NO. KAD PENGENALAN:

ANGKA GILIRAN:

PERSIDANGAN KEBANGSAAN PENGETUA SEKOLAH MENENGAH MALAYSIA (CAWANGAN MELAKA)

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2010   **4531/1**
PHYSICS
Kertas 1
Sept.
1 ¼ Jam   **Satu jam lima belas minit**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Calon dikehendaki membaca maklumat di halaman bawah.*

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

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

Kertas soalan ini mengandungi 25 halaman bercetak.

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

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

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

3. $s = ut + at^2$

4. Momentum $= mv$

5. $F = ma$

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

7. Potential energy $= mgh$

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

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

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

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

12. Heat, $Q = mc\theta$

13. Heat, $Q = ml$

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

15. $E = mc^2$

16. $v = f\lambda$

17. Power, $P = \dfrac{energy}{time}$

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

19. linear magnification $= \dfrac{image\ size}{object\ size}$

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

21. $n = \dfrac{Sin\ i}{Sin\ r}$

22. $n = \dfrac{real\ depth}{apparent\ depth}$

23. $Q = It$

24. $V = IR$

25. Power, $P = IV$

26. $\dfrac{N_s}{N_p} = \dfrac{V_s}{V_p}$

27. Efficiency $= \dfrac{I_s V_s}{I_p V_p}$ x 100%

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

1   Which of this is a scalar quantity?
     Antara berikut, yang mana adalah kuantiti skalar?

     A   Velocity
           Halaju
     B   Distance
           Jarak
     C   Acceleration
           Pecutan
     D   Displacement
           Sesaran

2   Diagram 1 shows the reading of micrometer screw gauge without any object.
   *Rajah 1 menunjukan bacaan sebuah tolok skru mikrometer tanpa sebarang objek.*
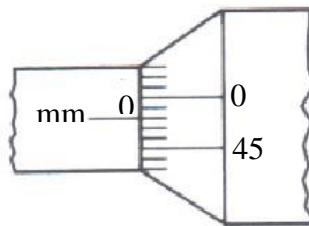
                    Diagram 1
                    Rajah 1

     What is the zero error of the micrometer screw gauge?
     Berapakah ralat sifar tolok skru mikrometer ?

     A   -0.03 mm
     B   -0.02 mm
     C   0.02 mm
     D   0.03 mm

3   Which of this has the largest value?
     *Di antara berikut yang manakah yang mempunyai nilai yang **terbesar**?*

     A 10^2 cm
     B 10^3 mm
     C 10^3 dm
     D 10^7 µm

4   Which speed - time graph applies to an object at rest?
     Graf kelajuan-masa yang manakah menunjukkan suatu objek berada dalam keadaan rehat?
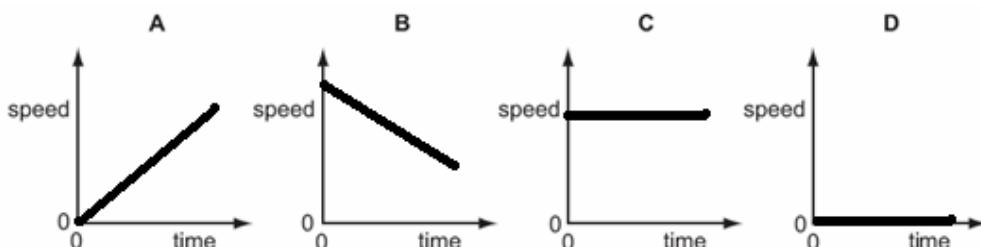
5   Diagram 2 shows a coconut of mass 2 kg falling from a height of 60 m from the ground. At which position the coconut have the highest gravitational potential energy?
Rajah 2 menunjukkan sebiji kelapa berjisim 2 kg jatuh dari ketinggian 60 m ke tanah. Di kedudukan manakah kelapa tersebut mempunyai tenaga keupayaan graviti yang paling tinggi?


R

Q

60 m   40 m

P
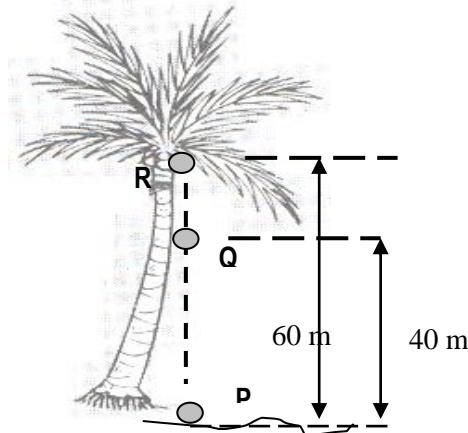
Diagram 2
Rajah 2

A   P

B   Q

C   R

6   A softball player as shown below, moves her hand downwards while catching a fast - moving ball.
Pemain sofbol seperti gambar di bawah menggerakkan tangannya ke bawah semasa menangkap bola yang laju.

The movement of her hand is to
Pergerakan tangan adalah untuk

A   increase the impulsive force
menambah daya impuls

B   increase the stopping time of the ball
memanjangkan masa bola berhenti

C   stop the ball from falling
mengawal bola supaya tidak jatuh

7   Diagram 3 shows a box is moving on a rough surface as pulled by a man with force of 50 N..What is the resultant force acting on the box?
Rajah 3 menunjukkan sebuah kotak bergerak di as permukaan yang kasar apabila ditarik oleh seorang lelaki dengan daya 50N. Apakah daya paduan yang bertindak ke atas kotak itu?
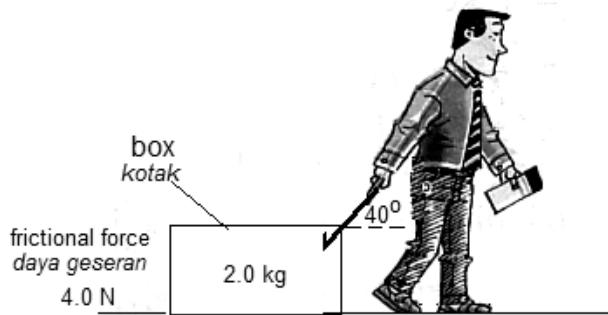
Diagram 3
Rajah 3

A   34.3 N

B   38.3 N

C   48 N

D   50 N

8   Diagram 4 shows a weight, W supported by two strings. Which vector diagram represents the forces T_1, T_2 and W that acts on the weight?
Rajah 4 menunjukkan sebuah pemberat, W tergantung oleh dua tali. Gambar rajah vektor yang manakah mewakili tindakan daya T_1, T_2 dan W pada pemberat itu.?
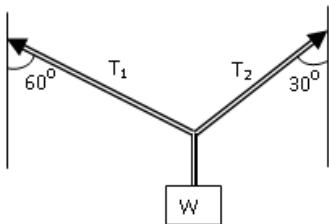

Diagram 4
Rajah 4
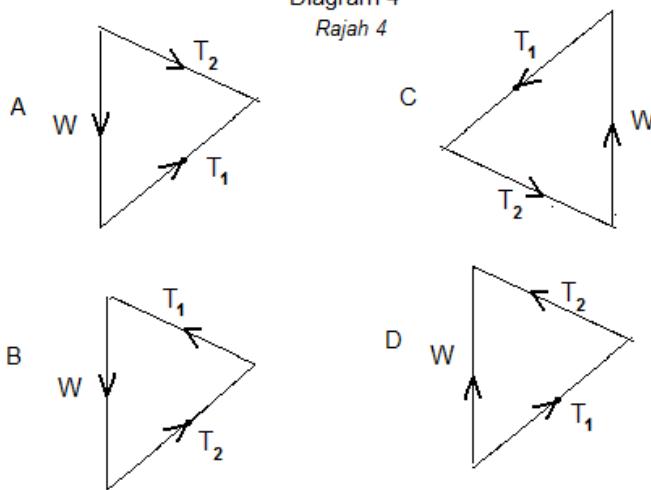
9   Diagram 5 shows a path of a model rocket.
    Rajah 5 menunjukkan lintasan model sebuah roket.
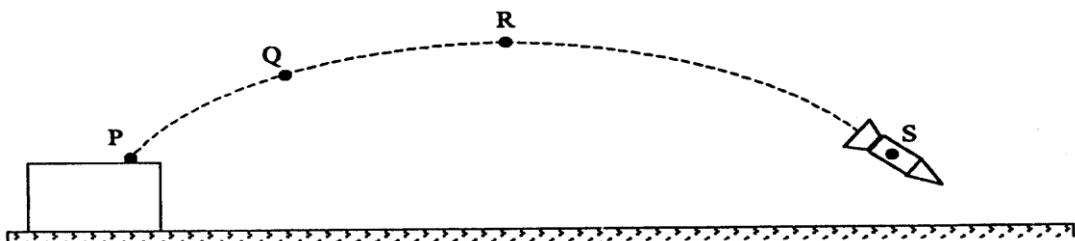
Diagram 5
Rajah 5

Kinetic energy is minimum at
Tenaga kinetik minimum di

    A   P

    B   Q

    C   R

    D   S

10   Diagram 6 shows a strip of ticker tape made by a moving trolley.
        Rajah 6 menunjukkan satu keratan pita detik yang dibuat oleh sebuah troli .

