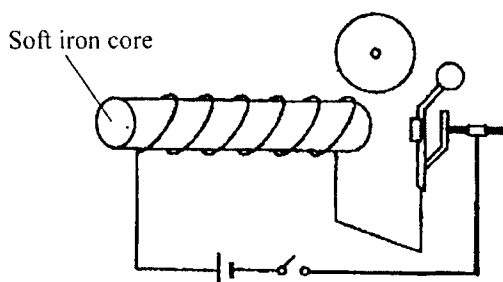


Diagram 29  
Rajah 29

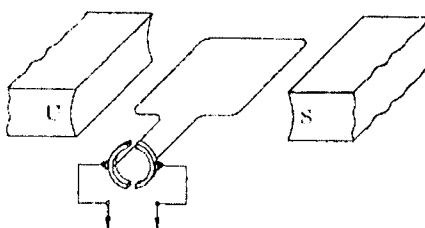
Which of the following **does not** effect the loudness sound of the bell when the switch is closed?

*Manakah yang berikut tidak mempengaruhi kekuatan bunyi loceng apabila suis ditutup?*

- A. Reverse the polarity of the dry cell  
*Menukarkan kekutuban sel kering.*
- B. Increase the number of dry cells.  
*Menambahkan bilangan sel kering.*
- C. Increase the number of turns of the coil.  
*Menambahkan bilangan lilitan gegelung.*
- D. The presence of soft iron core.  
*Kehadiran teras besi lembut*

- 42 Diagram 30 shows an electric generator which is connected to the CRO with the time-base on.

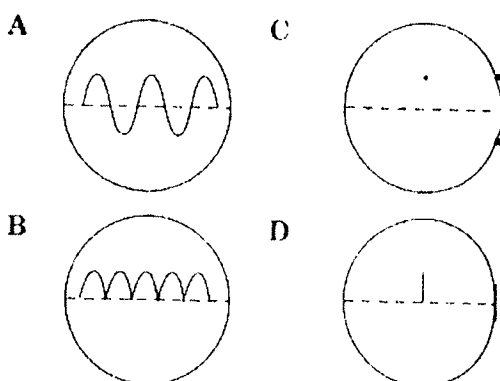
*Rajah 30 menunjukkan penjana elektrik yang disambungkan kepada OSK dengan dasar masa dihidupkan.*



To the Y input of cathode ray oscilloscope  
*Ke input Y osiloskop sinar katod*

Diagram 30  
Rajah 30

Which of the following traces shows the induced e.m.f produced by the generator?  
*Antara bentuk surihan berikut yang mana menunjukkan d.g.e yang teraruh dalam penjana tersebut?*



- 43 Induced electromotive force can be produced in a conductor by  
*Satu d.g.e aruhan boleh dihasilkan dalam sebuah konduktor yang*

- A moving in parallel to the magnetic field  
*bergerak selari dengan medan magnet*
- B moving in perpendicular to the magnetic field  
*bergerak serenjang kepada medan magnet*
- C staying stationary in the unchanged magnetic field  
*pegun dalam sebuah medan magnet yang tidak berubah.*

- 44 Diagram 31 shows a transformer used to change an input voltage of 240V to 12V.  
*Rajah 31 menunjukkan sebuah transformer digunakan untuk menukarkan voltan input 240 V kepada 12 V.*

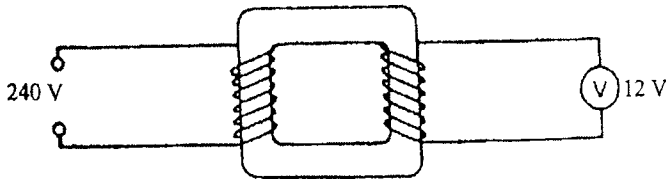
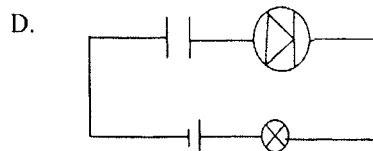
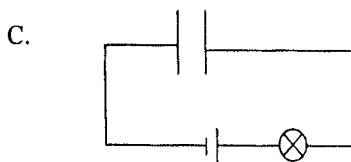
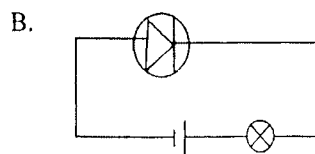
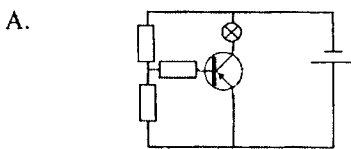


Diagram 31  
Rajah 31

If the primary coil has 1200 turns, how many turns must the secondary coil have?  
*Jika gegelung primer mempunyai 1200 lilitan, berapakah bilangan lilitan yang diperlukan untuk gegelung sekunder?*

- A. 24000  
B. 12000  
C. 600  
D. 60
- 45 Diagrams show the electric circuits. Which bulbs will be light up?  
*Rajah menunjukkan beberapa buah litar elektrik. Mentol mana yang akan menyala?*



46. Which of the following is the characteristic of the National Grid Network in electricity transmission?  
*Manakah yang berikut adalah ciri Rangkaian Grid Nasional dalam penghantaran tenaga elektrik?*
- A. When one power station breaks down, the whole country's electricity supply will be affected.  
*Apabila sebuah stesen kuasa rosak, keseluruhan bekalan elektrik negara akan terganggu.*
- B. During non peak hours of electricity usage, the operation of some power stations can not be stopped for repair and maintenances purposes.  
*Semasa penggunaan elektrik pada bukan waktu puncak, sebahagian stesen kuasa tidak boleh diberhentikan untuk tujuan pembaikan dan penyelenggaraan.*
- C. During non peak hours, some power stations can be closed to cut cost.  
*Semasa bukan waktu puncak, sebahagian stesen kuasa boleh ditutup untuk menjimatkan kos.*
- D. During peak hours of electricity usage, the electricity can be transmitted at low potential difference.  
*Semasa penggunaan elektrik pada waktu puncak tenaga elektrik boleh diagihkan pada beza keupayaan rendah*

47. Diagram 32 shows a logic gate with M, N are input and R is output.  
*Rajah 32 menunjukkan satu get logik dengan M, N adalah input dan R adalah output*

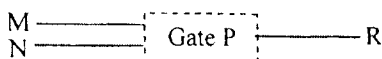


Diagram 32  
Rajah 32

| Input |   | Output |
|-------|---|--------|
| M     | N | R      |
| 0     | 0 | 1      |
| 1     | 0 | 1      |
| 0     | 1 | 1      |
| 1     | 1 | 0      |

The truth table for gate P is as follows.  
*Jadual kebenaran bagi get P adalah seperti berikut.*

- A. AND  
*DAN*
- B. NAND  
*TAK-DAN*
- C. OR  
*ATAU*
- D. NOR  
*TAK-ATAU*



48. Diagram 33 shows cross section of Cathode Ray Oscilloscope.  
*Rajah 33 menunjukkan keratan rentas Osiloskop Sinar Katod.*

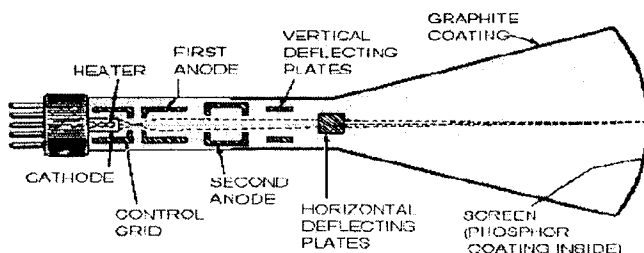


Diagram 33  
Rajah 33

Which of the following parts can be used to increase the intensity of the dot on screen.  
*Bagian manakah di antara berikut boleh digunakan untuk menambahkan keamatan cahaya titik pada skrin.*

- A. Cathode  
*Katod*
- B. Control Grid  
*Grid Kawalan*
- C. Anode  
*Anod*
- D. Deflecting Plate  
*Plat pemesongan*
49. In the radioactive decay of a certain nuclide, two radioactive rays are emitted. The nucleon number remains the same while the proton number increases by 1. What are the two radioactive rays emitted?  
*Dalam pereputan nuklid tertentu, dua sinaran radioaktif terhasil. Nombor nukleon tidak berubah manakala nombor proton bertambah 1. Apakah dua sinaran radioaktif tersebut?*
- A  $\alpha$  and  $\beta$
- B  $\alpha$  and  $\gamma$
- C  $\alpha$  and a neutron
- D  $\beta$  and  $\gamma$
50. A sample of a radioactive substance contains 50 g of the active substance. If its half life is 10 days, what was the mass of the active substance in this sample 20 days ago?  
*Satu sampel radioaktif mengandungi 50 g unsur yang aktif. Jika separuh hayatnya adalah 10 hari, berapakah jisim unsur sampel yang aktif 20 hari yang lalu.*
- A 25 g
- B 100 g
- C 150 g
- D 200 g

4531 / 2  
Physics  
Paper 2  
August  
2010  
2 ½ hours



Name : .....

Form : .....

**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA  
SEKOLAH MENENGAH MALAYSIA  
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS**

**PEPERIKSAAN PERCUBAAN BERSAMA  
SIJIL PELAJARAN MALAYSIA 2010**

**PHYSICS (FIZIK)**

Paper 2 (Kertas 2)

Two hours and thirty minutes ( Dua jam tiga puluh minit)

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Tuliskan **nama dan kelas** anda pada ruang yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam dalam Bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Inggeris atau Bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.

| Kod Pemeriksa |        |              |                  |
|---------------|--------|--------------|------------------|
| Bahagian      | Soalan | Markah Penuh | Markah Diperoleh |
| A             | 1      | 6            |                  |
|               | 2      | 6            |                  |
|               | 3      | 7            |                  |
|               | 4      | 7            |                  |
|               | 5      | 8            |                  |
|               | 6      | 8            |                  |
|               | 7      | 8            |                  |
|               | 8      | 10           |                  |
| B             | 1      | 20           |                  |
|               | 2      | 20           |                  |
| C             | 3      | 20           |                  |
|               | 4      | 20           |                  |
| Jumlah        |        |              |                  |

Kertas soalan ini mengandungi 33 halaman bercetak

**INFORMATION FOR CANDIDATES**

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 spaces provided in the question paper.*
3. *Answer **one** question in **Section B** and **one** question from **Section C**. Write your answers for **Section B** and **Section C** on a separate answer sheet.  
Answer questions in **Section B** and **Section C** in detail.  
Answers should be clear and logical. Equations, diagrams, tables, graphs and other suitable methods can be used to explain your answer.*
4. *If you wish to cancel any answer, neatly cross out the answer.*
5. *The diagrams in the questions provided are not drawn to scale unless stated.*
6. *The marks allocated for each question and sub-section of a question are shown in brackets.*
7. *A list of formulae is provided on page 5.*
8. *You may use a non-programmable scientific calculator. However, steps in calculation must be shown.*
9. *The time suggested to complete **Section A** is **90 minutes**, **Section B** is **30 minutes** and **Section C** is **30 minutes**.*
10. *Hand in all your answer sheets at the end of the examination.*

**MAKLUMAT UNTUK CALON**

1. *Kertas soalan ini mengandungi tiga bahagian:  
**Bahagian A, Bahagian B dan Bahagian C.***
2. *Jawab **semua** soalan dalam **Bahagian A**. Jawapan kepada **Bahagian A** hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan*
3. *Jawab **satu** soalan daripada **Bahagian B** dan **satu** soalan daripada **Bahagian C**. Jawapan kepada **Bahagian B** dan **Bahagian C** hendaklah ditulis dalam kertas jawapan berasingan.  
Anda diminta menjawab dengan lebih terperinci untuk **Bahagian B** dan **Bahagian C**.  
Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*
4. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*
5. *Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
6. *Markah yang diperuntukkan bagi setiap soalan atau ceraihan soalan ditunjukkan dalam kurungan di hujung setiap soalan atau ceraihan soalan.*
7. *Satu senarai rumus disediakan di halaman 5.*
8. *Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram. Walau bagaimanapun, langkah mengira perlu ditunjukkan.*
9. *Masa yang dicadangkan untuk menjawab **Bahagian A** ialah **90** minit.  
**Bahagian B** ialah **30** minit dan **Bahagian C** ialah **30** minit.*
10. *Ikatkan semua kertas jawapan dan serahkan di akhir peperiksaan.*

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

|     |  |     |   |
|-----|--|-----|---|
| 1.  | $a = \frac{v - u}{t}$                      | 15. | Power, $P = \frac{\text{energy}}{\text{time}}$        |
| 2.  | $v^2 = u^2 + 2as$                          | 16. | $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$             |
| 3.  | $s = ut + \frac{1}{2}at^2$                 | 17. | $\lambda = \frac{ax}{D}$                              |
| 4.  | Momentum = $mv$                            | 18. | $n = \frac{\sin i}{\sin r}$                           |
| 5.  | $F = ma$                                   | 19. | $n = \frac{\text{real depth}}{\text{apparent depth}}$ |
| 6.  | Kinetic energy = $\frac{1}{2}mv^2$         | 20. | $Q = It$  |
| 7.  | Gravitational potential energy = $mgh$     | 21. | $V = IR$  |
| 8.  | Elastic potential energy = $\frac{1}{2}Fx$ | 22. | Power, $P = IV$                                       |
| 9.  | $\rho = \frac{m}{V}$                       | 23. | $\frac{N_p}{N_s} = \frac{V_p}{V_s}$                   |
| 10. | Pressure, $P = h\rho g$                    | 24. | Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100\%$   |
| 11. | Pressure, $P = \frac{F}{A}$                | 25. | $g = 10 \text{ ms}^{-2}$                              |
| 12. | Heat, $Q = mc\theta$                       | 26. | $E = mc^2$  |
| 13. | $\frac{pV}{T} = \text{constant}$           | 27. | Linear magnification, $m = \frac{v}{u}$               |
| 14. | $v = f\lambda$                             | 28. | Power of lens $P = \frac{1}{f}$                       |

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*(HALAMAN KOSONG)*

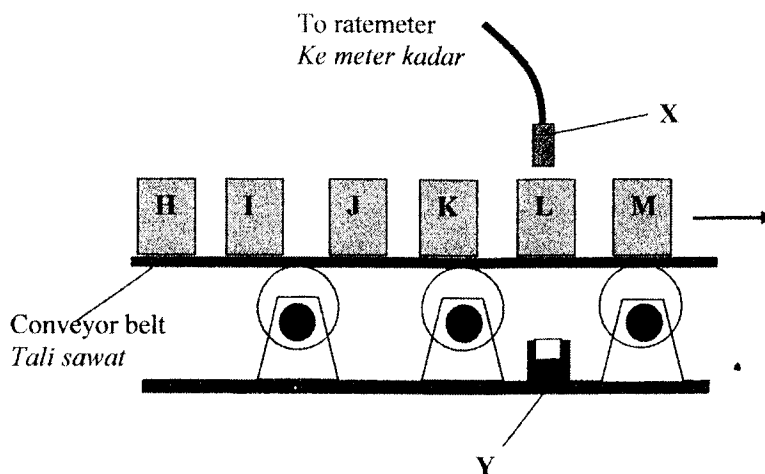
**SECTION A**  
**Bahagian A**

[60 marks]  
[60 markah]

Answer **all** questions from this section.  
Jawab **semua** soalan daripada bahagian ini.

- 1** Diagram 1 shows a detector system which uses a radioactive substance to detect the level of paint in the tins. The tins H, I, J, K, L and M which contain paint are transported on a conveyor belt, passing between the radioactive source and the Geiger-Muller (G-M) tube. Tins which contain less than the standard level of paint are rejected.

Rajah 1 menunjukkan sebuah sistem pengesanan yang menggunakan sumber radioaktif untuk mengesan paras cat dalam tin. Tin-tin H, I, J, K, L dan M yang mengandungi cat yang diangkut pada tali sawat, melalui antara sumber radioaktif dan tiub Geiger-Muller (GM). Tin yang mengandungi kurang dari paras piawai cat akan ditolak.



**Diagram 1**  
**Rajah 1**

**1(a) (i)**

|  |   |
|--|---|
|  | 1 |
|--|---|

- (a) Name the part labelled  
Namakan bahagian berlabel :

(i) X : .....

[1 mark]  
[1 markah]

(ii) Y : .....

[1 mark]  
[1 markah]

**1(a) (ii)**

|  |   |
|--|---|
|  | 1 |
|--|---|

- (b) (i) State a suitable type of radiation that can be used in this system.  
*Nyatakan jenis radiasi yang sesuai digunakan dalam sistem ini.*

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

1(b) (i)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (ii) Give **one** reason for your answer in (b)(i).  
*Berikan satu sebab untuk jawapan anda di (b)(i)*

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

1(b) (ii)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (c) (i) When the tins and the radioactive source are removed from the system, the ratemeter still records a reading.  
The reading is known as

.....  
[1 mark]

*Apabila tin dan sumber radioaktif dialihkan dari sistem, meter kadar masih merekodkan bacaan.*

*Bacaan tersebut dikenali sebagai .....*  
[1 markah]

1(c) (i)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (ii) What cause the reading stated in (c)(i)?  
*Apakah yang menyebabkan bacaan di (c)(i)?*

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

1(c) (ii)

|  |   |
|--|---|
|  | 1 |
|--|---|

Total  
AI

|  |   |
|--|---|
|  | 6 |
|--|---|



- 2 Diagram 2 shows combination of p-type and n-type semiconductor.  
*Rajah 2 menunjukkan gabungan semikonduktor jenis-p dan jenis-n.*



Diagram 2  
*Rajah 2*

- (a) Name the electronic device shown in Diagram 2.  
*Namakan alat elektronik yang ditunjukkan dalam Rajah 2.*

2(a)

|  |   |
|--|---|
|  | 1 |
|--|---|

[1 mark]  
[1 markah]

- (b) Draw a circuit using the device in Diagram 2, a dry cell and a bulb so that the bulb will light up.  
*Lukiskan litar dengan menggunakan alat pada Rajah 2, satu sel kering dan satu mentol supaya mentol boleh menyala.*

2(b)

|  |   |
|--|---|
|  | 2 |
|--|---|

[2 marks]  
[2 markah]

- (c) Replace the dry cell in circuit (b) with an a.c source.  
*Gantikan sel kering dengan sumber a.u pada litar (b).*

- (i) Is the bulb still light up ?  
*Adakah mentol itu masih menyala?*

2(c)(i)

|  |   |
|--|---|
|  | 1 |
|--|---|

[1 mark]  
[1 markah]

2(c)(ii)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (ii) Explain your answer in (c)(i).  
*Terangkan jawapan anda dalam (c)(i)*

Total  
A2

|  |   |
|--|---|
|  | 6 |
|--|---|

[2 marks]  
[2 markah]

- 3 Diagram 3 shows a diagram of stroboscopic photographs of a moving toy car.  
*Rajah 3 menunjukkan gambar sebuah kereta mainan bergerak yang diambil dengan menggunakan stroboskop.*

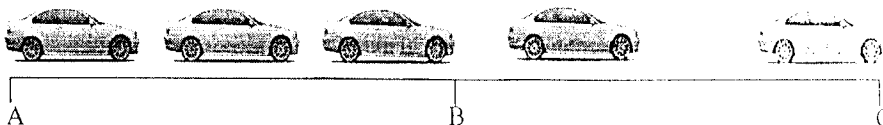


Diagram 3

Rajah 3

- (a) Explain the type of motion from A to B and from B to C, shown by the car in Diagram 3.

*Terangkan jenis pergerakan kereta dari A ke B dan B ke C dalam Rajah 3.*

[1 mark]

[1 markah]

3(a)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (b) What is the acceleration of the toy car from A to B?

Explain your answer.

*Apakah pecutan kereta mainan itu dari A hingga B?*

*Jelaskan jawapan anda.*

3(b)

[2 marks]

[2 markah]

|  |   |
|--|---|
|  | 2 |
|--|---|

- (c) Distance from A to B is 6 meter and the toy car took 20 seconds to reach B. The mass of the toy car is 0.5 kg.

*Jarak diantara A ke B adalah 6 meter dan kereta mainan itu mengambil 20 saat untuk sampai ke B. Jisim kereta mainan itu ialah 0.5 kg.*

- (i) Calculate the velocity of the toy car from A to B.

*Hitungkan halaju kereta mainan itu dari A ke B.*

[2 marks]

[2 markah]

3(c)(i)

|  |   |
|--|---|
|  | 2 |
|--|---|

- (ii) Calculate the momentum of the toy car.  
*Hitungkan momentum kereta mainan itu.*

**3(c)(ii)**

|  |   |
|--|---|
|  | 2 |
|--|---|

[2 marks]

[2 markah]

**Total  
A3**

|  |   |
|--|---|
|  | 7 |
|--|---|

- 4 Diagram 4 shows a man in a boat filled with goods floating in the sea.  
*Rajah 4 menunjukkan seorang lelaki di dalam sampan yang berisi muatan terapung di permukaan laut.*

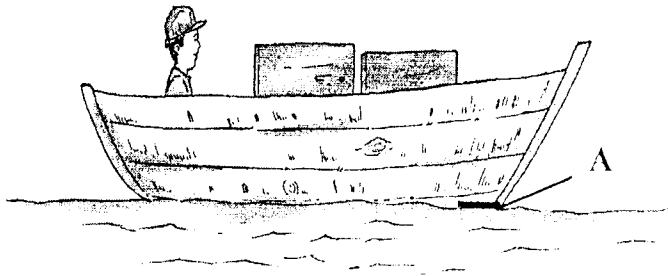


Diagram 4  
Rajah 4

- (a) Explain why the boat does not sink in the sea?  
*Terangkan mengapa sampan tersebut tidak tenggelam ke dalam laut?*

4(a)

[1 mark]  
[1 markah]

|  |   |
|--|---|
|  | 1 |
|--|---|

- (b) State the principle involved in 4(a).  
*Nyatakan prinsip yang terlibat dalam 4(a).*

4(b)

[1 mark]  
[1 markah]

|  |   |
|--|---|
|  | 1 |
|--|---|

- (c) When the boat entering a river mouth, will the water level on the boat be above mark 'A' in Diagram 4?  
Explain your answer.  
*Apabila sampan memasuki muara sungai, adakah paras air pada sampan akan melebihi tanda 'A' pada Rajah 4*  
*Terangkan jawapan anda.*

4(c)

[3 marks]  
[3 markah]

|  |   |
|--|---|
|  | 3 |
|--|---|

- (d) If the density of water at river mouth is  $1000 \text{ kgm}^{-3}$  and the total mass of the boat, man and goods is 530 kg, calculate the volume of the water displaced.

*Jika ketumpatan air di muara sungai  $1000 \text{ kgm}^{-3}$  dan jumlah jisim sampan, lelaki dan muatan ialah 530 kg, hitungkan isipadu air yang disesarkan.*

4(d)

|  |   |
|--|---|
|  | 2 |
|--|---|

[2 marks]

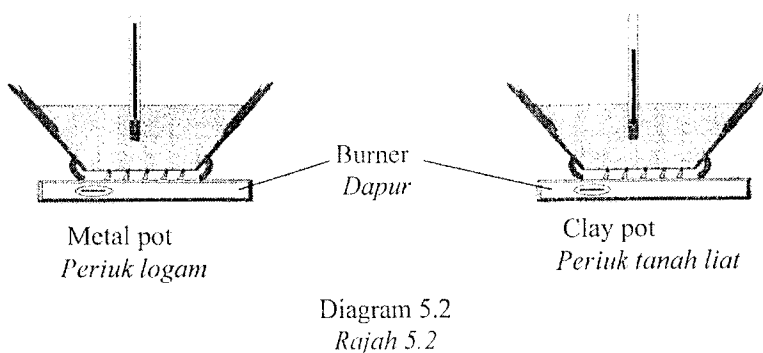
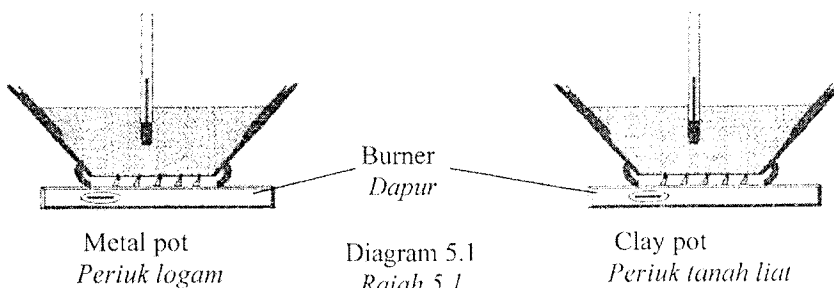
[2 markah]

Total  
A4

|  |   |
|--|---|
|  | 7 |
|--|---|

- 5 Diagram 5.1 shows the soup that boil in a metal pot and in a clay pot. Both pots and soups are supplied with same rate of heat and have same mass. Diagram 5.2 shows the changes in temperature after 5 minutes.

*Rajah 5.1 menunjukkan sup yang dimasak dalam periuk logam dan sup yang dimasak dalam periuk tanah liat. Kedua-dua periuk dan sup menerima kadar haba yang sama dan mempunyai jisim yang sama. Rajah 5.2 menunjukkan perubahan suhu selepas 5 minit.*



- (a) What is meant by specific heat capacity?  
*Apakah maksud muatan haba tentu?*

5(a)

[1 mark]

[1 markah]

|   |
|---|
| 1 |
|---|

- (b) Based on Diagram 5.1 and Diagram 5.2,  
*Berdasarkan Rajah 5.1 dan Rajah 5.2,*

- (i) compare the temperature of the soup in the metal pot and the temperature of the soup in the clay pot after 5 minutes.  
*bandingkan suhu sup dalam periuk logam dengan suhu sup dalam periuk tanah liat selepas 5 minit.*

5(b)(i)

[1 mark]

[1 markah]

|   |
|---|
| 1 |
|---|

- (ii) compare the specific heat capacity of the metal pot and the specific heat capacity of the clay pot.

*bandingkan muatan haba tentu periuk logam dengan muatan haba tentu periuk tanah liat.*

5(b)(ii)

|   |
|---|
| 1 |
|---|

[1 mark]

[1 markah]

- (iii) compare the mass of the soup in both pot.

*bandingkan jisim sup dalam kedua-dua periuk.*

5(b)(iii)

|   |
|---|
| 1 |
|---|

[1 mark]

[1 markah]

- (iv) state the relationship between the change of temperature and the specific heat capacity.

*nyatakan hubungan antara perubahan suhu dengan muatan haba tentu.*

5(b)(iv)

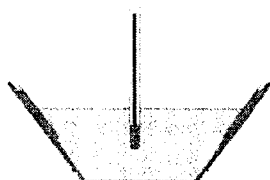
|   |
|---|
| 1 |
|---|

[1 mark]

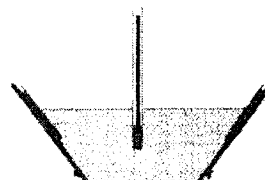
[1 markah]

- (c) After the soup in the pots reaches the same temperature, both pots are removed away from the burner as shown in Diagram 5.3. Diagram 5.4 shows the changes in temperature 5 minutes after removing them from the burner.

*Selepas kedua-dua sup dalam periuk mencapai suhu yang sama, kedua-dua periuk itu dialihkan dari dapur seperti yang ditunjukkan dalam Rajah 5.3. Rajah 5.4 menunjukkan perubahan suhu selepas 5 minit dialihkan dari dapur.*



Metal pot  
Periuk logam



Clay pot  
Periuk tanah liat

Diagram 5.3

Rajah 5.3

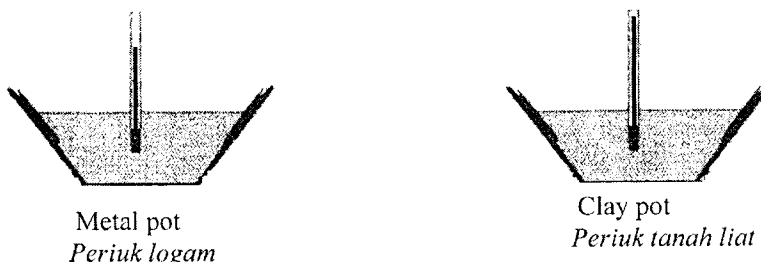


Diagram 5.4  
Rajah 5.4

- (i) Based on Diagram 5.3 and Diagram 5.4, compare the temperature of the soup in the metal pot and the temperature of the soup in the clay pot 5 minutes after removing them from the burner.  
*Berdasarkan Rajah 5.3 dan Rajah 5.4, bandingkan suhu sup dalam periuk logam dengan suhu sup dalam periuk tanah liat selepas 5 minit diangkat menjauhi api.*

5(c)(i)

[1 mark]  
[1 markah]

|   |
|---|
| 1 |
|---|

- (ii) Explain your answer in (c)(i).  
*Terangkan jawapan anda dalam (c)(i).*

5(c)(ii)

[1 mark]  
[1 markah]

|   |
|---|
| 1 |
|---|

- (iii) State the assumption that you make to answer (c)(ii).  
*Nyatakan anggapan yang anda buat untuk menjawab (c)(ii).*

5(c)(iii)

[1 mark]  
[1 markah]

|   |
|---|
| 1 |
|---|

Total  
A5

|   |
|---|
| 8 |
|---|



- 6 Diagram 6.1 shows the propagation of water waves in a ripple tank over a perspex plate in the shape of a trapezium.  
Diagram 6.2 shows the propagation of water waves from the sea as they advance towards the beach.

*Rajah 6.1 menunjukkan perambatan gelombang air dalam tangki riak merentasi satu kepingan perspex berbentuk trapezium.*

*Rajah 6.2 menunjukkan perambatan gelombang air dari laut dalam menghampiri kawasan pantai.*

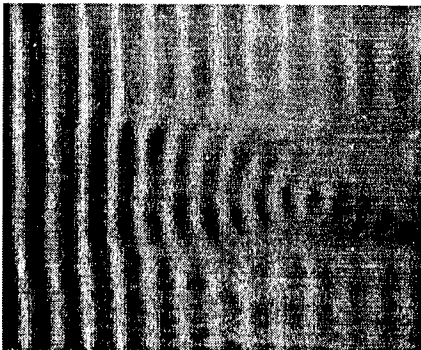


Diagram 6.1  
*Rajah 6.1*



Diagram 6.2  
*Rajah 6.2*

- (a) Based on Diagram 6.1 and 6.2:  
*Berdasarkan Rajah 6.1 dan 6.2 :*

- (i) State **two** similarities for the situations in Diagram 6.1 and 6.2.  
*Nyatakan **dua** kesamaan untuk situasi dalam Rajah 6.1 dan 6.2*

.....  
.....  
.....