Diagram 6
Rajah 6

The trolley is moving with a
Troli itu sedang bergerak dengan

    A   constant deceleration
            nyahpecutan seragam

    B   constant acceleration
            pecutan seragam

    C   constant velocity
            halaju seragam

11   Four arrangements A, B, C and D are made of identical springs. Each spring extends by 4
      cm when a 200 g load is hung at its end. Which arrangement produces the largest
      extension?

*Empat susunan A, B, C dan D adalah terdiri daripada spring yang sama. Setiap spring meregang
sebanyak 4 cm apabila satu beban 200 g digantung pada hujungnya. Susunan yang manakah
menghasilkan regangan yang terbesar?*

A	**B**	**C**	**D**
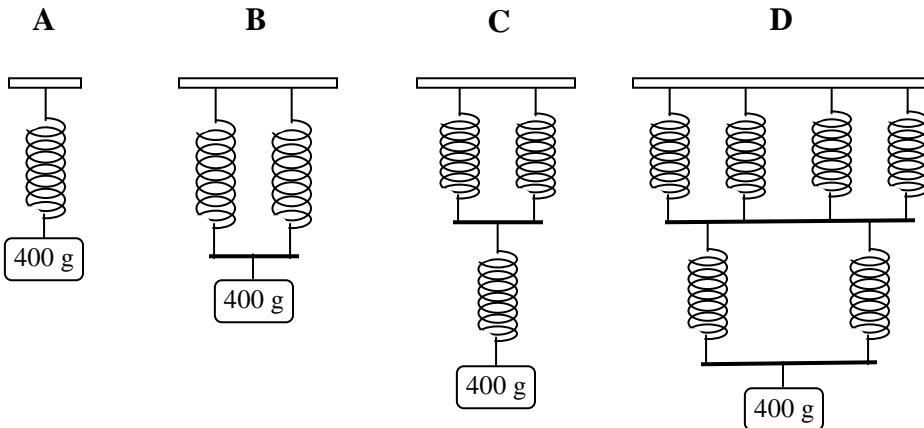
12   Diagram 7 shows a crane lifting a concrete beam.
      Rajah 7 menunjukkan sebuah kren mengangkat alang konkrit.
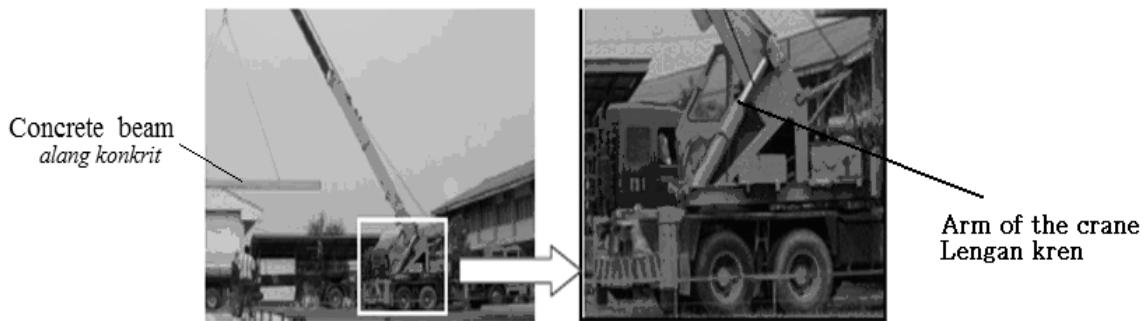

Diagram 7
Rajah 7

What principle is used to move the piston at the arm of the crane?
Apakah prinsip yang digunakan untuk menggerakkan omboh pada lengan kren itu?

A   Pascal's principle / *Prinsip Pascal*

B   Archimedes' principle / *Prinsip Archimedes*

C   Bernoulli's principle / *Prinsip Bernoulli*

D   Conservation of momentum/ prinsip keabadian momentum

13. Diagram 8 shows a manometer is connected to a gas supply.
*Rajah 8 menunjukkan satu manometer yang disambung ke satu bekalan gas.*
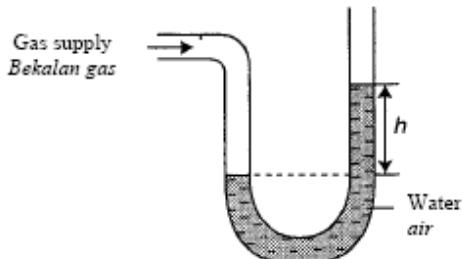
Diagram 8
Rajah 8

The difference in height, h will increase if
Beza pada ketinggian, h akan bertambah jika

A   the pressure of the gas supply is decreased.
        tekanan bekalan gas dikurangkan.
B   the manometer is placed at a region of higher atmospheric pressure.
        manometer itu diletak pada kawasan yang tekanan atmosfera lebih tinggi.
C   the water is replaced with a liquid of smaller density
        air diganti dengan cecair yang kurang tumpat
D   the water is replaced with a liquid of greater density
        air diganti dengan cecair yang lebih tumpat

14   Diagram 9 shows liquid X and liquid Y in glass tubes.
Rajah 9 menunjukkan cecair X dan cecair Y di dalam tiub kaca.

Density of X = 800 kg m⁻³
Ketumpatan X = 800 kg m⁻³

Density of Y = 1 000 kg m⁻³
Ketumpatan Y = 1 000 kg m⁻³

P_S = pressure at S
P_S = *tekanan di S*

P_T = pressure at T
P_T = *tekanan di T*
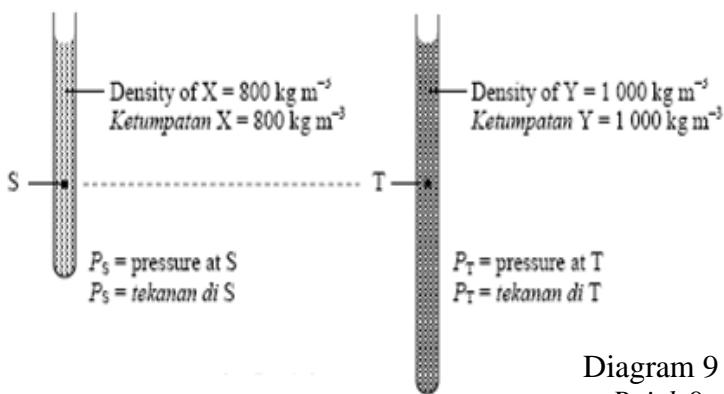
Diagram 9
Rajah 9

Which statement is correct?
Pernyataan manakah betul?

A $P_S = P_T$ because S and T are at the same depth
        $P_S = P_T$ *sebab* S *dan* T *berada pada kedalaman yang sama*
B $P_S = P_T$ because S and T are at the same level
        $P_S = P_T$ *sebab* S *dan* T *berada pada aras yang sama*
C $P_S < P_T$ because the density of X is less than the density of Y
        $P_S < P_T$ *sebab ketumpatan* X *lebih kecil daripada ketumpatan* Y
D $P_S > P_T$ because S is nearer to the bottom of the tube
        $P_S > P_T$ *sebab* S *lebih dekat kepada dasar tiub*

15.   Diagram 10 shows the cross-section of an iceberg floating on the surface of the sea.
        Rajah 10 *menunjukkan keratan rentas sebuah bongkah ais terapung di permukaan laut.*
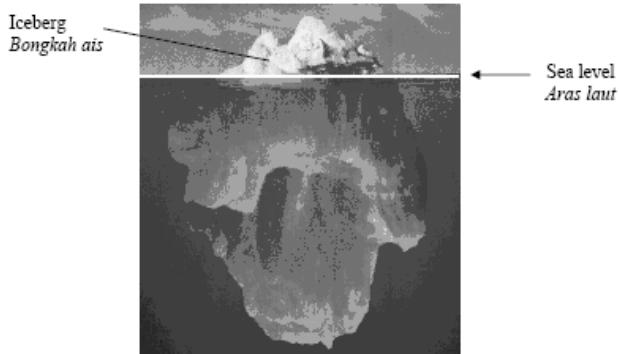
Diagram 10
Rajah 10

Which statement is correct?
Pernyataan yang manakah betul?