[2 marks]

[2 markah]

- (ii) Name the phenomenon observed.  
*Namakan fenomena yang diperhatikan.*

.....

[1 mark]

[1 markah]

6(a)(i)

|   |
|---|
| 2 |
|---|

6(a)(ii)

|   |
|---|
| 1 |
|---|

- (b) (i) What is happening to the distances between the wavefronts as the water waves approach the beach?  
*Apa yang berlaku terhadap jarak antara muka gelombang apabila gelombang air menghampiri pantai?*

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

6(b)(i)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (ii) Explain your answer in (b)(i).  
*Terangkan jawapan anda di (b)(i).*

.....  
.....  
.....  
[2 marks]  
[2 markah]

6(b)(ii)

|  |   |
|--|---|
|  | 2 |
|--|---|

- (c) The trapezium shaped perspex plate is replaced with a convex shaped perspex plate as shown in Diagram 6.3.  
*Kepingan perspex berbentuk trapezium digantikan dengan kepingan perspex berbentuk cembung seperti Rajah 6.3.*

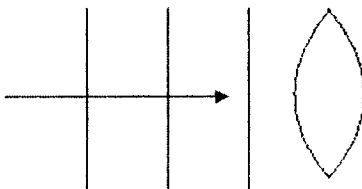


Diagram 6.3  
Rajah 6.3

Draw the wave produced as the wave pass through the convex shaped perspex plate in Diagram 6.3.

*Lukiskan gelombang yang terhasil apabila gelombang itu melalui kepingan perspeks berbentuk cembung pada Rajah 6.3..*

[2 marks]  
[2 markah]

6(c)

|  |   |
|--|---|
|  | 2 |
|--|---|

Total  
A6

|  |   |
|--|---|
|  | 8 |
|--|---|

- 7 Diagram 7 shows one of the applications of electromagnetic induction in the generation of electricity.  
*Rajah 7 menunjukkan penggunaan aruhan elektromagnet dalam penghasilan elektrik.*

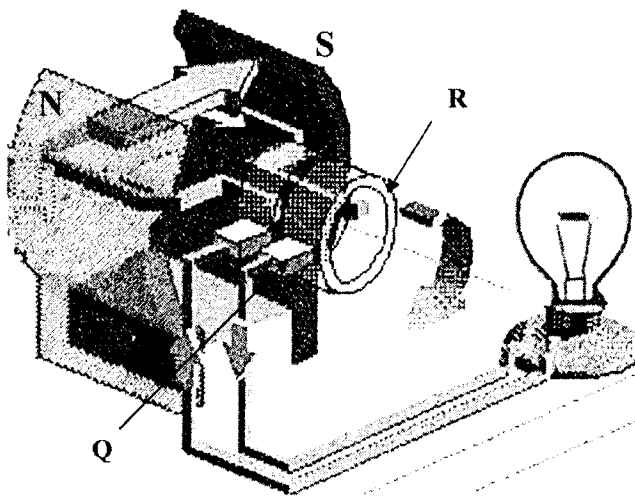


Diagram 7  
*Rajah 7*

- (a) What is meant by electromagnetic induction?  
*Apakah yang dimaksudkan dengan aruhan elektromagnet?*

7(a)

|  |   |
|--|---|
|  | 1 |
|--|---|

[1 mark]  
[1 markah]

- (b) What type of generator is shown in Diagram 7?  
*Apakah jenis penjana bagi Rajah 7?*

7(b)

|  |   |
|--|---|
|  | 1 |
|--|---|

[1 mark]  
[1 markah]

- (c) Name the part labelled  
*Namakan bahagian berlabel*

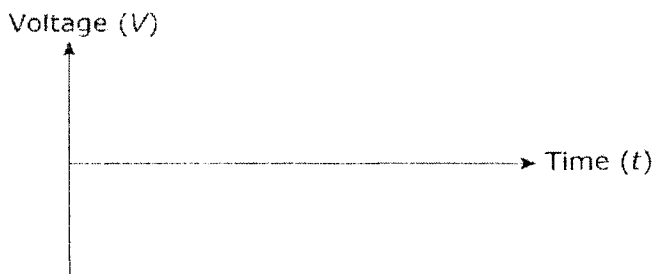
7(c)

|  |   |
|--|---|
|  | 2 |
|--|---|

- (i) Q : .....  
(ii) R : .....

[2 marks]  
[2 markah]

- (d) Sketch a graph of the voltage ( $V$ ) against time ( $t$ ) for the generator.  
*Lakarkan graf voltan ( $V$ ) melawan masa ( $t$ ) untuk penjana itu.*



[1 mark]  
[1 markah]

7(d)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (e) State **two** ways that can be applied to increase the voltage produced by the generator.  
*Nyatakan **dua** cara untuk menambah voltan yang dihasilkan oleh penjana?*

.....

.....

.....

[2 marks]  
[2 markah]

7(e)

|  |   |
|--|---|
|  | 2 |
|--|---|

- (f) Describe the conversion of energy that occurs in the generator.  
*Terangkan perubahan tenaga yang berlaku pada penjana itu*

.....

[1 mark]  
[1 markah]

7(f)

|  |   |
|--|---|
|  | 1 |
|--|---|

**Total**  
**A7**

|  |   |
|--|---|
|  | 8 |
|--|---|

- 8 Diagram 8 shows the structure of a periscope used in a submarine.  
*Rajah 8 menunjukkan struktur bagi sebuah periskop yang digunakan di dalam kapal selam.*

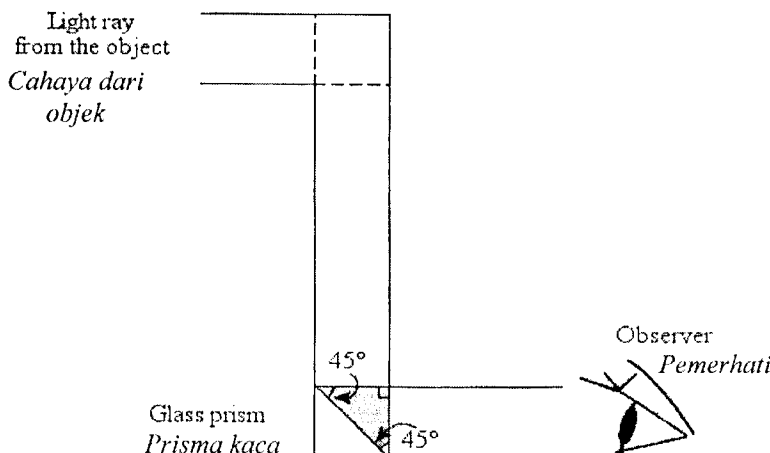


Diagram 8  
Rajah 8

- (a) Two glass prisms must be placed so the observer can see the objects outside the submarine. The position of one of the glass prisms is shown in Diagram 8.  
*Dua prisma kaca mesti digunakan supaya pemerhati dapat melihat objek di luar kapal selam. Kedudukan satu daripada prisma kaca itu ditunjukkan pada Rajah 8.*

On Diagram 8,  
*Pada Rajah 8,*

8(a)(i)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (i) **draw and shade** the second prism.  
*lukis dan lorekkan kedudukan prisma.*

[1 mark]

[1 markah]

8(a)(ii)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (ii) complete the path of the light ray from the object to the observer's eye.  
*lengkapkan rajah sinar cahaya dari objek ke mata pemerhati.*

[1 mark]

[1 markah]

8(b)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (b) State the light phenomenon involved.  
*Nyatakan fenomena cahaya yang terlibat.*

[1 mark]

[1 markah]

- (c) If the critical angle of the glass prism is  $44^\circ$ , calculate the refractive index of the glass prism.

*Sudut genting prisma kaca itu ialah  $44^\circ$ . Kirakan indeks biasan prisma kaca itu.*

[2 marks]

[2 markah]

8(c)

|   |
|---|
| 2 |
|---|

- (d) Q, R and S are three different materials used as a prism in a periscope. Table 8 shows the characteristics of each material.

*Q, R and S adalah tiga jenis bahan yang berbeza digunakan sebagai prisma di dalam periskop.*

*Jadual 8 menunjukkan ciri-ciri pada setiap bahan.*

| Materials<br><i>Bahan</i> | Refractive index<br><i>Indeks Biasan</i> | Critical Angle<br><i>Sudut Genting</i> |
|---------------------------|--|--|
| Q                         | 1.25                                     |  |
| R                         | 1.33                                     |  |
| S                         | 1.52                                     |  |

Table 8

*Jadual 8*

- (i) Calculate the critical angle for each materials and fill in Table 8.

*Hitungkan sudut genting bagi setiap bahan dan lengkapkan Jadual 8.*

[1 mark]

[1 markah]

8(d)(i)

|   |
|---|
| 1 |
|---|

- (ii) Based on the answers in 8(d)(i), state the most suitable material to be used in periscope.

*Berdasarkan jawapan di 8(d)(i), nyatakan bahan yang paling sesuai untuk digunakan dalam periskop?*

8(d)(ii)

|   |
|---|
| 1 |
|---|

[1 mark]

[1 markah]

- (iii) State **one** reason for the answer in 8(d)(ii)?

*Nyatakan **satu** sebab bagi jawapan di 8(d)(ii)?*

8(d)(iii)

|   |
|---|
| 1 |
|---|

[1 mark]

[1 markah]

- (e) Mirror can also be used in periscopes.  
*Cermin juga boleh digunakan di dalam periskop*

8(e)(i)

|  |   |
|--|---|
|  | 1 |
|--|---|

- (i) State the light phenomenon applied when using mirror.  
*Nyatakan fenomena cahaya yang digunakan jika menggunakan cermin.*

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

- (ii) Give **one** reason why mirror is not suitable to be used compared to prism.  
*Beri **satu** sebab mengapa cermin tidak sesuai digunakan berbanding prisma.*

8(e)(ii)

|  |   |
|--|---|
|  | 1 |
|--|---|

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

**Total**  
**A8**

|  |    |
|--|----|
|  | 10 |
|--|----|

**Section B**  
**Bahagian B**  
[20 marks]  
[20 markah]

Answer any **one** question in this section.

*Jawab mana-mana **satu** soalan daripada bahagian ini.*

- 9 Diagram 9.1 shows a boy pouring hot coffee into a cup. The hand of the boy is not scalded by the coffee droplets that are spattered from the kettle. Diagram 9.2 shows hot coffee spilling over and getting onto his hand and his hand gets scalded because of the higher heat capacity in it.

*Rajah 9.1 menunjukkan seorang budak lelaki sedang menuang kopi ke dalam cawan. Tangan budak tersebut tidak melecur apabila terpercik air kopi yang panas itu. Rajah 9.2 menunjukkan kopi panas tertumpah ke atas tangannya dan tangannya melecur kerana terdapat muatan haba yang lebih tinggi di dalamnya.*

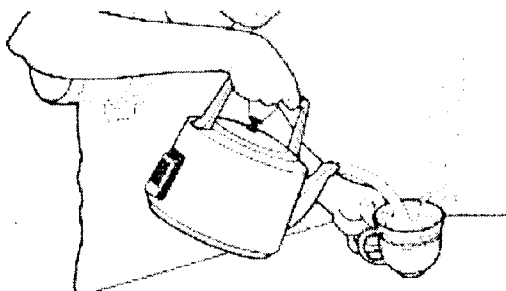


Diagram 9.1  
*Rajah 9.1*

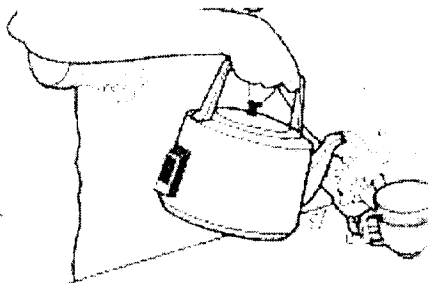


Diagram 9.2  
*Rajah 9.2*

- (a) What is meant by heat capacity?  
*Apakah maksud muatan haba?*
- (b) (i) Observe Diagrams 9.1 and 9.2. Compare the temperature of the coffee, the mass of the coffee droplets spatters on his hand and the coffee from the kettle spills on it, and the injury to the hands.  
State the relationship between the mass of the coffee and the injury that occurs.  
*Perhatikan Rajah 9.1 and 9.2. Bandingkan suhu air kopi, jisim titik air kopi mengenai tangan budak tersebut dan air kopi panas tertumpah ke atas tangannya, serta kecederaan yang dialami.  
Nyatakan hubungan di antara jisim percikan air kopi dengan kecederaan yang dialami.*

[4 marks]

[4 markah]

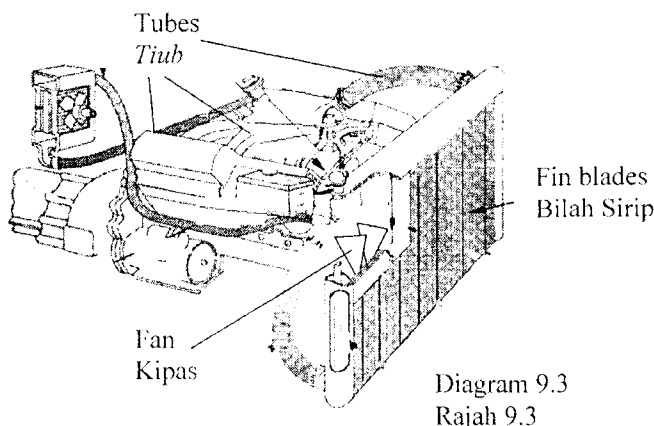
- (ii) State the relationship between the heat capacity and the mass.  
*Nyatakan hubungan diantara muatan haba dengan jisim*

[1 mark]

[1 markah]



- (c) Diagram 9.3 shows a radiator of a car.  
*Rajah 9.3 menunjukkan sebuah radiator kereta.*



Water is used as a cooling agent in a radiator. Explain how water is used as a cooling agent in the radiator.

*Air digunakan sebagai agen penyejuk. Terangkan bagaimana air digunakan sebagai agen penyejuk di dalam radiator tersebut.*

[4 marks]

[4 markah]

- (d) You are required to give some suggestions to design an efficient thermometer to be used in physics laboratory.  
Using your knowledge about heat and properties of materials, explain how to build a thermometer which can function effectively based on the following aspects,

*Anda dikehendaki memberi beberapa cadangan untuk merekabentuk sebuah termometer yang berkesan.*

*Menggunakan pengetahuan tentang haba dan sifat-sifat bahan, terangkan bagaimana untuk membina sebuah termometer yang dapat berfungsi secara berkesan berdasarkan aspek-aspek berikut,*

- (i) Strength of the thermometer  
*Kekuatan termometer*
- (ii) Choice of the thermometric liquid  
*Pilihan cecair termometrik.*
- (iii) Sensitivity of the thermometer  
*Kepekaan termometer.*
- (iv) Design of the thermometer so that the scale can easily be read.  
*Rekabentuk termometer dengan skala yang mudah dibaca.*
- (v) Melting point and freezing point of the liquid  
*Takat lebur dan takat beku cecair itu.*

[10 marks]

[10 markah]

- 10 Diagram 10.1 and Diagram 10.2 show the pattern of interference using coherent sources of water waves.

*Rajah 10.1 dan Rajah 10.2 menunjukkan corak interferens menggunakan sumber koheren gelombang air.*

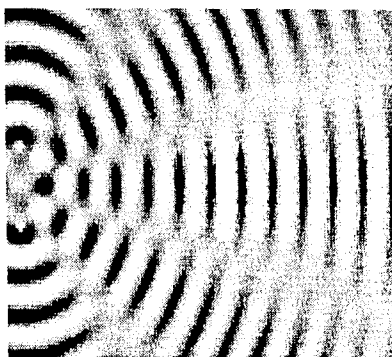


Diagram 10.1  
*Rajah 10.1*

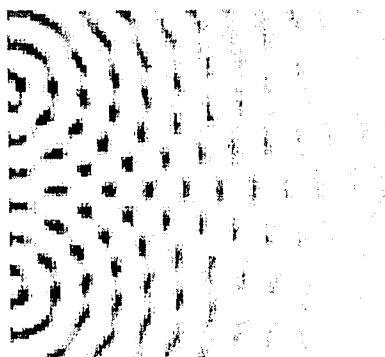


Diagram 10.2  
*Rajah 10.2*

- (a) How does constructive interference occur?  
*Bagaimana interferens membina terjadi?*

[1 mark]

[1 markah]

- (b) Using Diagram 10.1 and Diagram 10.2, compare the distance between the two coherent sources, wavelength of the propagating water waves and distance between two consecutive antinodes.  
*Menggunakan Rajah 10.1 dan Rajah 10.2, bandingkan jarak di antara dua sumber koheren, panjang gelombang bagi gelombang air yang merambat dan jarak di antara dua garis antinod yang berturutan.*

[3 marks]

[3 markah]

- (c) Relate the distance between the two coherent sources with the distance between two consecutive antinodes.  
*Hubungkan jarak di antara dua sumber koheren dengan jarak di antara dua garis antinod berturutan.*

[2 marks]

[2 markah]



Diagram 10.3

Rajah 10.3

- (d) Diagram 10.3 shows tourists at a beach observing the sunset.  
*Rajah 10.3 menunjukkan pelancong berada di pantai memerhatikan matahari terbenam.*

Using physics concepts, explain why the tourist can still able to see the sun even though it has already set.

*Dengan menggunakan konsep fizik, terangkan mengapa pelancong itu masih dapat melihat matahari walaupun matahari sebenarnya telah pun terbenam.*

[4 marks]

[4 markah]

- (e) Diagram 10.4 shows a restaurant in the town of Seremban. The restaurant is always packed with customers and always noisy. A student and his parents often visit the restaurant to enjoy a pleasant dinner. The restaurant in Diagram 10.4 is not suitable for a quiet evening and they decided to suggest a few modifications to the restaurant owner.

*Rajah 10.4 menunjukkan sebuah restoran di Bandar Seremban. Restoran tersebut sentiasa penuh dan selalu bising. Seorang pelajar dan ibubapanya selalu pergi ke restoran tersebut untuk menjamu selera. Restoran tersebut didapati tidak sesuai untuk makan malam yang tenang dan mereka ingin mencadangkan beberapa pengubahsuaian kepada pemilik restoran.*



Diagram 10.4

Rajah 10.4

Using the appropriate physics concepts, suggest and explain the modifications that have to be done to reduce the noise pollution. The modifications should include the following aspects:-

*Menggunakan konsep-konsep fizik yang sesuai, cadang dan terangkan pengubahsuaian yang perlu dibuat ke atas restoran tersebut. Pengubahsuaian yang dibuat mestilah melibatkan aspek-aspek berikut:-*

- (i) Materials used for floor, ceiling and wall.  
*Bahan yang digunakan untuk lantai, siling dan dinding.*
- (ii) Finishing for table and countertops.  
*Kemasan untuk meja dan kaunter.*
- (iii) Solution for large windows  
*Penyelesaian bagi masalah tingkap besar*
- (iv) Dining space design  
*Rekaan ruang makan*

[10 marks]

[10 markah]

**Section C**  
**Bahagian C**  
[20 marks]  
[20 markah]

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

- 11** Diagram 11.1 shows an aeroplane. Diagram 11.2 shows a cross section of the aeroplane's wing.

*Rajah 11.1 menunjukkan sebuah kapal terbang. Rajah 11.2 menunjukkan keratan rentas sayap kapal terbang tersebut.*

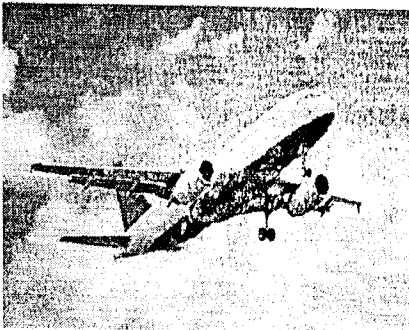


Diagram 11.1  
*Rajah 11.1*

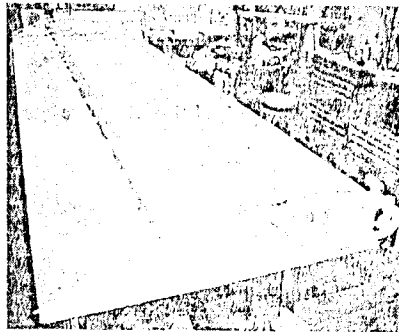


Diagram 11.2  
*Rajah 11.2*

- (a) Name the shape of the cross sectional of the aeroplane wing. [1 mark]  
*Namakan bentuk keratan rentas bagi sayap kapal terbang itu. [1 markah]*
- (b) The aeroplane can be lifted up when flying due to a difference in pressure of the air between the upper and bottom sides of the wings.  
*Kapal terbang itu boleh terangkat semasa sedang terbang disebabkan wujudnya perbezaan tekanan udara di antara bahagian atas dan bawah sayapnya.*
- (i) Explain how this difference in pressure is produced. [3 marks]  
*Terangkan bagaimana perbezaan tekanan ini terhasil. [3 markah]*
- (ii) Name the principle involved in your answer in 11(b)(i). [1 mark]  
*Namakan prinsip yang terlibat dalam jawapan anda untuk 11(b)(i). [1 markah]*

- (c) Table 11 shows characteristic of four designs of the aeroplane wings.  
*Jadual 11 menunjukkan ciri-ciri bagi empat rekabentuk sayap kapal terbang.*

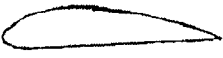


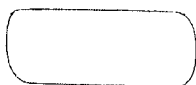
| Design<br><i>Rekabentuk</i> | Shape of cross section of wing<br><i>Bentuk keratan rentas sayap</i>                | Area of wing<br><i>Keluasan sayap/ m<sup>2</sup></i> | Density of wing material<br><i>Ketumpatan bahan sayap / kgm<sup>-3</sup></i> | Difference in speed of air above and below the wing<br><i>Perbezaan laju udara di antara bahagian atas dan bawah sayap / ms<sup>-1</sup></i> |
|-----------------------------|---|--|--|--|
| W                           |    | 38.0   | 2400   | 0.0  |
| X                           |    | 39.7   | 2300   | 21.8   |
| Y                           |    | 60.5   | 2000   | 20.0   |
| Z                           |  | 40.5   | 2050   | 15.5   |

Table 11  
*Jadual 11*

You are requested to choose the most suitable wing to be installed to the body of an aeroplane.

*Anda dikehendaki memilih sayap yang paling sesuai untuk dipasang kepada badan kapal terbang.*

By referring to the information given in Table 11, explain the suitability of each characteristic and suggest the most suitable wing to be installed with the body of the aeroplane.

*Dengan merujuk kepada maklumat yang diberikan dalam Jadual 11, terangkan kesesuaian setiap ciri dan cadangkan sayap yang paling sesuai untuk dipasang bersama badan kapal terbang tersebut.*

[10 marks]

[10 markah]

- (d) An aeroplane's wing has a mass of 900 kg and area of wing  $50 \text{ m}^2$ .  
*Sayap sebuah kapal terbang mempunyai jisim 900 kg dan keluasan sayap  $50 \text{ m}^2$ .*

- (i) If the pressure below the wing is more than the air pressure above the wing by  $400 \text{ Nm}^{-2}$ , calculate the force that exerted from below of the wing.

*Jika tekanan udara di bawah sayap melebihi tekanan udara di atasnya sebanyak  $400 \text{ Nm}^{-2}$ , kirakan daya yang bertindak dari bawah sayap kapal terbang tersebut.*

[2 marks]

[2 markah]

- (ii) Determine the resultant force and its direction that exerted to the wing of the aeroplane.

*Tentukan daya paduan dan arahnya yang bertindak terhadap sayap kapal terbang tersebut.*

[3 marks]

[3 markah]

- 12 (a) What is meant by a semiconductor? [1 mark]  
*Apakah maksud semikonduktor?* [1 markah]

- (b) Diagram 12.1 shows a full wave rectifier circuit.  
*Rajah 12.1 menunjukkan litar rektifikasi gelombang penuh.*

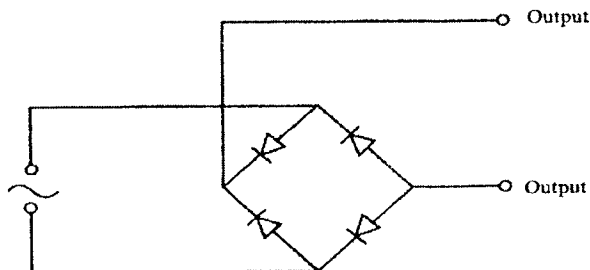


Diagram 12.1  
*Rajah 12.1*

- (i) Draw the waveform of a full wave rectification. [1 mark]  
*Lukiskan rektifikasi gelombang penuh.* [1 markah]

- (ii) State the modification that can done on the circuit in Diagram 12.1 to smoothen the current.

*Nyatakan modifikasi yang perlu buat pada litar dalam Rajah 12.1 untuk meratakan arus.*

[1 mark]  
[1 markah]

- (iii) Based on Diagram 12.1, draw the modification you suggest in (a)(ii).  
*Berdasarkan pada Rajah 12.1 lukiskan modifikasi yang anda cadangkan dalam (a)(ii).*

[1 marks]  
[1 markah]

- (iv) Draw the smoothen current. [1 mark]  
*Lukiskan arus yang diratakan* [1 markah]

- (c) The door of the lift is fitted with a light transmitter and a detector which is a light dependent resistor (LDR). If the LDR detects light, the relay switch is activated and the lift door will close.

*Suatu pintu lif dipasang dengan satu pemancar cahaya dan pengesan dengan perintang peka cahaya (PPC). Bila cahaya terang, geganti elektrik akan menghidupkan suis supaya pintu lif tutup.*

You are asked to investigate the circuit of the lift, and design suitable circuit to close the door of the lift, if there is no people in front of the lift as shown in Table 12.



| Circuit | Diagram |
|---------|---------|
| P       |         |
| Q       |         |
| R       |         |
| S       |         |

Table 12  
Jadual 12

Explain the suitability of the characteristics in Table 12 and then determine the most suitable circuit for the door of the lift. Give a reason for your choice.

*Terangkan kesesuaian ciri dalam Jadual 12 dan seterusnya tentukan litar yang paling sesuai untuk pintu lif itu. Beri sebab untuk pilihan anda.*

[10 marks]

[10 markah]

- (d) Diagram 12.2 shows trace of CRO screen when a potential different connected on it. The Y- gain setting is  $2\text{ V / div}$  and time-base is set to  $0.1\text{ s / div}$ .

*Rajah 12.2 menunjukkan surihan skrin OSK apabila disambung dengan suatu beza keupayaan. Anjakan -Y disetkan  $2\text{V/ bah}$ . Dan masa-tapak di setkan kepada  $0.1\text{ s /bah}$ .*

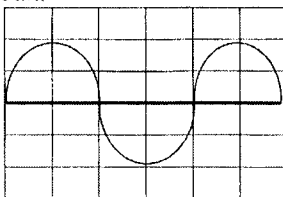
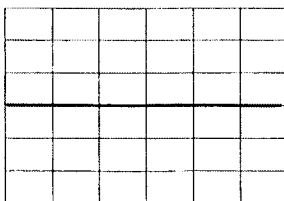


Diagram 12.2

*Rajah 12.2*

- (i) What type of current that is connected to the CRO? [1 mark]  
Apakah jenis arus disambung pada OSK itu? [1 markah]
  - (ii) What is the peak-voltage of the current? [1 mark]  
Berapakah nilai voltan bagi arus yang disambung? [1 markah]
  - (iii) Calculate the frequency of the current. [2 marks]  
Hitungkan frekuensi bagi arus itu. [2 markah]
- (e) Sketch the trace of CRO screen of the same current if the time-base is off.  
*Lakarkan surihan skrin OSK bagi arus yang sama bila masa tapak ditutup.*



[1 mark]  
[1 markah]

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

NAMA : .....

TINGKATAN : .....



**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA  
SEKOLAH MENENGAH MALAYSIA  
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS**

**PEPERIKSAAN PERCUBAAN BERSAMA 4531/3  
SIJIL PELAJARAN MALAYSIA 2010**

**PHYSICS**

**Kertas 3**

**Ogos**

**1  $\frac{1}{2}$  jam**

**Satu jam tiga puluh minit**

**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

1. Tulis **nama** dan **tingkatan** anda pada ruangan yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau bahasa Melayu.
5. Calon dikehendaki membaca maklumat di halaman dalam kertas soalan ini.

| Untuk Kegunaan Pemeriksa |        |              |                  |
|--------------------------|--------|--------------|------------------|
| Bahagian                 | Soalan | Markah Penuh | Markah Diperoleh |
| A                        | 1      | 16           |                  |
|                          | 2      | 12           |                  |
| B                        | 3      | 12           |                  |
|                          | 4      | 12           |                  |
| Jumlah                   |        |              |                  |

**This question paper has 15 printed pages**

**INFORMATION FOR CANDIDATES**  
**MAKLUMAT UNTUK CALON**

1. This question paper consists of two sections: **Section A** and **Section B**.  
*Kertas soalan ini mengandungi dua bahagian: **Bahagian A** dan **Bahagian B**.*
2. Answer **all** questions in **Section A**. Write your answer for **Section A** in the space provided in this question paper.  
*Jawab **semua** soalan dalam **Bahagian A**. Jawapan anda bagi **Bahagian A** hendaklah ditulis pada ruang yang disediakan dalam kertas soalan ini.*
3. Answer **one** question in **Section B**. Write your answers for **Section B** in a separate answer sheet. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answers.  
*Jawab **satu** soalan daripada **Bahagian B**. Tulis jawapan anda pada helaian tambahan. Anda boleh menggunakan persamaan, rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda.*
4. Show your working. It may help you to get marks.  
*Tunjukkan kerja mengira. Ini membantu anda mendapatkan markah.*
5. The diagrams in the questions are not drawn to scale unless stated.  
*Rajah yang mengiringi soalan tidak dilukis mengikut skala kecuali dinyatakan.*
6. If you wish to change your answer, cross out the answer that you have done. Then write down the new answer.  
*Jika anda hendak menukar jawapan, batalkan jawapan yang telah dibuat. Kemudian tulis jawapan yang baru.*
7. You may use a non-programmable scientific calculator.  
*Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogramkan.*
8. You are advised to spend 60 minutes to answer question in **Section A** and 30 minutes for **Section B**.  
*Anda dinasihati supaya mengambil masa 60 minit untuk menjawab soalan dalam **Bahagian A** dan 30 minit untuk **Bahagian B**.*

**HALAMAN KOSONG**

**Section A**  
**Bahagian A**

[ 28 marks ]

[ 28 markah ]

Answer **all** questions in this section.