A   Weight of iceberg = Weight of sea water displaced
        Berat bongkah ais = Berat air laut tersesar
B   Volume of iceberg = Volume of sea water displaced
        Isipadu bongkah ais = Isipadu air laut tersesar
C   Density of iceberg = Density of sea water displaced
        Ketumpatan bongkah ais = Ketumpatan air laut tersesar

16   Diagram 11 shows a cross section of swimming pool which has different depth
        Rajah 11 menunjukkan keratan rentas sebuah kolam renang yang mempunyai kedalaman yang berbeza.
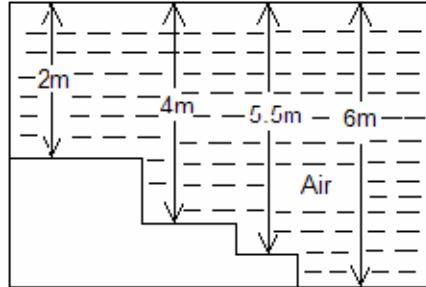
Diagram 11
Rajah 11

What is the maximum pressure experienced at the bottom of the swimming pool?
Berapakah tekanan air yang maksimum di alami oleh dasar kolam itu?
[Density of water = 1000 kg m^{-3}]
[*Ketumpatan air = 1000 kg m^{-3}*]
A 2.0×10^4 Pa
B 4.0×10^4 Pa
C 5.5×10^4 Pa
D 6.0×10^4 Pa

17 A boy puts some ice cubes in his orange juice. There is energy transfer between the ice cube and the juice. Which of this property determines the direction of energy transfer?
*Seorang budak lelaki meletakkan beberapa ketul kiub ais ke dalam oren jusnya. Terdapat pemindahan tenaga dari kiub ais ke jus minuman itu. Manakah antara sifat berikut yang menentukan arah perubahan tenaga tersebut?*

    A.   Density / *ketumpatan*

    B.   Temperature / *suhu*

    C.   State of matter / *keadaan jirim*

    D.   Specific Heat Capacity / *muatan haba tentu*

18 Diagram 12 shows a metal sphere P at 80°C is immersed in a cooler liquid Q.
Rajah 12 menunjukkan sebuah sfera logam P pada suhu 80°C direndamkan ke dalam satu cecair Q yang lebih sejuk.
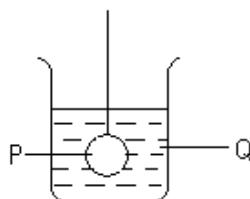
Diagram 12
Rajah 12

Thermal equilibrium is reached when
Keseimbangan terma dicapai apabila

    A.   temperature of P = temperature of Q
        suhu P = suhu Q
    B.   mass of Q displaced = mass of P
        jisim Q yang disesarkan = jisim P
    C.   volume of Q = volume of P
        isipadu Q = isipadu P
    D.   specific heat capacity of P = specific heat capacity of Q
        muatan haba tentu P = muatan haba tentu Q

19 Mercury is used in thermometer because it
Merkuri digunakan dalam termometer kerana ia

    A.   sticks to the glass
        melekat pada kaca
    B.   has a low boiling point
        mempunyai takat didih yang rendah
    C.   expands and contracts uniformly
        mengembang dan menguncup dengan seragam
    D.   is transparent and therefore it is easier to read.
        ia telus cahaya oleh itu ia mudah dilihat

20 Which liquid is the most suitable to use in a liquid glass thermometer to measure temperatures from -50° C to 50° C?
Cecair manakah yang paling sesuai untuk digunakan sebagai cecair dalam termometer kaca untuk mengukur suhu antara -50° C to 50° C?

	Freezing point /^{o}C *takat beku*	Boiling point /^{o}C *takat didih*
A	-115	78
B	-39	357
C	0	100
D	17	118

21 **D**iagram 13 shows temperature – time graph of a liquid . The liquid is heated by using a heater of 0.4 kW. The mass of the liquid is 0.4 kg .
Rajah 13 menunjukkan graf suhu – masa suatu cecair. Cecair itu dipanaskan dengan menggunakan pemanas 0.4 kW. Jisim cecair itu ialah 0.4 kg.
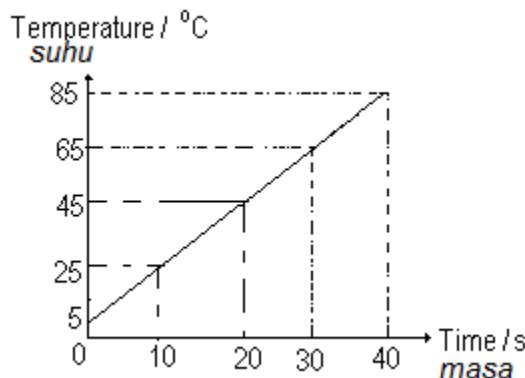
Diagram 13
Rajah 13

What is the specific heat capacity of the liquid?
Berapakah muatan haba tentu cecair itu

A.   0.50 J kg^{-1} o C^{-1}

B.   50 J kg^{-1}o C^{-1}

C.   500 J kg^{-1} o C^{-1}

D.   5000 J kg^{-1} o C^{-1}

E.   50000 J kg^{-1} o C^{-1}

22   Diagram 14 shows path of light rays reflected by a concave mirror.

Rajah 14 menunjukkan lintasan sinar cahaya dipantulkan oleh sebuah cermin cekung.
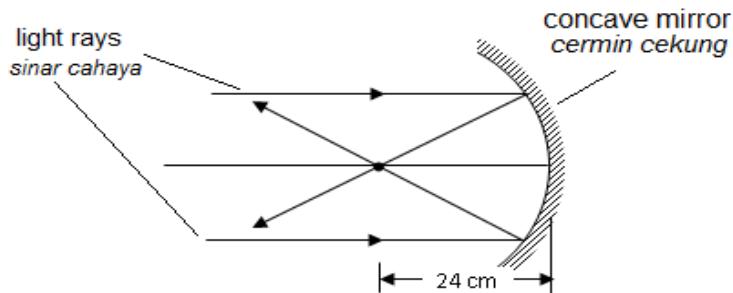
Diagram 14
Rajah 14

What is the focal length, f, of the concave mirror?

Berapakah panjang fokus,f, cermin cekung itu?

A.   12 cm
B.   24 cm
C.   36 cm
D.   48 cm

23.   Diagram 15.1 shows a ray of light passing from medium X to medium Y while Diagram15 .2 shows a ray of light passing from medium X to medium Z.

Rajah15 .1 menunjukkan satu sinar cahaya merambat dari medium X ke medium Y manakala Rajah15 .2 menunjukkan satu sinar cahaya merambat dari medium X ke medium Z.
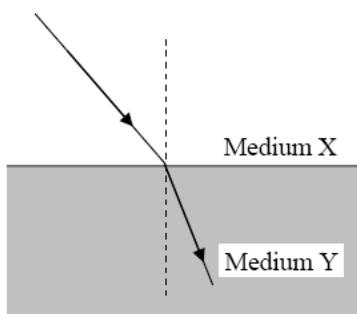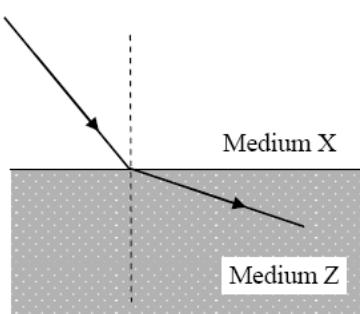
Diagram 15.1   Diagram 15.2
Rajah 15.1   *Rajah* 15.2

Arrange the optical density for the medium in ascending order.
Susun ketumpatan optik medium mengikut susunan menaik

A. Z, X, Y
B. Y, X, Z
C. Z, Y, X
D. X, Y, Z

24. Which path of light ray undergoes the phenomenon of total internal reflection?
Lintasan sinar cahaya manakah yang akan menghasilkan pantulan dalam penuh?

A

B

C

D   Air /
     Udara

     Water
     Air

E
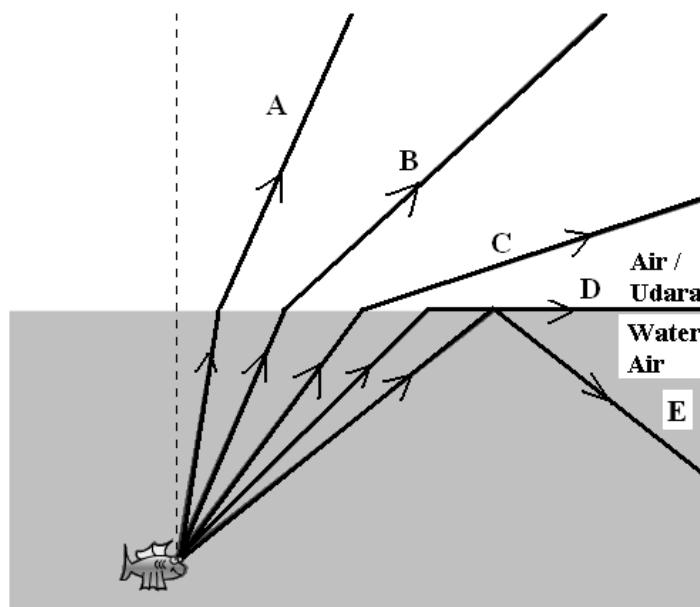
25. Diagram 16 shows the formation of the image of an object by a convex lens.
Rajah 16 menunjukkan pembentukan imej daripada suatu object oleh kanta cembung.