Jawab **semua** soalan dalam bahagian ini.

- 1 A student carries out an experiment to find the relationship between the object distance,  $u$ , and the linear magnification  $M$  of a convex lens. Diagram 1.1 shows the arrangement of apparatus for the experiment.

Seorang pelajar menjalankan satu eksperimen untuk menentukan hubungan di antara jarak objek  $u$ , dengan pembesaran linear,  $M$  dengan menggunakan kanta cembung. Rajah 1.1 menunjukkan susunan radas eksperimen itu.

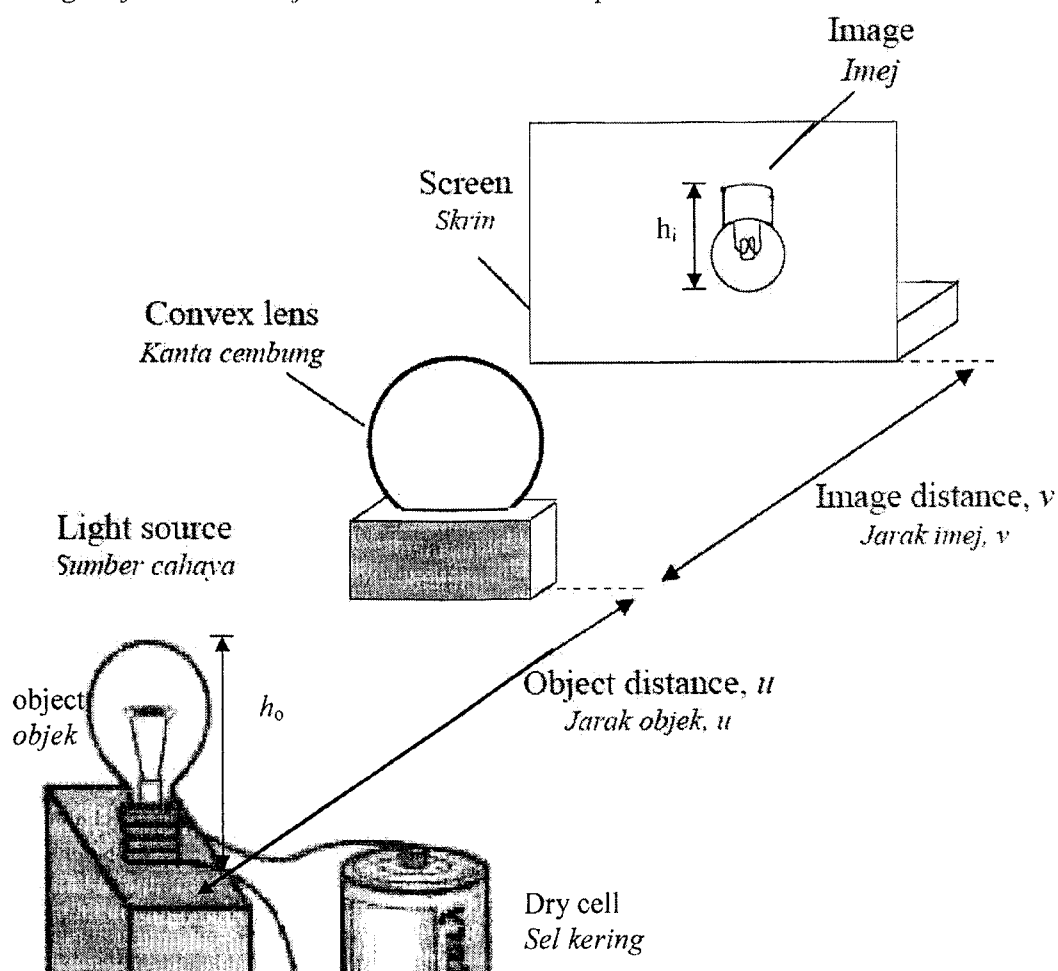


Diagram 1.1  
Rajah 1.1

At the beginning of the experiment, the object distance is fixed at 30 cm. The position of the screen is adjusted until a sharp image is formed on the screen. The experiment is then repeated for object distance,  $u = 25$  cm, 20 cm, 15 cm and 10 cm. The corresponding images on the screen are shown in Diagram 1.2.

*Pada permulaan eksperimen, jarak objek ditetapkan pada 30 cm. Kedudukan skrin di ubah supaya imej yang tajam dilihat pada skrin. Eksperimen itu diulang dengan jarak objek  $u = 25$  cm, 20 cm, 15 cm and 10 cm. Imej yang dihasilkan itu, ditunjukkan pada Rajah 1.2.*

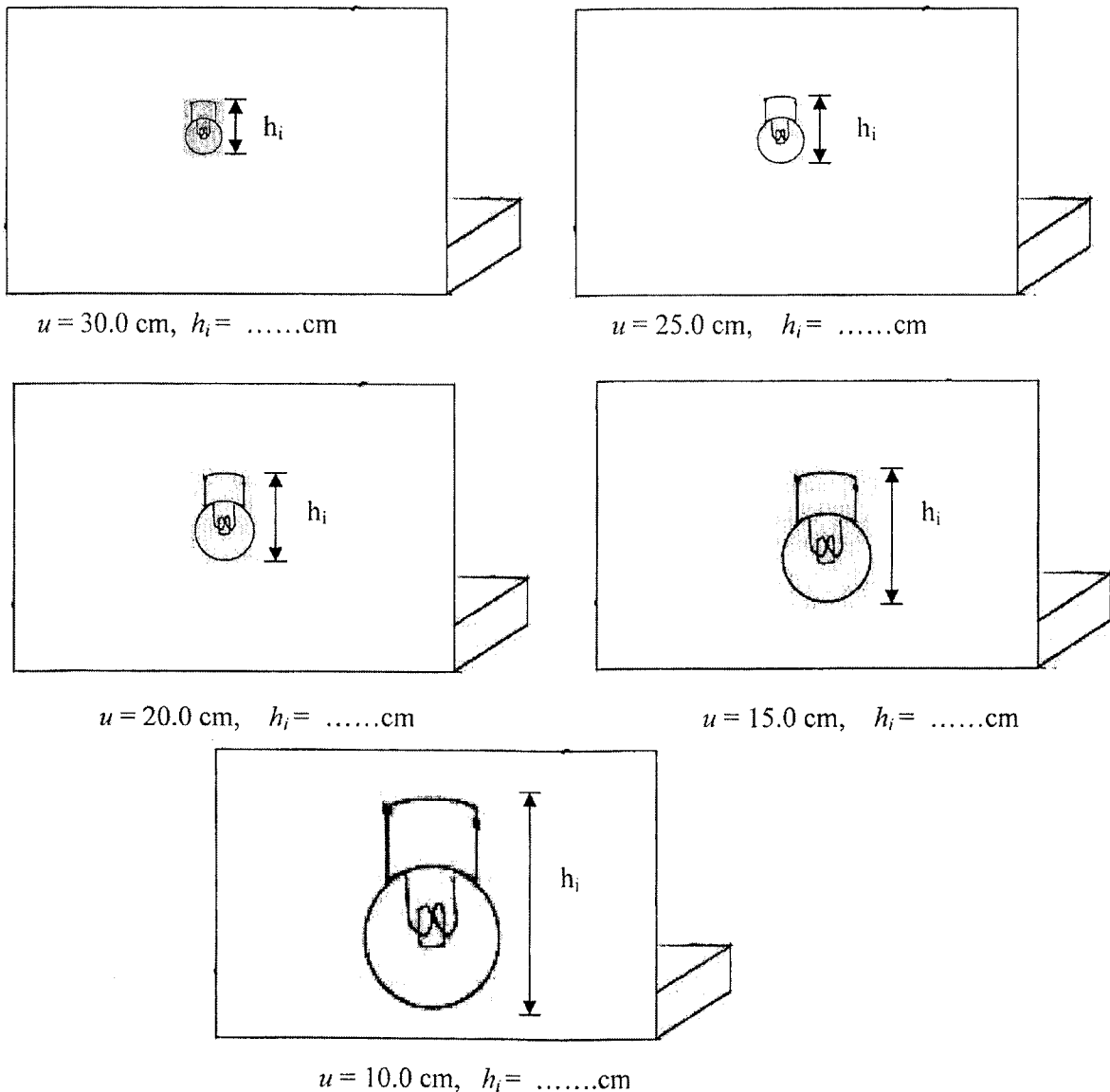
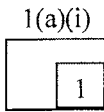


Diagram 1.2  
Rajah 1.2

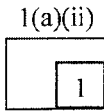
- (a) Based on the experiment above, identify:  
*Berdasarkan eksperimen di atas, kenalpasti:*

- (i) The manipulated variable  
*Pembolehubah dimanipulasikan*



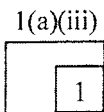
.....  
 [1 mark]  
 [1 markah]

- (ii) The responding variable  
*Pembolehubah bergerak balas*



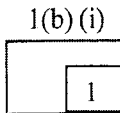
.....  
 [1 mark]  
 [1 markah]

- (iii) The constant variable  
*Pembolehubah dimalarkan*



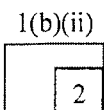
.....  
 [1 mark]  
 [1 markah]

- (b) (i) Based on the object shown in Diagram 1.1, measure the height of the object,  $h_o$   
*Berdasarkan objek dalam Rajah 1.1, ukur tinggi objek,  $h_o$*



$h_o = \dots\dots\dots$  cm  
 [1 mark]  
 [1 markah]

- (ii) Measure the height of the images,  $h_i$  in Diagram 1.2 for different object distances.  
*Ukur tinggi imej,  $h_i$  pada Rajah 1.2 untuk berlainan jarak objek.*



[2 marks]  
 [2 markah]



- (iii) Calculate the linear magnification  $M$  for each value of  $h_i$  and  $h_o$  of objects using the formula below.

*Kirakan pembesaran linear  $M$  untuk  $h_i$  dan  $h_o$  berdasarkan persamaan di bawah.*

$$M = \frac{h_i}{h_o}$$

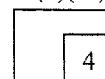
Tabulate your results for  $u$ ,  $h_i$  and  $M$ .

*Jadualkan keputusan anda untuk  $u$ ,  $h_i$  dan  $M$ .*

[4 marks]

[4 markah]

1(b)(iii)



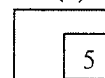
- (c) On the graph paper on page 8, plot a graph of  $u$  against  $M$

*Pada kertas graf di halaman 8, lukis graf  $u$  melawan  $M$*

[5 marks]

[5 markah]

1(c)



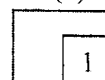
- (d) Based on your graph, state the relationship between  $u$  and  $M$ .

*Berdasarkan graf anda, nyatakan hubungan  $u$  dan  $M$ .*

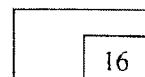
[1 mark]

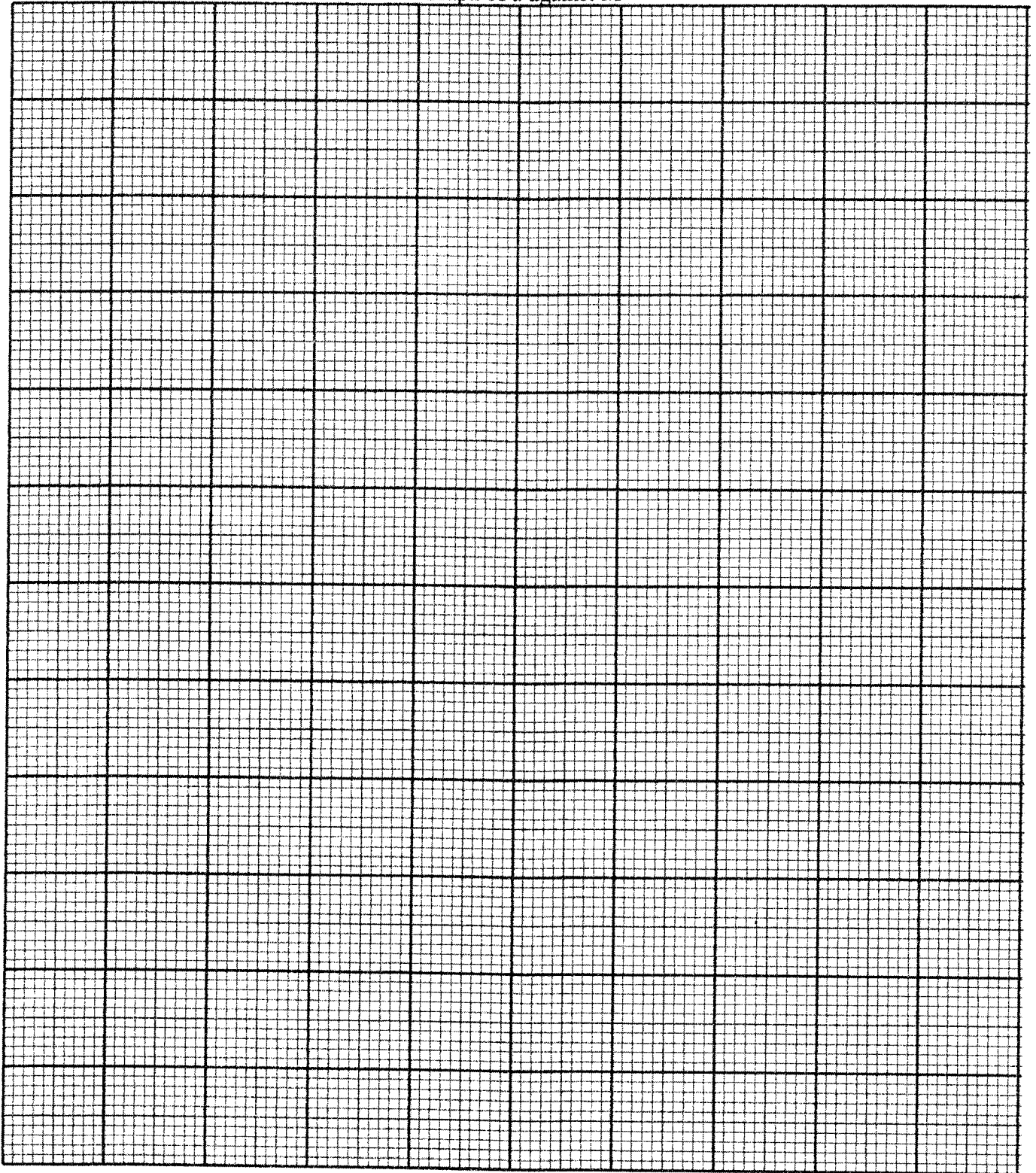
[1 markah]

1(d)



Total



Graph of  $u$  against  $M$ 

- 2 A student carries out an experiment by using a mercury barometer to determine the relationship between the atmospheric pressure,  $P$  and the altitude (height above sea level),  $h$ .

*Seorang pelajar menjalankan suatu eksperimen dengan menggunakan barometer merkuri untuk menyiasat hubungan antara tekanan atmosfera  $P$  dan altitud (ketinggian atas paras laut).*

The results of the experiment is shown in graph of  $P$  against  $h$  as shown in Diagram 2.