20 cm

image
imej

object
objek

4 cm

60 cm
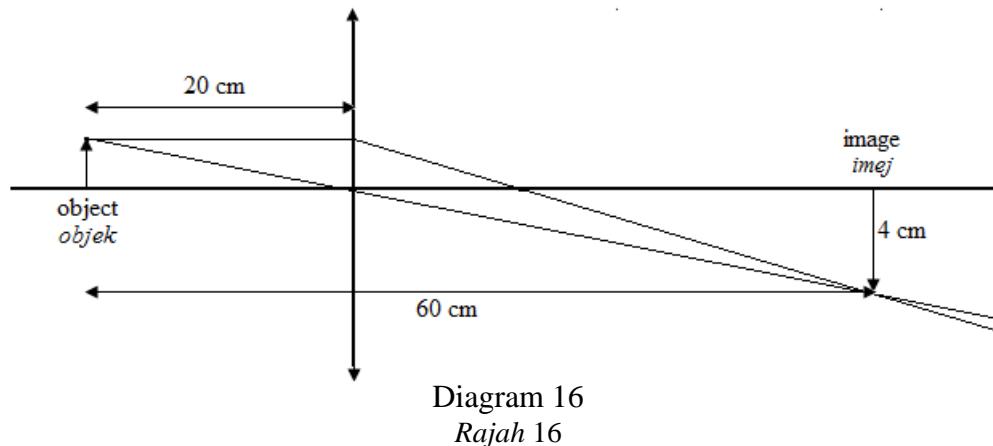
Diagram 16
Rajah 16

What is the height of the object if the height of the image is 4 cm,?
Berapakah tinggi objek itu sekiranya tinggi imej yang dihasilkan ialah 4 cm?

A   0.5 cm

B   0.8 cm

C   2.0 cm

D   4.0 cm

[Lihat halaman sebelah
                    http://chngtuition.blogspot.com   SULIT

26. Diagram 17 shows an object is placed in front of a concave lens.
    Rajah 17 menunjukkan sebuah objek diletakkan di hadapan sebuah kanta cekung.

Diagram 17
*Rajah*17
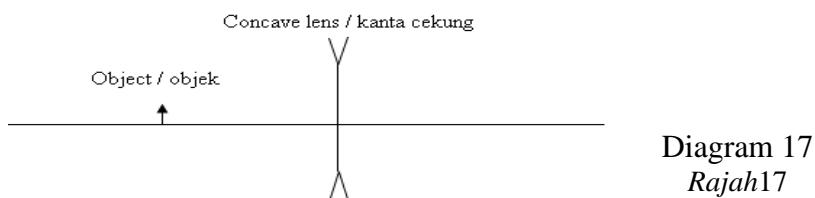
What are the image characteristics of the object?
Apakah ciri –ciri imej objek tersebut ?

A. Real, upright and magnified
   Nyata, tegak dan besar

B. Real, inverted and diminished
   Nyata, songsang dan kecil

C. Virtual, upright and magnified
   Maya, tegak dan besar

D. Virtual, upright and diminished
   Maya ,tegak dan kecil

27 A transverse wave and a longitudinal wave can only be differentiated by
   Gelombang melintang dan gelombang membujur hanya boleh dibezakan melalui

A Amplitude
  Amplitud

B Frequency
  Frekuensi

C Wavelength
  Jarak gelombang

D Direction of propagation
  Arah perambatan

28 Diagram 18 shows a transverse wave propagating from P to Q.
   Rajah 18 menunjukkan suatu gelombang melintang yang merambat dari P ke Q.

Diagram 18
Rajah 18

Which is the correct direction of vibration and the direction of energy transfer between P and Q?
Manakah arah getaran dan arah pemindahan tenaga yang betul antara P dan Q?

	Direction of vibration *Arah getaran*	Direction of energy transfer *Arah pemindahan tenaga*
A	↔	→
B	↔	←
C	↕	→
D	↕	←

29 Diagram 19 shows the interference pattern of water waves from two coherent sources S_1 and S_2 in a ripple tank.
Rajah 19 menunjukkan corak interferen gelombang air dari dua sumber koheren S, dan S_2 dalam sebuah tangki riak.

Which point is a destructive interference?
Antara titik-titik berikut, yang manakah mempunyai interferens memusnah?
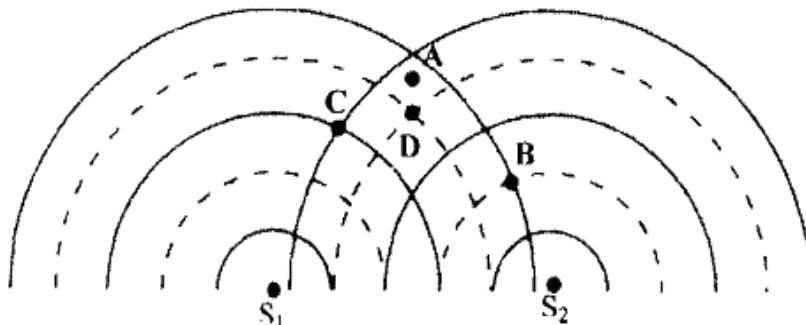
Diagram 19
Rajah 19

30 Diagram 20 below shows the water wave pattern formed when the dipper is placed at the centre of the ripple tank.
Rajah 20 di bawah menunjukkan corak gelombang air yang dihasilkan oleh penggetar yang diletakkan di tengah-tengah tangki riak.
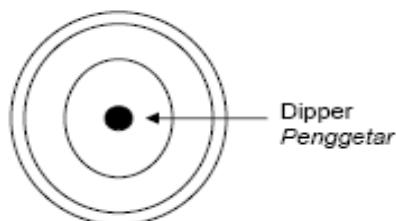
Diagram 20
Rajah 20

Which of this diagram is the possible side view of the ripple tank ?
Yang manakah antara rajah berikut menunjukkan pandangan sisi pada tangki riak.
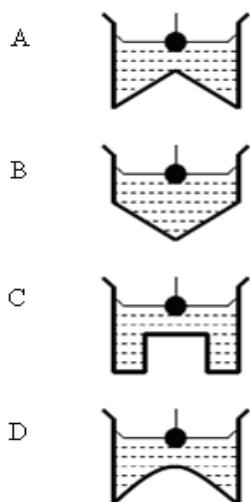
31   Diagram 21 shows a boy experiencing an echo phenomenon.
      Rajah 21 *menunjukkan seorang budak sedang mengalami fenomena gema.*
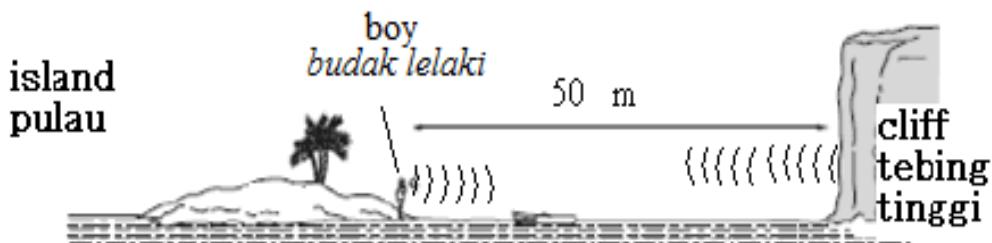
Diagram 21
Rajah 21

What is the time interval between the boy shouting and hearing the echo?
Apakah masa pemisahan di antara pekikan suaranya dan gema yang terhasil.
(speed of sound wave in air /*halaju gelombang bunyi dalam udara* = 340 ms^{-1})

    A   0.147 s

    B   0.294 s

    C   0.312 s

    D   0.278 s

32   Which circuit shows the correct connection of voltmeter to measure the potential
      difference across a cell?
      *Litar yang manakah menunjukkan sambungan voltmeter yang betul untuk mengukur beza
      keupayaan merentasi sel kering?*
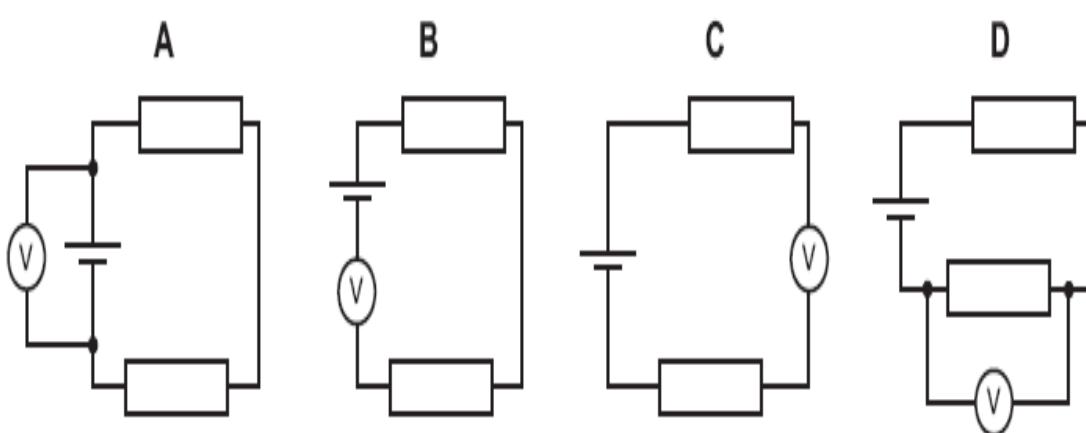
33   Diagram 22 shows an electrical circuit .
      Rajah 22 menunjukkan satu litar elektrik.
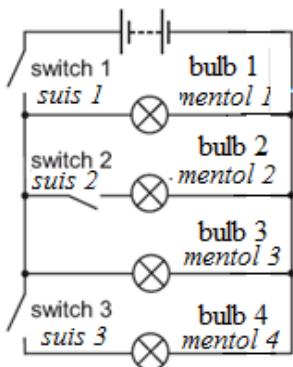
Diagram 22
Rajah 22

Which switches should be closed to light up only bulb 1 and bulb2?
Suis yang manakah harus dihidupkan untuk menyalakan mentol 1 dan mentol 2 sahaja?

A   switch 1 only
      suis 1 sahaja
B   switch 1 and switch 2 only
      suis 1 dan suis 2 sahaja
C   switch 1 and switch 3 only
      suis 1 dan suis 3 sahaja
D   switch 2 and switch 3 only
      suis 2 dan suis 3 sahaja

34   Diagram 23 shows a torch light containing two dry cells, a switch and a lamp.
      Rajah 23 menunjukkan lampu suluh yang mengandungi dua sel kering 2 V, suis dan lampu.
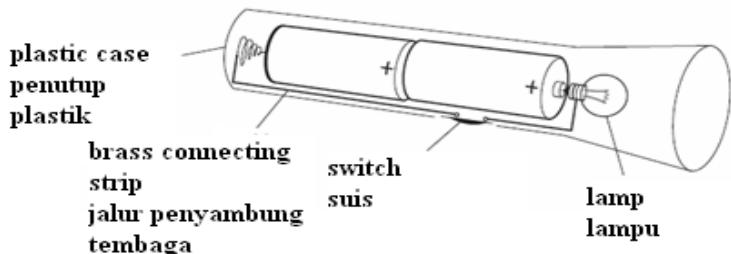
Diagram 23
Rajah 23

Which circuit diagram represents the above torch light?
Rajah yang manakah mewakili litar lampu suluh di atas?
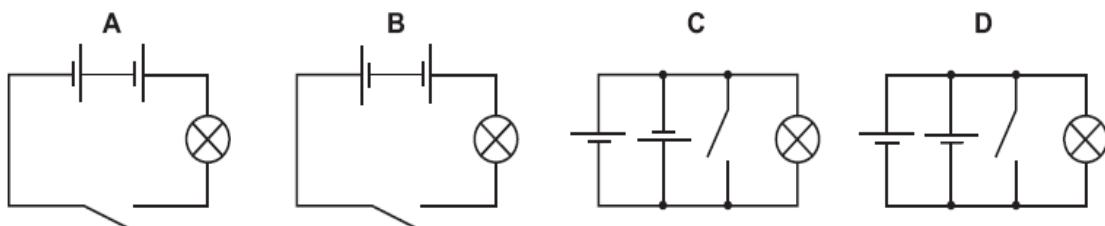
35 Which circuit has the lowest resistance ?
Litar manakah yang mempunyai rintangan yang paling rendah?
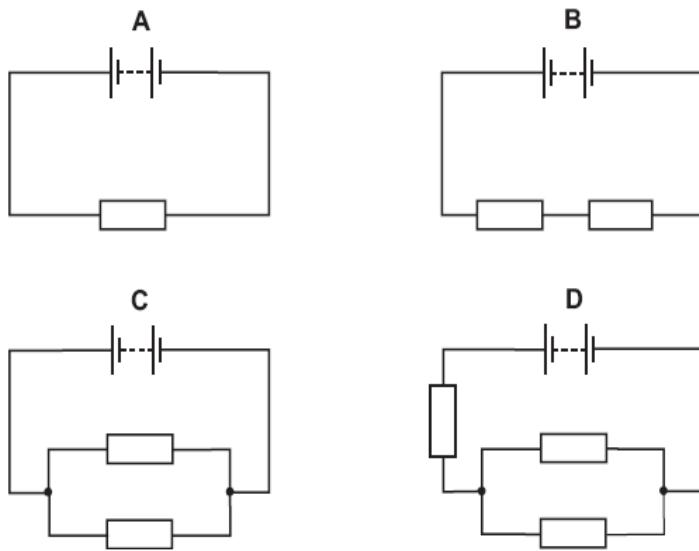
36 Diagram 24 shows two identical resistors connected in parallel.
Rajah 24 menunjukkan dua perintang yang serupa disambungkan secara selari.
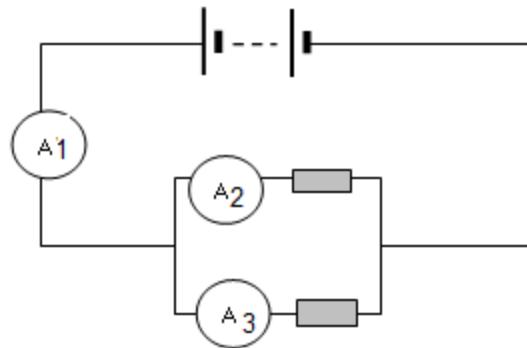
Diagram 24
Rajah 24

Which reading is correct?
Bacaan manakah yang betul?.

A $A_1 = A_2 + A_3$

B $A_1 > A_3 > A_2$

C $A_2 > A_3 = A_1$

D $A_3 > A_2 > A_1$

[Lihat halaman sebelah

SULIT

37 Diagram 25 shows an electric heater operates at 230 V carries a current of 2A.
Rajah 25 menunjukkan suatu pemanas elektrik beroperasi pada 230V membawa arus elektrik sebanyak 2A.
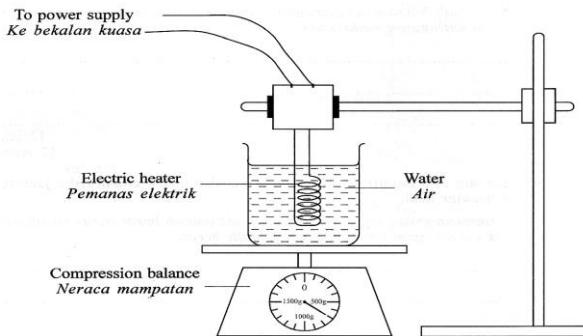
Diagram 25
Rajah 25

How much charge will flow through the electric heater in 2 minutes.?
Berapakah cas yang mengalir melalui pemanas elektrik itu selama 2 minit?

A 230 C
B 240 C
C 180 C
D 4 C

38 Which rule determines the force direction for a current carrying conductor in magnetic fields.
Petua manakah menentukan arah daya untuk konduktor yang membawa arus dalam medan magnet .

   A   Right hand Grip Rule
          Petua Genggaman Tangan Kanan
   B   Fleming's Right Hand Rule
          Petua Tangan Kanan Fleming
   C   Fleming's Left Hand Rule
          Petua Tangan Kiri Fleming
   D   Direction of current flow
          Arah arus mengalir

39 What is emitted from a hot metal filament in a cathode-ray tube?
Apakah yang dibebaskan oleh filamen logam yang panas di dalam sebuah tiub sinar katod?

A Alpha particle
  Zarah alpha
B Electrons
  Elektron
C Protons
  Proton
D X-rays
  sinar-x

40   Diagram 26 shows an electrical circuit connected to a solenoid surround an iron rod
      Rajah 26 menunjukkan satu solenoid mengelilingi satu rod besi dalam satu litar elektrik.
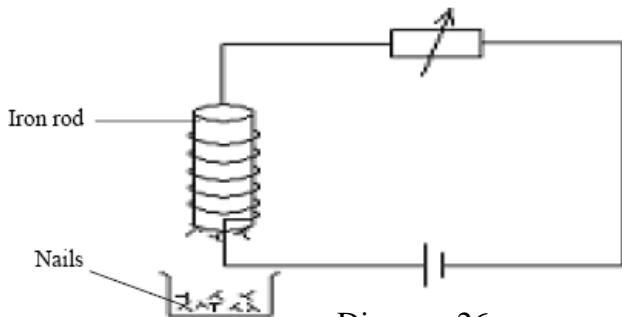
Diagram 26
Rajah   26

The number of nails attracted to the iron rod will increase if
 Bilangan paku yang ditarik oleh rod besi akan bertambah jika

A   a smaller current is used
      arus yang lebih kecil digunakan
B   the number of turns of the coil is increased
      bilangan gegelung ditambah
C   the distance between the coils is increased
      jarak antara gegelung- gegelung ditambah
D   an iron rod with a larger diameter is used
      satu rod besi yang lebih besar diameternya di gunakan

41   Diagram 27 shows a bar magnet moving into a solenoid.
      Rajah 27 menunjukkan sebuah magnet bergerak masuk ke dalam suatu solenoid.
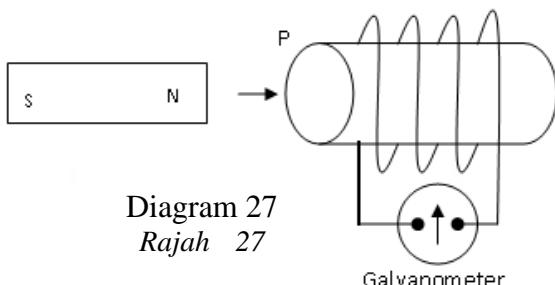
Diagram 27
Rajah   27

The polarity of the solenoid at P and the deflection of the galvanometer are
Kekutuban pada hujung P solenoid dan pesongan jarum galvanometer ialah

	Polarity of the solenoid at P *Kekutuban solenoid di P*	Deflection of the Galvanometer *Pesongan Galvanometer*
A	North *Utara*	to the right *ke kanan*
B	North *Utara*	to the left *ke kiri*
C	South *Selatan*	to the right *ke kanan*
D	South *Selatan*	to the left *ke kiri*

42 Diagram 28 shows two electrical circuits. The iron rods are placed close together and are free to move.
Rajah 28 menunjukkan dua litar elektrik.. Rod besi diletak berdekatan dan bebas bergerak.
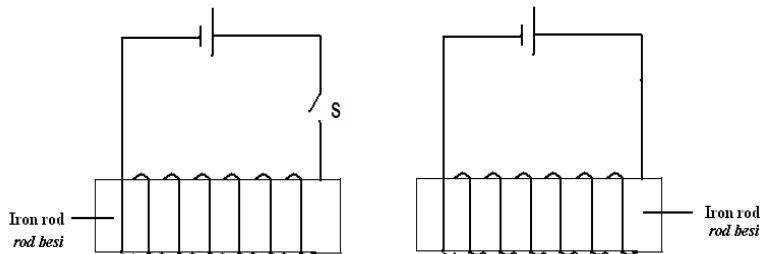
Diagram 28
Rajah 28

What happens to the distance between the two iron rods when S is switched on?
Apakah yang berlaku kepada jarak antara dua rod besi apabila suis S ditutup?