*Keputusan eksperimen ini ditunjukkan oleh graf  $P$  melawan  $h$  seperti Rajah 2.*

Atmospheric  
Pressure,  $P$

$/ 10^3 \text{ Pa}$

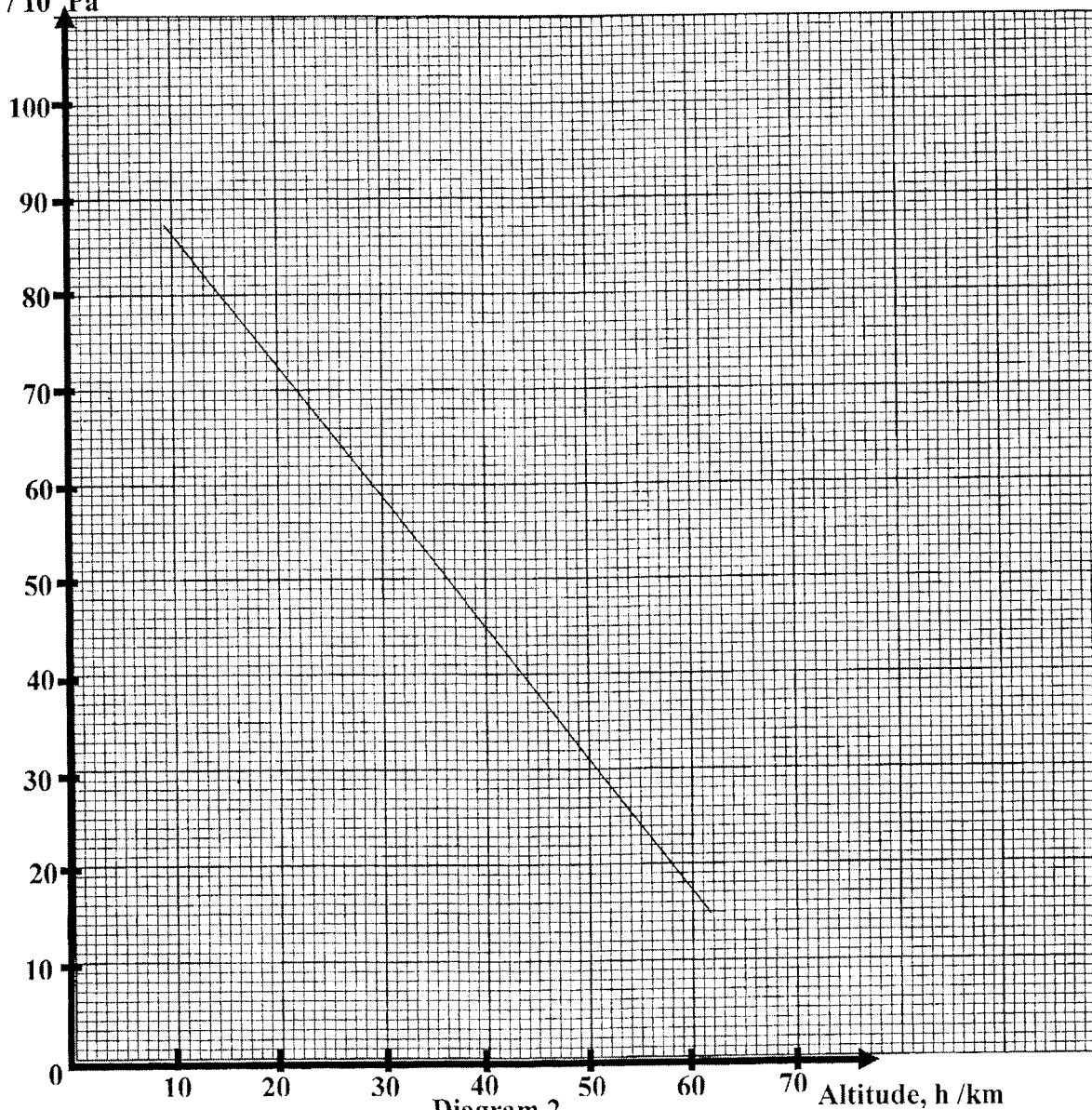
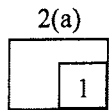


Diagram 2

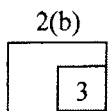
Rajah 2





- (a) State the relationship between  $P$  and  $h$ .  
*Nyatakan hubungan antara  $P$  dan  $h$ .*

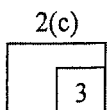
.....  
 [1 mark]  
 [1 markah]



- (b) The atmospheric pressure above sea level,  $P_0$  can be determined from the interception of the graph on the  $P$  axis. Show on the graph how you determine  $P_0$ , and write the value below.

*Tekanan atmosfera pada aras laut,  $P_0$  boleh ditentukan daripada pintasan graf pada paksi  $P$ . Tunjukkan pada graf bagaimana anda menentukan  $P_0$ , dan tuliskan nilainya di bawah.*

$P_0 =$  .....  
 [2 marks]  
 [2 markah]



- (c) Calculate the gradient,  $m$  of the graph. Show on the graph how you determine  $m$ .

*Hitungkan kecerunan,  $m$  pada graf. Tunjukkan pada graf bagaimana menentukan nilai  $m$ .*

$m =$  .....  
 [3 marks]  
 [3 markah]

- (d) The atmospheric pressure can be measured by using a simple mercury barometer. Given the formula of atmospheric pressure,  $P$  is

*Tekanan atmosfera boleh diukur menggunakan barometer merkuri. Diberi rumus untuk tekanan atmosfera,  $P$  ialah*

$$P = h\rho g$$

where  $h$  is height of mercury in barometer,  $\rho$  is density of mercury and  $g$  is gravitational acceleration.

*di mana  $h$  ialah ketinggian paras merkuri,  $\rho$  ialah ketumpatan merkuri dan  $g$  ialah pecutan graviti.*

- (i) Calculate the atmospheric pressure on top of a mountain if the height of the mercury in the barometer is 45 cm.

(Given  $\rho_{\text{Hg}} = 13600 \text{ kgm}^{-3}$  and  $g = 9.8 \text{ ms}^{-2}$ )

*Hitungkan tekanan atmosfera di atas suatu puncak gunung sekiranya ketinggian merkuri dalam barometer ialah 45 cm.*

*(Diberikan  $\rho_{\text{Hg}} = 13600 \text{ kgm}^{-3}$  and  $g = 9.8 \text{ ms}^{-2}$ )*

[2 marks]

[2 markah]

2(d)(i)

|   |
|---|
| 2 |
|---|

- (ii) Based on the graph and question d(i), determine the height of the mountain where the mercury barometer is being placed. Show on the graph how you determine the height of the mountain.

*Berdasarkan graf dan soalan d(i), tentukan ketinggian gunung di mana barometer merkuri tersebut diletakkan. Tunjukkan pada graf bagaimana anda menentukan ketinggian gunung tersebut.*

[2 marks]

[2 markah]

2(d)(ii)

|   |
|---|
| 2 |
|---|

- (iii) What is a more suitable instrument to measure the atmospheric pressure at the top of a mountain? Explain your answer.

*Apakah alat yang lebih sesuai untuk mengukur tekanan atmosfera di atas puncak gunung? Terangkan jawapan anda..*

2(d)(iii)

|   |
|---|
| 2 |
|---|

[2 marks]

[2 markah]

Total

|    |
|----|
| 12 |
|----|

**SECTION B**  
**BAHAGIAN B**

[ 12 marks ]

[ 12 markah ]

*Answer any one question from this section.*

*Jawab mana-mana satu soalan daripada bahagian ini.*

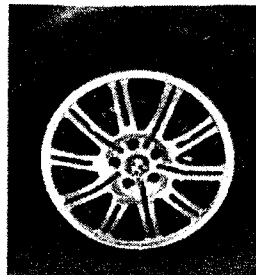
- 3 Before going to Johor Bahru, Afiff measures the air pressure of the tyres of his car, as shown in Diagram 3. He noticed that the pressure of the tyre is 200 kPa.  
*Sebelum pergi ke Johor Bahru, Afiff mengukur tekanan udara di dalam tayar keretanya, seperti yang ditunjukkan pada Rajah 3. Dia mendapati tekanan di dalam tayar adalah 200 kPa.*

At Johor Bahru, Afiff measured the air pressure. He found that the air pressure in tyre has increased to 240 kPa.

*Di Johor Bahru, Afiff telah mengukur tekanan udara di dalam tayar itu. Dia mendapati tekanan udara dalam tayar itu telah meningkat kepada 240 kPa.*

Afiff also found that the tyre become hot after he arrived at Johor Bahru. However the size of the tyre remains the same.

*Afiff juga mendapati tayar itu menjadi panas setelah sampai di Johor Bahru. Walau bagaimanapun, saiz tayar itu adalah sama.*



**Figure 3**

**Rajah 3**

Based on the information and observation:

*Berdasarkan maklumat dan pemerhatian tersebut:*

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

[1 mark]

*Nyatakan **satu** inferens yang sesuai.*

[1 markah]

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

[1 mark]

*Nyatakan **satu** hipotesis yang sesuai.*

[1 markah]

- (c) With the use of apparatus such as Bourdon gauge, a round bottom flask and other apparatus, describe **one** experiment to investigate the hypothesis stated in Question 3(b).

*Dengan menggunakan radas seperti tolok Bourdon, kelalang dasar bulat dan lain-lain radas, terangkan **satu** eksperimen untuk menyiasat hipotesis yang dinyatakan pada Soalan 3(b)*

In your description, state clearly the following:

*Dalam penerangan anda, nyatakan dengan jelas perkara berikut:*

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

[10 marks]

[10 markah]

4

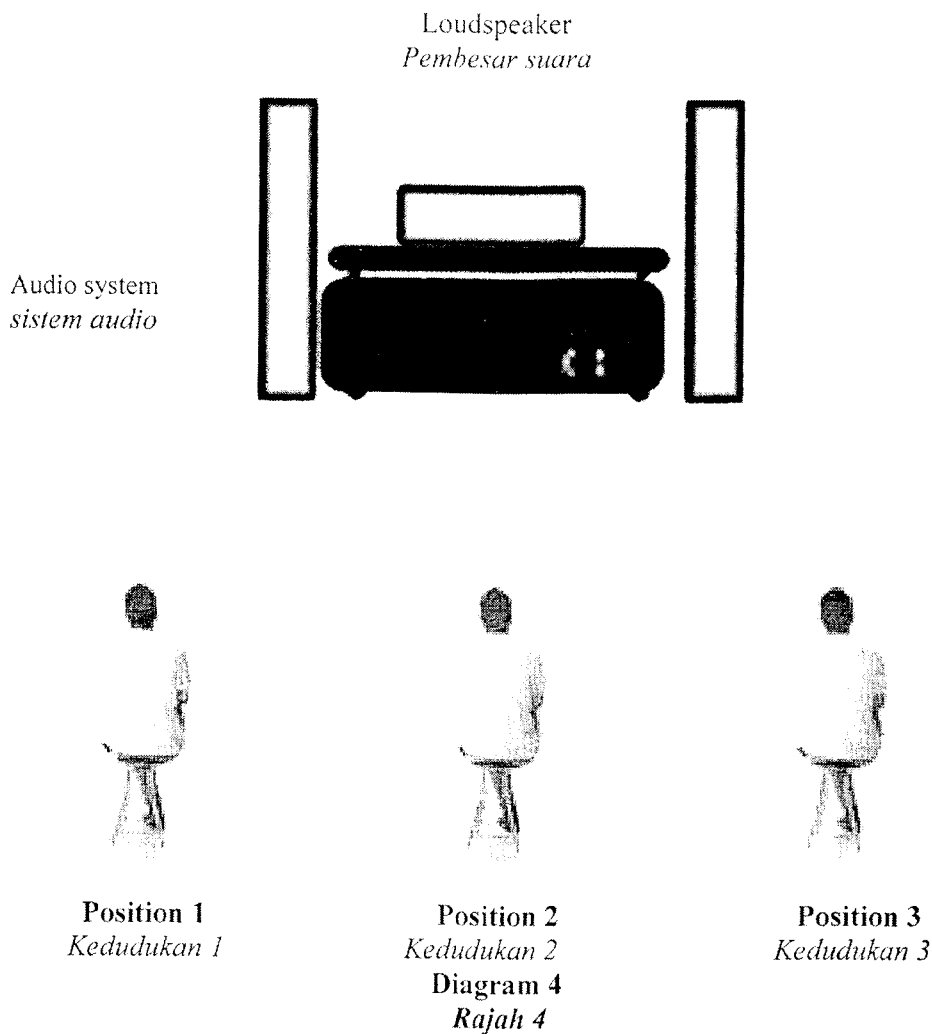


Diagram 4 shows a man testing a newly bought audio system in a mini theatre by changing his seating position. Loud sound can only be obtained at some seating positions with a certain distance from the loudspeaker.

*Rajah 4 seorang lelaki sedang menguji sistem audio teater mini yang baru dibelinya dengan menukar tempat duduknya. Bunyi yang kuat hanya boleh didengar di beberapa tempat tertentu dengan jarak tertentu dari pembesar suara.*

Based on the observation above and your knowledge on waves phenomena;  
*Berdasarkan pemerhatian di atas dan pengetahuan anda mengenai fenomena gelombang;*



- (a) State **one** suitable inference. [1 mark]  
*Nyatakan **satu** inferens yang sesuai.* [1 markah]
- (b) State one suitable hypothesis. [1 mark]  
*Nyatakan **satu** hipotesis yang sesuai dan boleh diasasat.* [1 markah]
- (c) With the use of apparatus such as an audio generator, loudspeakers and other apparatus, describe an experimental framework to investigate the hypothesis stated in 3(b).  
*Dengan menggunakan radas seperti penjana audio, pembesar suara dan lain-lain radas, terangkan satu rangka kerja eksperimen untuk menyiasat hipotesis yang anda nyatakan dalam 3(b)*

In your description, state clearly the following:

*Dalam penerangan anda, nyatakan dengan jelas perkara berikut:*

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

[10 marks]

[10 markah]

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

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SULIT

4531  
Fizik



**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA  
SEKOLAH MENENGAH  
CAWANGAN NEGERI SEMBILAN**

**PEPERIKSAAN PERCUBAAN BERSAMA  
SIJIL PELAJARAN MALAYSIA 2010**

**FIZIK**

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**SKEMA PEMARKAHAN**

**KERTAS 1**

**PAPER 1**

**ANSWER**

|    |   |    |   |    |   |    |   |    |   |
|----|---|----|---|----|---|----|---|----|---|
| 1  | D | 11 | A | 21 | B | 31 | A | 41 | A |
| 2  | A | 12 | C | 22 | B | 32 | B | 42 | B |
| 3  | C | 13 | A | 23 | D | 33 | A | 43 | B |
| 4  | B | 14 | D | 24 | D | 34 | A | 44 | D |
| 5  | C | 15 | C | 25 | C | 35 | B | 45 | A |
| 6  | A | 16 | D | 26 | C | 36 | C | 46 | C |
| 7  | C | 17 | D | 27 | B | 37 | C | 47 | B |
| 8  | C | 18 | D | 28 | B | 38 | A | 48 | B |
| 9  | C | 19 | C | 29 | C | 39 | D | 49 | D |
| 10 | D | 20 | B | 30 | C | 40 | B | 50 | D |

**4531**  
**Fizik**



**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA  
SEKOLAH MENENGAH  
CAWANGAN NEGERI SEMBILAN**

**PEPERIKSAAN PERCUBAAN BERSAMA  
SIJIL PELAJARAN MALAYSIA 2010**

**FIZIK**

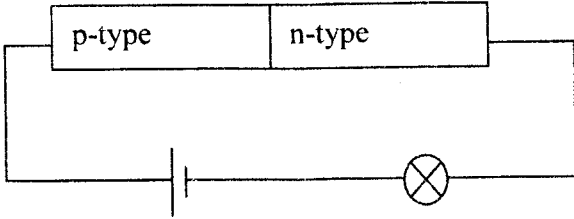
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**SKEMA PEMARKAHAN**

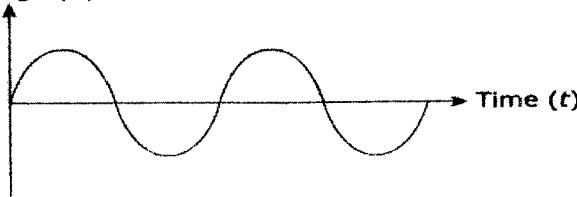
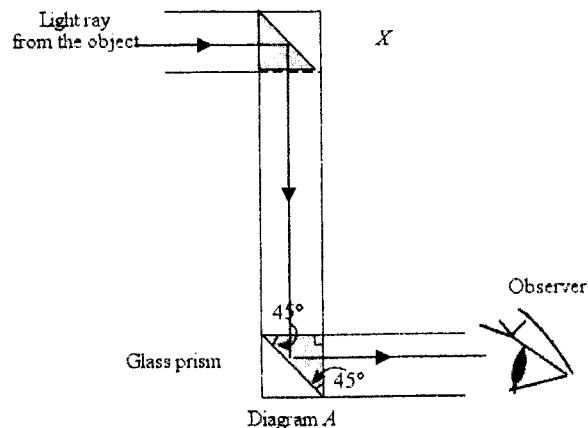
**KERTAS 2**

## MARKING SCHEME PAPER 2

## SECTION A

| No Question | ANSWER  | MARK     |
|-------------|---|----------|
| 1 a         | (i) GM Tube   | 1        |
|             | (ii) Radioactive / Gamma/ beta source   | 1        |
| b           | (i) Beta ray  | 1        |
|             | (ii) High penetration power.  | 1        |
| c           | (i) Background reading  | 1        |
|             | (ii) Certain rocks(minerals) /Cosmic ray from the surrounding   | 1        |
|             | <b>Total</b>  | <b>6</b> |
| 2 a         | Diode   | 1        |
| b           |  <p>- p-type connected to positive terminal (forward biased)</p> <p>- All component labeled / correct symbol</p> | 1        |
|             |   | 1        |
| c           | (i) Yes, the bulb will lights up.   | 1        |
|             | (ii) a.c source, the current will moves in two directions. So,there is current moves in forward-biased through the diode and the bulb will lights up  | 1        |
|             | <b>Total</b>  | <b>6</b> |
| 3 a         | A to B the car moves with constant velocity and B to C the car accelerate.  | 1        |
| b           | 0,  | 1        |
|             | A to B the car moves constant velocity.   | 1        |
| c           | (i) $V = 6 / 20$<br>$= 0.3 \text{ ms}^{-1}$   | 1        |
|             | (ii) $mv = 0.5 \times 0.3$<br>$= 0.15 \text{ kg ms}^{-1}$   | 1        |
|             | <b>Total</b>  | <b>7</b> |

| NO<br>QUESTION | ANSWER   | MARK        |
|----------------|--|-------------|
| 4              |  |             |
| a              | The upthrust force/buoyance force is greater than total weight of boat/ density of the boat is less than density of sea water  | 1           |
| b              | Archimedes' Principle  | 1           |
| c              | Yes/ water level increase.<br>Density of water at river mouth less than sea water.<br>Therefore upthrust force less than weight  | 1<br>1<br>1 |
| d              | $\rho Vg = 5300$<br>$V = 5300 / 1000(10)$<br>$= 0.53 \text{ m}^3$  | 1<br>1      |
|                | <b>Total</b>   | <b>7</b>    |
| 5              |  |             |
| a              | Quantity of heat energy required to increase the temperature of 1 kg of the substance by 1°C or 1 K.   | 1           |
| b              | (i) The temperature in metal pot is bigger than in clay pot  | 1           |
|                | (ii) The specific heat capacity of clay pot is bigger than metal pot   | 1           |
|                | (iii) Mass of the soup is same for both pot  | 1           |
|                | (iv) The lower the specific heat capacity, the higher the change of temperature  | 1           |
| c              | (i) The temperature of the soup in metal pot decreases faster than in clay pot.  | 1           |
|                | (ii) Because the higher the specific heat capacity, the temperature decrease becomes slower  | 1           |
|                | (iii) No heat lost to surroundings<br>/ all heat from the burner is absorbed by the pots and soups   | 1           |
|                | <b>Total</b>   | <b>8</b>    |
| 6              |  |             |
| a              | (i) Wavelength /speed of the wave decreases<br>Waves take on the shape of the Perspex plate / coastline of the beach / change in direction from deep to shallow                          | 1<br>1      |
| b              | (ii) Refraction of waves   | 1           |
|                | (i) Decreases/becomes smaller  | 1           |
|                | (ii) On approaching the beach, the water will be become shallower.<br>The speed and wavelengths of the waves decreases<br>/The wavefronts are refracted and become closer to each other. | 1<br>1      |

|       |   |   |
|-------|---|---|
| d     | Smaller wavelength on Perspex plate<br>Focus on F   | 1<br>1  |
| Total |   | 8   |
| 7     | a   | The production of e.m.f / induced current across a conductor in a changing magnetic field / flux                          |
|       | b   | A.C / Alternating current generator   |
|       | c   | (i) Carbon brush  |
|       |   | (ii) Slip rings   |
| d     | <p>Voltage (V)</p>  <p>Time (t)</p> | 1   |
| e     | - Increasing the speed of rotation of the coil.<br>- Increasing the strength of the magnetic field.                   | 1<br>1  |
| f     | Mechanical/kinetic energy of water → electrical energy  | 1   |
| Total |   | 8   |
| 8     | a   | (i)- draw triangle at correct position<br>- shade to show the prism<br>(ii) Draw the light ray with the correct direction |
|       |                                   | 1<br><br>1  |
| b     | Total internal reflection   | 1   |
| c     | $n = \frac{1}{\sin 44}$ $= 1.44$  | 1<br>1  |

|           |            |  |                  |       |   |       |   |       |   |
|-----------|------------|--|------------------|-------|---|-------|---|-------|---|
| d         | (i)        | <table><tr><td>Q</td><td>53.1°</td></tr><tr><td>R</td><td>48.7°</td></tr><tr><td>S</td><td>41.1°</td></tr></table>   | Q                | 53.1° | R | 48.7° | S | 41.1° | 1 |
|           | Q          | 53.1°  |                  |       |   |       |   |       |   |
|           | R          | 48.7°  |                  |       |   |       |   |       |   |
|           | S          | 41.1°  |                  |       |   |       |   |       |   |
| (ii)      | material S | 1  |                  |       |   |       |   |       |   |
|           | (iii)      | the incident angle of prism must be > the critical angle / the critical angle is smaller so that it is easy to achieve total internal reflection to occur  | 1                |       |   |       |   |       |   |
| e         | (i)        | Reflection of light  | 1                |       |   |       |   |       |   |
|           | (ii)       | To prevent overlapping image / image blare   | 1                |       |   |       |   |       |   |
| Total     |            |  | 10               |       |   |       |   |       |   |
| SECTION B |            |  |                  |       |   |       |   |       |   |
| 9         | a          | The total amount of heat needed to increase the temperature of an object by 1°C  | 1                |       |   |       |   |       |   |
|           | b(i)       | 1. the temperature of water droplet = the temperature of water poured on the hand<br>2. The mass of water droplets is smaller than water poured<br>3. Hand in diagram 9.1 less injured than that in 9.2<br>4. the bigger the heat capacity , the more injury to the skin | 1<br>1<br>1<br>1 |       |   |       |   |       |   |
|           | b(ii)      | The bigger the mass of an object, the bigger the heat capacity of the object   | 1                |       |   |       |   |       |   |
| c         |            | Water has high specific heat capacity  | 1                |       |   |       |   |       |   |
|           |            | When water in tube pass through the engine it can absorb large amount of heat energy   | 1                |       |   |       |   |       |   |
|           |            | Once water reach the radiator, the heat of the water absorbed by the fin blade of the radiator .   | 1                |       |   |       |   |       |   |
|           |            | The same time the fan in the radiator push the heat out of the car.  | 1                |       |   |       |   |       |   |
| d         |            | ✓ thermometer is made from transparent glass that is strong  | 1                |       |   |       |   |       |   |
|           |            | ✓ - so that it is not easily broken  |                  |       |   |       |   |       |   |
|           |            | ✓ the thermometric liquid chosen is mercury  | 1                |       |   |       |   |       |   |
|           |            | ✓ - because it easily expands uniformly / opaque   | 1                |       |   |       |   |       |   |
|           |            | ✓ the capillary tube is made narrow and thin   | 1                |       |   |       |   |       |   |
|           |            | ✓ - so that it is more sensitive   | 1                |       |   |       |   |       |   |
|           |            | ✓ the shape of the thermometer is round  | 1                |       |   |       |   |       |   |
|           |            | ✓ - so that it has a magnifying effect   | 1                |       |   |       |   |       |   |
|           |            | ✓ high boiling point and low freezing point  | 1                |       |   |       |   |       |   |
|           |            | ✓ - so that it can measure very high and low temperature   | 1                |       |   |       |   |       |   |
| Total     |            |  | 20               |       |   |       |   |       |   |



|    |   |  |        |
|----|---|--|--------|
| 10 | a | When two crests or two troughs meet each other to form maximum amplitude   | 1      |
|    | b | (i) Distance between two coherent sources in Diagram 10.2 is bigger than diagram 10.1                                | 1      |
|    |   | (ii) The wavelength are the same   | 1      |
|    |   | (iii) The distance between two adjacent antinodal lines in diagram 10.2 is smaller than diagram 10.1                 | 1      |
|    | c | As the distance between two coherent sources increases, the distance between two adjacent antinodal lines decreases. | 1<br>1 |
|    | d | Refraction of light ray  | 1      |
|    |   | Light travels from less dense to a denser medium   | 1      |
|    |   | towards the normal / bending closer.   | 1      |
|    |   | In the observer eyes, the sun is still not setting as they can still see the image from refraction.                  | 1      |

| Suggestion   | Reason   | Marks  |
|--|--|--------|
| The material of ceiling, wall and floor absorb sound / carpet                      | Absorb excess sound                                      | 1<br>1 |
| Soundproof panels and floor tiles  | Reduce echo.   | 1<br>1 |
| Use ceiling clouds decorative suspended sound panels that "float" from the ceiling | Absorb reflection of sound waves                         | 1<br>1 |
| Materials for tables and countertops cover with tablecloths                        | Absorb echo  | 1<br>1 |
| Areas with large windows, sound absorbing blinds may be installed                  | To capture sound and control reverberations from windows | 1<br>1 |
| Space design - Sit in tables in alcoves  | Provide a barricade against sound waves                  | 1<br>1 |
| Create area away from kitchen area   | Reduce noise   | 1<br>1 |
| Divide into smaller area/room  | Open area will create echo                               | 1<br>1 |


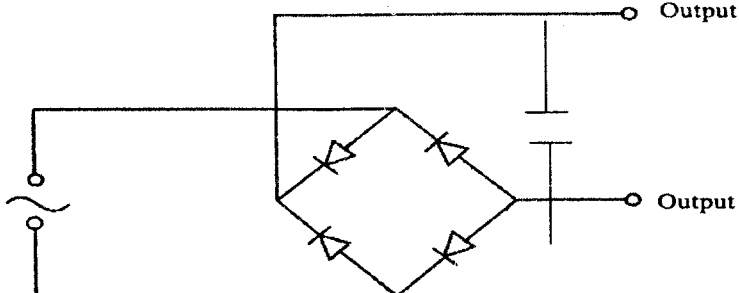

Choose any 5 suggestions

max – 10 marks

**Total 20 marks**

## SECTION C

|               |   |             |
|---------------|---|-------------|
| No. 11<br>(a) | Aerofoil  | 1           |
| (b) (i)       | The shape of cross section of the wing causes the speed of airflow above the wings to be higher than the speed of airflow below.<br>When the speed of moving air is higher the pressure is lower.<br>Hence air pressure below the wings is higher compare to above the wings. | 1<br>1<br>1 |
| (ii)          | Bernoulli's Principle   | 1           |
| (c)           | A shape of cross section which is upper side is longer than the bottom.<br>To produce the speed of airflow above the wings to be higher than the speed of airflow below   | 1<br>1      |
|               | The larger the area of the wing   | 1           |
|               | The larger the lift force   | 1           |
|               | The less density of the wing materials  | 1           |
|               | Less weight // produce more upward resultant force  | 1           |
|               | The higher the difference in speed of air   | 1           |
|               | The higher the difference in pressure   | 1           |
|               | The most suitable wing is Y.  | 1           |
|               | Because of<br>A shape of cross section which is upper side is longer than the bottom.<br>The larger the area of the wing<br>The less density of the wing materials<br>The higher the difference in speed of air   | 1           |
| (d)(i)        | $P = F / A$<br>$F = 400 \times 50$<br>$F = 20000 \text{ N}$   | 1<br>1      |
| (ii)          | Resultant Force = $20\,000 - 900(10)$<br>= $11000 \text{ N}$  | 1<br>1      |
|               | Direction of force : upwards  | 1           |
|               | <b>Total</b>  | <b>20</b>   |

|    |        |  |   |
|----|--------|--|---|
| 12 | a      | Semiconductor is a material with electrical conductivity better than an insulator but weaker than a conductor. | 1 |
|    | b(i)   |                              | 1 |
|    | b(ii)  | connect a capacitor in parallel to the output  | 1 |
|    | b(iii) |                              | 1 |
|    | b(iv)  |                             | 1 |

(c)

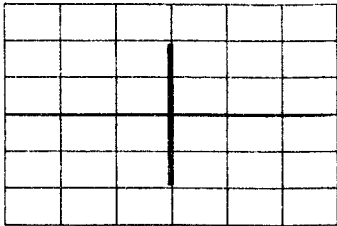
| Suggestion   | Explanation   | Marks  |
|--|---|--------|
| 1. LDR must connect to the base circuit.   | If there is light(no people in front of the lift) no current flow on base circuit , and no current flow on collector circuit and the motor won't switch on. | 1<br>1 |
| 2. Relay switch must be connected to the collector circuit.  | If there is a small change in base current, transistor can amplify the current to the relay to switch on the motor.   | 1<br>1 |
| 3. Positive terminal of dry cell must be connected to collector of transistor and negative terminal of dry cell must be connected to emitter | So current can flow from collector of transistor to emitter .   | 1<br>1 |
| 4. Resistance 10k $\Omega$ must be connected in series to LDR  | To function as potential divider that applies a proportion of a total voltage across the emitter-base junction so that the junction is forward bias.        | 1<br>1 |
| 5. Resistance 1 k $\Omega$ must be connected in series to base of transistor   | To limit the current passing through base of transistor.  | 1<br>1 |

Choose any 4 suitable suggestions and reasons.