    A   It increases
          bertambah
    B   It decreases
          berkurang
    C   It does not change
          tidak berubah

43 Diagram 29 shows a transformer that is used to light up a bulb.
Rajah 29 menunjukkan sebuah transformer yang digunakan untuk menghidupkan sebiji mentol.
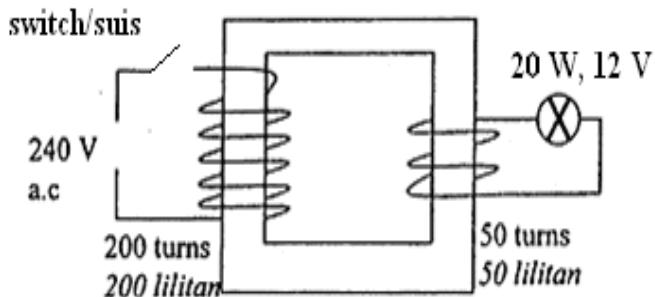
Diagram 29
Rajah 29

What happens to the bulb after switch is on?.
Apakah yang berlaku kepada mentol selepas suis dihidupkan?

    A   Lights up normal brightness.
          Menyala dengan kecerahan biasa
    B.   Lights up brighter
          Menyala dengan lebih cerah
    C.   Lights up dimly
          Menyala dengan malap
    D.   Blow
          Rosak

44 Diagram 30 shows a logic circuit . Input P and Q is 0011 and 1001 respectively.
Rajah 30 menunjukkan satu litar get logik. Isyarat input pada P dan Q masing-masing ialah 0011 dan 1001.
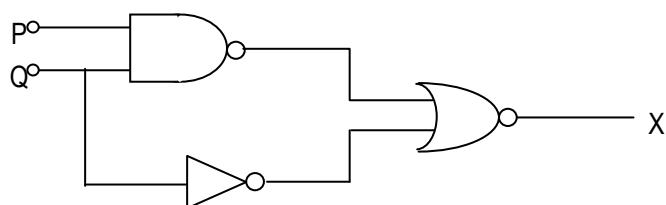
Diagram 30
Rajah 30

What is output X?
Apakah isyarat output X?

A 0001
B 1110
C 1000
D 1100

45 Diagram 31 shows a cathode ray oscilloscope (CRO) connected to an electrical circuit.

Rajah 31 menunjukkan sebuah osiloskop sinar katod (OSK) disambungkan ke suatu litar elektrik.
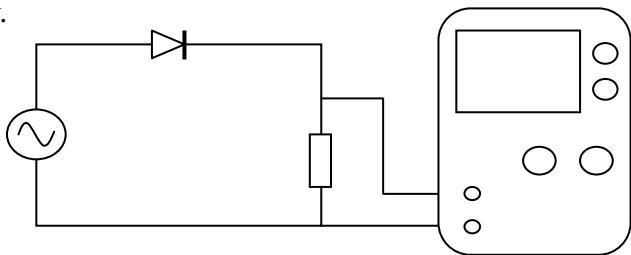
Diagram 31
Rajah 31

Which diagram shows the trace displayed on the screen of the CRO ?

Rajah manakah menunjukkan surih yang yang dipaparkan pada skrin OSK?

A

B

C

D

46   Diagram 32 shows a transistor as an automatic switching circuit.
     Rajah 32 menunjukkan sebuah transistor sebagai suis automatic.
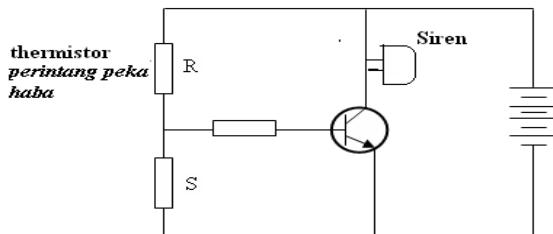
Diagram 32
Rajah 32

The siren will on when

Siren akan berbunyi apabila

   A   the resistor S is disconnected
          perintang S *ditanggalkan*
   B   the terminals of the battery are reversed
          apabila terminal bateri disongsangkan
   C   the surrounding is hot
          persekitaran adalah panas
   D   the surrounding is cold
          persekitaran adalah sejuk

47   Diagram 33 shows a circuit consisting of a diode and a bulb. When the switch
     is on, the bulb does not light up.
     *Rajah 33 menunjukkan litar yang mengandungi diod dan mentol. Apabila
     suis dihidupkan, mentol tidak menyala.*
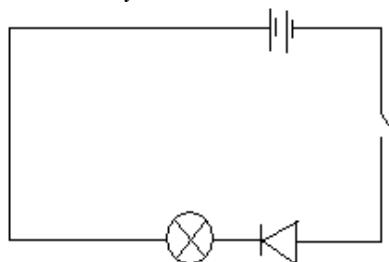
Diagram 33
Rajah 33

What needs to be done to light up the bulb?
Apakah yang perlu dilakukan untuk menyalakan mentol itu ?

   A   Replace with a new bulb
       Menggantikan mentol baru
   B   Increase the number of dry cells
       Menambahkan bilangan sel kering
   C   Reverse the diode connection
       Menyongsangkan sambungan diod
   D   Connect a resistor parallel to the bulb
       Menyambungkan satu perintang selari dengan mentol

48. A uranium atom has 92 protons and 146 neutrons. What is the notation for this atom?
Atom uranium mempunyai 92 proton dan 146 neutron. Apakah perwakilan untuk atom ini?

A $_{238}^{92}U$

B $_{146}^{92}U$

C $_{92}^{146}U$

D $_{92}^{238}U$

49. Diagram 34 shows an arrangement of an instrument to to detect the thickness of discs. It is automatically controlled by using radioactive rays and a detector.
Rajah 34 menunjukkan susunan alat untuk mengesan ketebalan cakera. Ia dikawal secara automatik menggunakan sinar radioaktif dan satu pengesan..
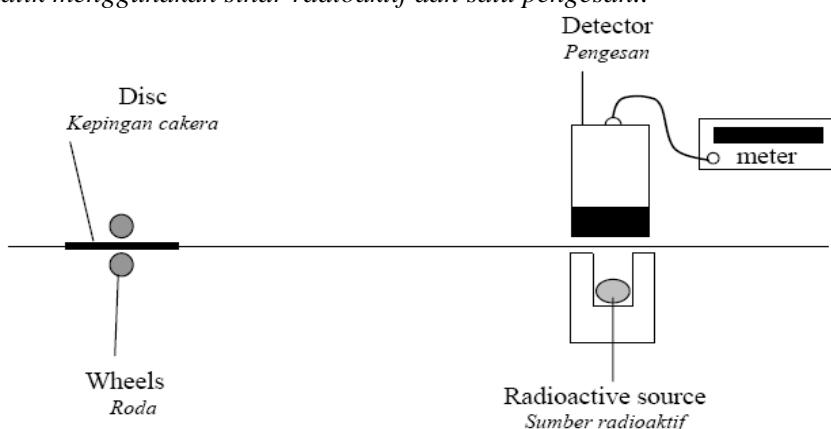
Diagram 34
Rajah 34

Which of the following radioactive sources is suitable for this detector.
Antara yang berikut, sumber radioaktif manakah sesuai untuk alat pengesan ini?

	Radiation *Sinaran*	Half-life *Separuh hayat*
A	α	1 day *1 hari*
B	α	60 years *60 tahun*
C	β	1 day *1 hari*
D	β	60 years *60 tahun*

50 In a nuclear reaction, the energy released is equivalent to the loss in mass which is 4.0×10^{-3} kg. What is the total energy released in the reaction?
[speed of light = 3.0×10^8 ms^{-1}]

Di dalam satu tindakbalas nuklear, tenaga yang dibebaskan adalah bersamaan dengan kehilangan jisim sebanyak 4.0×10^{-3} kg. Berapakah jumlah tenaga yang dibebaskan semasa tindakbalas ini?
[halaju cahaya = 3.0×10^8 m s^{-1}]

A 1.2×10^5 J

B 1.2×10^{12} J

C 3.6×10^{12} J

D 3.6×10^{13} J

E 3.6×10^{14} J

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Nama: ....