[8 marks]

The most suitable circuit is P. Reason .....(repeat any 4 reason given)

[2 marks]

| No<br>Question | Answer  | Mark      |
|----------------|---|-----------|
| 12             |   |           |
| d(i)           | current a.c.  | 1         |
| d(ii)          | 4 V   | 1         |
| d(iii)         | $T = 4 \times 0.1 = 0.4\text{s}$  | 1         |
|                | Frequency, $f = 1/T$<br>$= 1/0.4$<br>$= 2.5 \text{ Hz}$                           | 1         |
| d(iv)          |  | 1         |
|                | <b>Total</b>  | <b>20</b> |

4531  
Fizik



**PERSIDANGAN KEBANGSAAN PENGETUA-PENGETUA  
SEKOLAH MENENGAH  
CAWANGAN NEGERI SEMBILAN**

**PEPERIKSAAN PERCUBAAN BERSAMA  
SIJIL PELAJARAN MALAYSIA 2010**

**FIZIK**

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**SKEMA PEMARKAHAN**

**KERTAS 3**

**JPNS FIZIK - 2010**

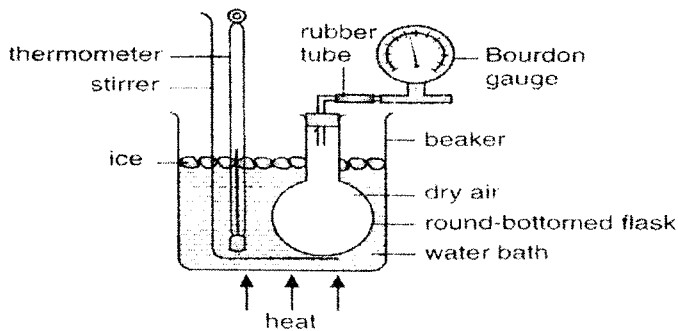
**PAPER 3**

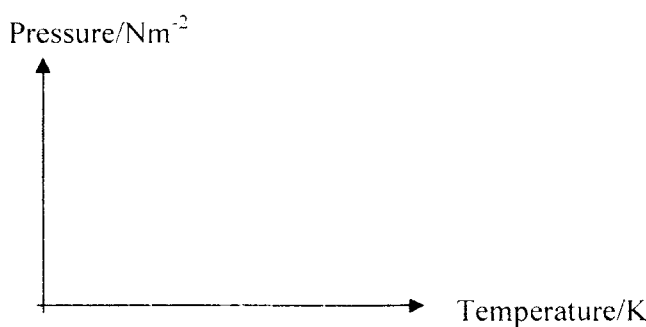
| No              | Answer   | Marks           |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
|-----------------|--|-----------------|-------------------|---|------|-----|------|------|-----|------|------|-----|------|------|-----|------|------|-----|------|--|
| 1               | a)(i) object distance  | 1               |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
|                 | (ii) linear magnification  | 1               |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
|                 | (iii) power / thickness of lens  | 1               |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
|                 | b)(i) $h_o = 3.3 \text{ cm}$   | 1               |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
|                 | (ii) $u = 30 \text{ cm}, h_i = 0.8 \text{ cm}$<br>$u = 25 \text{ cm}, h_i = 1.0 \text{ cm}$<br>$u = 20 \text{ cm}, h_i = 1.3 \text{ cm}$ (Note: Readings depend on<br>$u = 15 \text{ cm}, h_i = 2.0 \text{ cm}$ printed copy)<br>$u = 10 \text{ cm}, h_i = 3.2 \text{ cm}$<br>All correct answer – 2m<br>Min 3 correct answer – 1m   | 2               |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
|                 | (iii) <table border="1" data-bbox="443 1377 1157 1787"> <thead> <tr> <th><math>u / \text{cm}</math></th><th><math>h_i / \text{cm}</math></th><th>M</th></tr> </thead> <tbody> <tr> <td>10.0</td><td>3.3</td><td>1.00</td></tr> <tr> <td>15.0</td><td>2.0</td><td>0.61</td></tr> <tr> <td>20.0</td><td>1.3</td><td>0.39</td></tr> <tr> <td>25.0</td><td>1.0</td><td>0.30</td></tr> <tr> <td>30.0</td><td>0.8</td><td>0.24</td></tr> </tbody> </table> | $u / \text{cm}$ | $h_i / \text{cm}$ | M | 10.0 | 3.3 | 1.00 | 15.0 | 2.0 | 0.61 | 20.0 | 1.3 | 0.39 | 25.0 | 1.0 | 0.30 | 30.0 | 0.8 | 0.24 |  |
| $u / \text{cm}$ | $h_i / \text{cm}$  | M               |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
| 10.0            | 3.3  | 1.00            |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
| 15.0            | 2.0  | 0.61            |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
| 20.0            | 1.3  | 0.39            |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
| 25.0            | 1.0  | 0.30            |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |
| 30.0            | 0.8  | 0.24            |                   |   |      |     |      |      |     |      |      |     |      |      |     |      |      |     |      |  |

| No | Answer   | Marks     |
|----|--|-----------|
|    | <p>correct variable <math>u</math> , <math>h_i</math> , <math>M</math> - 1m</p> <p>all units correct - 1m</p> <p>Correct value of <math>M</math> (2 or 3 d.p) - 1m</p> <p>Consistent to 1 d.p for <math>u</math> and <math>h_i</math> - 1m</p>   | 4         |
|    | <p>c) Graph</p> <ul style="list-style-type: none"> <li>- label y axis - <math>M</math> and x axis - <math>u</math> - 1m</li> <li>- label units correctly - 1m</li> <li>- plot the points correctly from the table - 1m</li> <li>- saiz of graph <math>&gt; \frac{1}{2}</math> graph paper - 1m</li> <li>- draw a smooth curve through the points - 1m</li> </ul> | 5         |
|    | d) $M$ increases as $u$ decreases  | 1         |
|    | <b>JUMLAH</b>  | <b>16</b> |

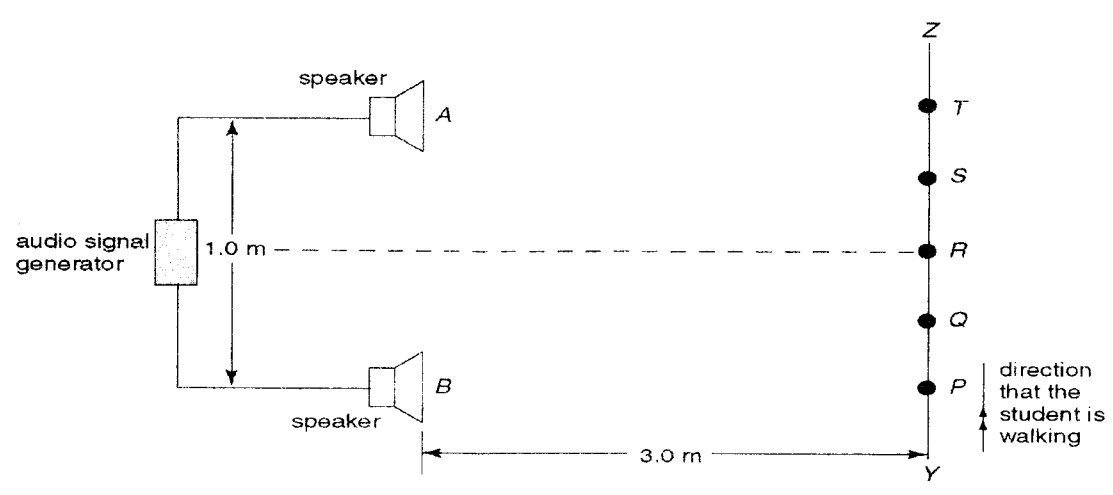
| Question | Answer   | Mark |
|----------|--|------|
| 2        |  |      |
| (a)      | P decreases linearly with h  | 1    |
|          | Extrapolated the graph   | 1    |
| (b)      | $P_0 = 100 \times 10^3 // 10^5 // 1 \times 10^5$   |      |
|          | $= 10^5 \text{ Pa} // \text{Nm}^{-2}$ [ correct unit ]                                       | 1    |
|          | Draw triangle of the gradient  | 1    |
|          | Gradient, $m = \frac{(100 - 30)10^3}{(0 - 51)10^3}$ or $m = \frac{(100 - 30)10^3}{(0 - 51)}$ | 1    |
|          | $= -1.37 \text{ Nm}^{-3}$ or $-1.37 \times 10^3 \text{ Pa km}^{-1}$                          | 1    |
|          | [with correct unit]  |      |
| (c)      | $P = h\rho g$  |      |
|          | $= 0.45 (13600)(9.8)$  | 1    |
|          | $= 59976 \text{ Pa}$   | 1    |
| (d) (i)  | Show a straight line on the graph when   | 1    |
| (ii)     | ( $P = 59\,976 \text{ Pa} \approx 60\,000 \text{ Pa}$ )                                      | 1    |
|          | $h = 29 \text{ km}$  |      |
| (iii)    | Aneroid barometer  | 1    |
|          | Do not spill / portable / small size   | 1    |
|          | JUMLAH   | 12   |

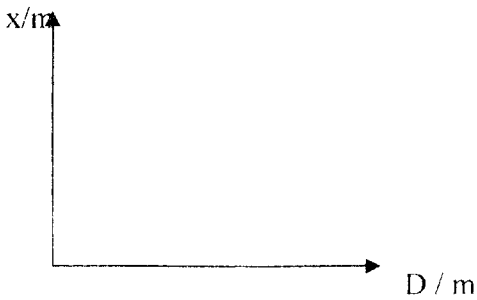


| No |        | Item  | Marks                          |
|----|--------|---|--------------------------------|
| 3  | (a)    | pressure depends on temperature   | 1                              |
|    | (b)    | The higher the temperature, the higher the pressure   | 1                              |
|    | (c)(i) | To investigate the relationship between the air pressure and its temperature.   | 1                              |
|    | (ii)   | Variables<br><br>Manipulated : temperature<br><br>Responding : pressure<br><br>Fixed : volume / mass of gas   | 1<br><br><br><br><br><br><br>1 |
|    | (iii)  | Apparatus/material:<br><br>Round-bottomed flask, glass tube, bourdon gauge, thermometer, rubber tube, retort stand, tripod stand, Bunsen burner, stirrer, beaker, wire gauze, water   | 1                              |
|    | (iv)   | Arrangement of apparatus<br><br> <p>thermometer<br/>stirrer<br/>ice<br/>rubber tube<br/>Bourdon gauge<br/>beaker<br/>dry air<br/>round-bottomed flask<br/>water bath<br/>heat</p> | 1                              |
|    | (v)    | Read thermometer when the temperature reach 30°C.<br><br>At the same time, read the bourdon gauge to get the reading of gas pressure.<br><br>Stir the water continuously, and repeat the experiment when the temperature reach 40°C, 50°C, 60°C and 70°C.             | 1<br><br>1<br><br><br>1        |

| No                                     |                            | Item  | Marks                                  |                            |    |  |    |  |    |  |    |  |    |  |   |
|--|----------------------------|---|--|----------------------------|----|--|----|--|----|--|----|--|----|--|---|
|  | (vi)                       | Tabulate data<br><br><table><tr><th>Temperature/<math>^{\circ}\text{C}</math><br/>/ K</th><th>Pressure/<math>\text{Nm}^{-2}</math></th></tr><tr><td>30</td><td></td></tr><tr><td>40</td><td></td></tr><tr><td>50</td><td></td></tr><tr><td>60</td><td></td></tr><tr><td>70</td><td></td></tr></table> | Temperature/ $^{\circ}\text{C}$<br>/ K | Pressure/ $\text{Nm}^{-2}$ | 30 |  | 40 |  | 50 |  | 60 |  | 70 |  | 1 |
| Temperature/ $^{\circ}\text{C}$<br>/ K | Pressure/ $\text{Nm}^{-2}$ |   |  |                            |    |  |    |  |    |  |    |  |    |  |   |
| 30                                     |                            |   |  |                            |    |  |    |  |    |  |    |  |    |  |   |
| 40                                     |                            |   |  |                            |    |  |    |  |    |  |    |  |    |  |   |
| 50                                     |                            |   |  |                            |    |  |    |  |    |  |    |  |    |  |   |
| 60                                     |                            |   |  |                            |    |  |    |  |    |  |    |  |    |  |   |
| 70                                     |                            |   |  |                            |    |  |    |  |    |  |    |  |    |  |   |
|  | (ii)                       | Analyse data<br><br>  | 1                                      |                            |    |  |    |  |    |  |    |  |    |  |   |
|  |                            | JUMLAH  | 12                                     |                            |    |  |    |  |    |  |    |  |    |  |   |

4.

|      | Item   | Marks       |
|------|--|-------------|
| a    | The distance between two successive loud, x sound depends on the distance from the loudspeakers, D   | 1           |
| b    | The distance between two loud sounds, x increases as the distance of separation of two sources, a increases.<br>/ the longer the distance between two loud sounds,x the longer the distance from the loudspeakers, D   | 1           |
| C(i) | To investigate the relationship between distance, x and distance, D  | 1           |
| (ii) | Manipulated : Distance between the observer and loudspeakers, D  | 1           |
|      | Responding : Distance between two successive positions of loud sounds, x.<br>Fixed : Distance between the two loudspeaker, a, / frequency of audio generator   | 1           |
|      | List of apparatus and materials<br>Audio signal generator, two identical loudspeakers, connecting wires and metre rule.  | 1           |
|      | Arrangement of apparatus<br>   | 1           |
|      | Procedure<br>A student walked slowly along a parallel straight line at a distance, D = 5.0 m from the loudspeakers using a metre rule /measuring tape<br>the distance, x between two successive positions of loud sounds is measured using a metre rule.<br>The experiment is repeated for a = 1.0m, 1.5 m, 2.0 m, 2.5 m and 3.0m. | 1<br>1<br>1 |

|       | Tabulation of data   | 1     |       |     |  |     |  |     |  |     |  |     |  |  |
|-------|--|-------|-------|-----|--|-----|--|-----|--|-----|--|-----|--|--|
|       | <table><tr><th>D / m</th><th>x / m</th></tr><tr><td>1.0</td><td></td></tr><tr><td>1.5</td><td></td></tr><tr><td>2.0</td><td></td></tr><tr><td>2.5</td><td></td></tr><tr><td>3.0</td><td></td></tr></table> | D / m | x / m | 1.0 |  | 1.5 |  | 2.0 |  | 2.5 |  | 3.0 |  |  |
| D / m | x / m  |       |       |     |  |     |  |     |  |     |  |     |  |  |
| 1.0   |  |       |       |     |  |     |  |     |  |     |  |     |  |  |
| 1.5   |  |       |       |     |  |     |  |     |  |     |  |     |  |  |
| 2.0   |  |       |       |     |  |     |  |     |  |     |  |     |  |  |
| 2.5   |  |       |       |     |  |     |  |     |  |     |  |     |  |  |
| 3.0   |  |       |       |     |  |     |  |     |  |     |  |     |  |  |
|       | (ii) Analysis of data  |       |       |     |  |     |  |     |  |     |  |     |  |  |
|       |   | 1     |       |     |  |     |  |     |  |     |  |     |  |  |
|       | JUMLAH   | 12    |       |     |  |     |  |     |  |     |  |     |  |  |