NO. KAD PENGENALAN:

ANGKA GILIRAN:

**PERSIDANGAN KEBANGSAAN PENGETUA
SEKOLAH MENENGAH MALAYSIA
(CAWANGAN MELAKA)**

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2010   4531/2
PHYSICS
Kertas 2
Ogos/Sept.
2 ½ jam   **Dua jam tiga puluh minit**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1.   *Tulis **nombor kad pengenalan** dan
angka giliran 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 halamanbelakang kertas soalan ini.*

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

Kertas soalan ini mengandungi 27 halaman bercetak

MAKLUMAT UNTUK CALON

1. *Kertas soalan mengandungi* **tiga** *bahagian :* **Bahagian A , Bahagian B** *dan* **Bahagian C.**

2. *Jawab semua soalan daripada* **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 anda sendiri. Anda diminta menjawab dengan lebih terperinci untuk* **Bahagian B** *dan* **Bahagian C.** *Jawapan mestilah jelas dan logik. Persamaan, gambar rajah, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

4. *Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.*

5. *Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan di hujung setiap soalan atau ceraian soalan.*

6. *Sekiranya anda hendak membatalkan sesuatu jawapan, buat garisan di atas jawapan itu.*

7. *Satu senarai rumus disediakan di halaman 3.*

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. *Lekatkan semua kertas jawapan dan serahkan di akhir peperiksaan.*

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

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

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

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

4. Momentum $= mv$

5. $F = ma$

6. Kinetic energy / *Tenaga kinetik*
   $= \dfrac{1}{2}mv^2$

7. Gravitational potential energy /
   Tenaga keupayaan graviti $= mgh$

8. Elastic potential energy /
   Tenaga keupayaan kenyal $= \dfrac{1}{2}Fx$

9. Power, $P = \dfrac{energy}{time}$
   Kuasa, $P = \dfrac{Tenaga}{masa}$

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

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

12. Pressure / *Tekanan*, $P = \rho gh$

13. Heat / *Haba*, $Q = mc\theta$

14. Heat / *Haba*, $Q = ml$

15. $\dfrac{PV}{T} = $ constant / *pemalar*

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

17. $n = \dfrac{\text{Real depth}}{\text{apparent depth}}$
    $= \dfrac{dalam\ nyata}{dalam\ ketara}$

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

19. Linear magnification
    Pembesaran linear, $m = \dfrac{v}{u}$

20. $v = f\lambda$

21. $\lambda = \dfrac{ax}{d}$

22. $Q = It$

23. $eV = \frac{1}{2}mv^2$

24. $E = QV$

25. $V = IR$

26. Power / *Kuasa,* $P = IV$

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

28. $\dfrac{Ns}{Np} = \dfrac{Vs}{Vp}$

29. Efficiency / *kecekapan* $=$
    $\dfrac{Is\ Vs}{Ip\ Vp}\ \times\ 100\ \%$

30. $E = mc^2$

http://chngtuition.blogspot.com

Section A
Bahagian A

[60 marks]
[*60 markah*]

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

1. Diagram 1.1 shows an instrument to measure a physical quantity.
   Rajah 1.1 menunjukkan satu alat pengukur untuk mengukur suatu kuantiti fizikal.
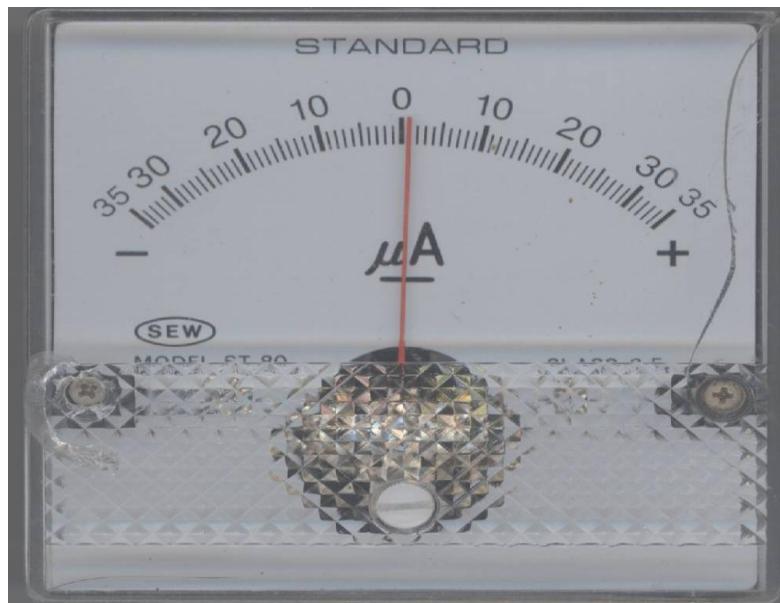
Diagram 1
Rajah 1

1(a)

1

(a) What is the meaning of physical quantity?
   Apakah yang dimaksudkan dengan kuantiti fizikal?

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

(b) Based on Diagram 1
   Berdasarkan Rajah 1

1(b)

1

   (i) State the type of error caused by the instrument.
       Nyatakan jenis ralat yang disebabkan oleh alat pengukur itu

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

(ii) Name the measurement unit reads by the instrument
Namakan unit pengukuran yang ditunjukkan oleh alat pengukur itu

....

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

1(c)

| 1 |

(c) Complete the following sentence by ticking (√) the correct word.
Lengkapkan ayat berikut dengan menandakan (√)perkataan yang betul.

The reading taken using this instrument should be corrected by
Bacaan yang diambil oleh alat pengukur ini hendaklah dibetulkan dengan

1(d)

| 1 |
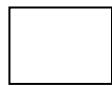
☐   Subtracting the reading with the error reading   [1 *mark*]
Menolak bacaan dengan ralat bacaan yang ada   [1 *markah*]
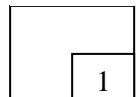
☐   Adding the reading to the error reading
Mencampurkan bacaan dengan ralat bacaan yang ada

Total
A.1

| 4 |
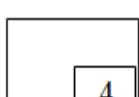
2   Diagram 2 is a set up apparatus used to investigate the relationship
between pressure and temperature of air at constant volume and mass.
Rajah 2 menunjukkan susunan radas yang digunakan untuk menyiasat hubungan antara tekanan dengan suhu udara pada isipadu dan jisim tetap.
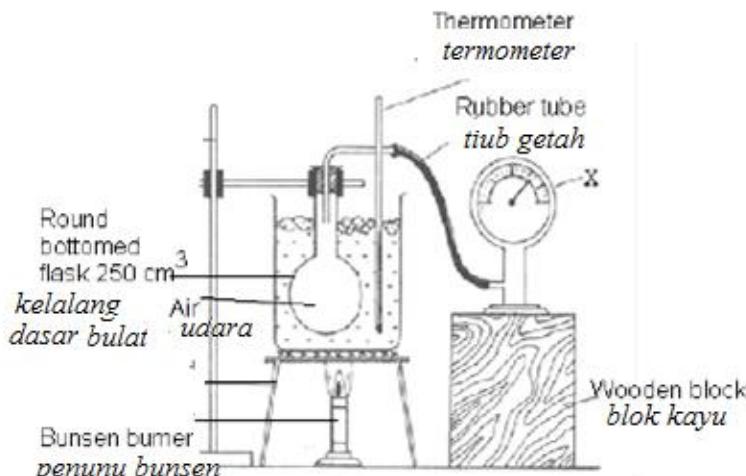
Diagram 2
Rajah 2

(a) Underline the correct answer / *gariskan jawapan yang betul*
The measuring instrument with labeled X in Diagram 2 is known as
Ala t pengukur berlabel X dalam Rajah 2 dikenali sebagai
(Barometer, Bourdon gauge, Manometer)
(Barometer, Tolok Bourdon, Manometer)   [1 mark]
[1 *markah*]

2(a)

| 1 |
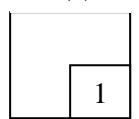
(b)   State the physical quantity measured by the instrument labeled X.
      Nyatakan kuantiti fizik yang disukat oleh alat pengukur berlabel X.

....

[1 mark]
[1 *markah*]

(c)   A car tyre has a pressure of 128 kPa when tested in a garage at
      a temperature of 27°C. The air volume in the tyre is fixed and the pressure
      is changed to 132 kPa?
      Dalam sebuah garaj, tayar sebuah kereta mempunyai tekanan 128 kPa *pada suhu*
      27℃ . Isipadu udara adalah tetap dan tekanan diubah kepada 132 kPa?

      Calculate   the air temperature of the tyre.
      Hitung suhu udara di dalam tayar tersebut.

2(c)(ii

| 1 |

.

Total
A 2

| 5 |

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

3. Diagram 3 shows a bar magnet is pushed into solenoids P and the same bar magnet is pull away from solenoid Q at the same speed. In both situations the galvanometer is deflected.
   Rajah 3 menunjukkan sebatang magnet ditolak masuk ke dalam solenoid P dan magnet bar yang sama ditunjukkan menjauhi solenoid Q.pada kelajuan yang sama. Dalam dua situasi itu galvanometer didapati terpesong.

Solenoid P   Solenoid Q

galvanometer   galvanometer
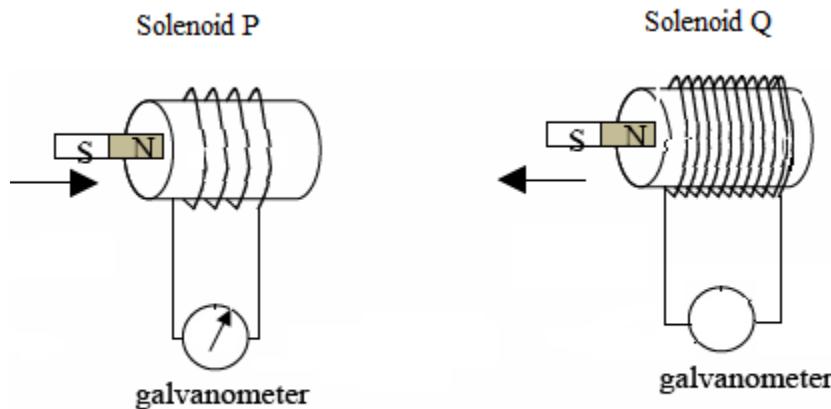
Diagram 3
Rajah 3

(a) Name the phenomenon showed on Diagram 3?
Namakan fenomena yang ditunjukkan pada Rajah 3 ?

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

3(a)(i)

1

(b) On Diagram 3.1 mark with arrows the direction of current flows in the solenoids and the deflection of the pointer in the galvanometer in Solenoid Q
Pada Rajah 3.1 , tandakan dengan anak panah arah pengaliran arus dalam kedua-dua solenoid dan pesongan jarum galvanometer dalam solenoid Q

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

3(b)

3

(c) (i) State the name given to the current that flows in the circuit?
Nyatakan nama arus yang mengalir di dalam litar itu?

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

3(c)(i)

1

(ii) Explain what causes the current flows in the circuit.
Terangkan apakah yang menyebabkan arus mengalir di dalam litar itu.

....

....

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

3(c)(ii)

1

Total
A3

6

4. Diagram 4.1 shows a lattice structure of semiconductor atoms.
   Rajah 4.1 menunjukkan susunan kekisi atom suatu semikonduktor.
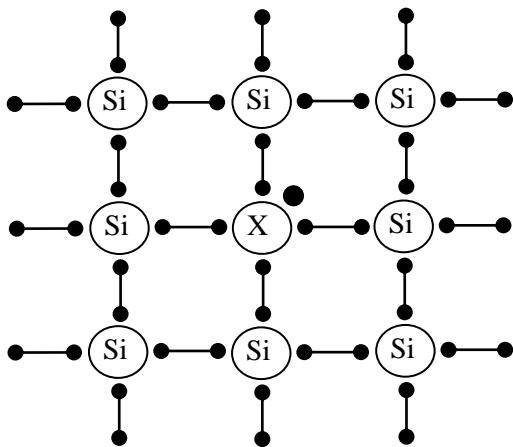
Diagram 4.1
Rajah 4.1

4(a)(i)

	1

(a)(i) Name one example of atom X .
Namakan satu contoh atom X.

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

4(a)(ii)

	1

(ii) State one characteristic of X so it can be added to the lattice structure .
Nyatakan satu sifat X yang membolehkan ia ditambah ke dalam struktur kekisi.

....

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

4(a)(iii)

	1

(iii) What type of semiconductor produce in diagram 4.1
Apakah jenis semikonduktor yang dihasilkan dalam rajah 4.1

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

(iv) Explain the existence of majority charge carrier in the semiconductor.
Huraikan kewujudan pembawa cas majoriti dalam semikonduktor itu.

4(a)(iv)

	2

....

....

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

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(b) Diagram 4.2 shows an electrical circuit.
Rajah 4.2 menunjukkan sebuah litar elektrik
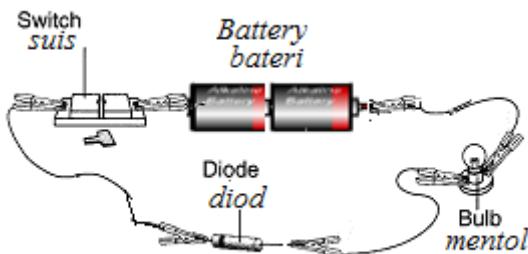
Diagram 4.2
Rajah 4.2
On space below draw the relevant circuit diagram
Pada ruangan di bawah lukis gambar rajah litar yang sepadan

[2 *marks*]
[2 *markah*]

4(c)

2

Total
A4

7

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5.   Two apples with same size and mass ,each of these apples is dipped into oil and water separately.
      The apples immersed at different levels in the two liquids. The density of the oil is 800 kg m^{-3} and
      the density of water is 1000 kg m^{-3} .
      Dua biji epal dengan saiz dan jisim yang sama, sebiji dari setiap epal tersebut dicelupkan ke dalam
      minyak dan air secara berasingan .Buah epal tersebut terendam pada aras yang berbeza di dalam
      kedua-dua cecair tersebut. Ketumpatan minyak adalah 800 kg m^{-3} dan ketumpatan air ialah
      1000 kg m^{-3} .
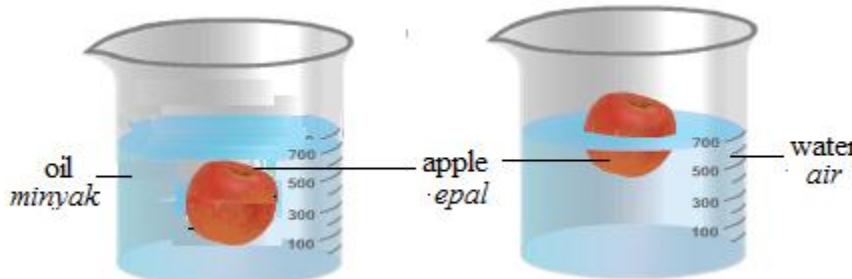
Diagram 5.1
Rajah 5.1

Diagram 5.2
Rajah 5.2

Diagram 5.1 and Diagram 5.2 illustrate the situation of the apples in the oil and in the water.
Rajah 5.1 dan Rajah 5.2 menggambarkan situasi buah-buah epal itu di dalam minyak dan air.

5(a)

1

(a) What is meant by mass?
     Apakah yang dimaksudkan dengan jisim?

     ....

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

(b) Based on Diagram 5.1 and Diagram 5.2 :
     Berdasarkan Rajah 5.1 dan Rajah 5.2 :

5(b)(i)

1

     (i)   Compare the level of the apple in the oil and in the water.
           Bandingkan aras epal di dalam minyak dan di dalam air.

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

5(b)(ii)

1

     (ii)   Compare the volume of liquid displaced by the apple in the oil and in the water
            Bandingkan isipadu cecair yang disesarkan oleh epal itu di dalam minyak dan di dalam air.

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

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(iii) Compare the density of oil and water.
Bandingkan ketumpatan minyak dan air .

....

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

5(b)(iii)

	1
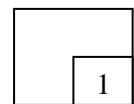
(c) (i) Relate the volume of liquid displaced to the density of the liquid.
Hubungkaitkan isipadu cecair yang disesarkan dengan ketumpatan cecair.

....

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

5(c)(i)

	1

(ii) State the relationship between weight of the apple and the weight of the liquid displaced.
Nyatakan hubungan di antara berat epal dengan berat cecair yang tersesar.

....

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

5(c)(ii)

	1

(d) Name the physics principle that explains the situation above.
Namakan satu prinsip fizik yang menerangkan situasi di atas.

....

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

5(d)

	1
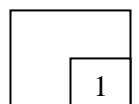
(e) A submarine can sail on the sea surface and under the sea by using the principle stated in (d). How a submarine at the seabed can float to the surface of the sea?
Kapal selam boleh belayar di permukaan laut dan di bawah permukaan laut menggunakan prinsip yang anda namakan dalam (d).Bagaimanakah kapal selam di dasar laut boleh terapung di permukaan laut?

....

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

5(e)

	1

Total
A5

	8

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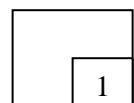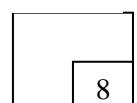
6   Diagram 6 shows a group of identical pendulum K, L, M, N, O and P .

The pendulum is arranged in line then L is allowed to oscillate. Consequences all the pendulums starts to oscillate. It is observed that N is vibrating at the maximum amplitude.

The length of the pendulum affected the frequency of oscillation.

Rajah 6 menunjukkan satu kumpulan bandul yang serupa K, L, M, N, O dan P . Bandul-bandul itu disusun sebaris, kemudian bandul L diayunkan pada frekuensi aslinya. Akibatnya kesemua bandul lain turut berayun. Diperhatikan bahawa bandul N berayun dengan amplitud yang maksimum Panjang bandul mempengaruhi frekuensi ayunan bandul
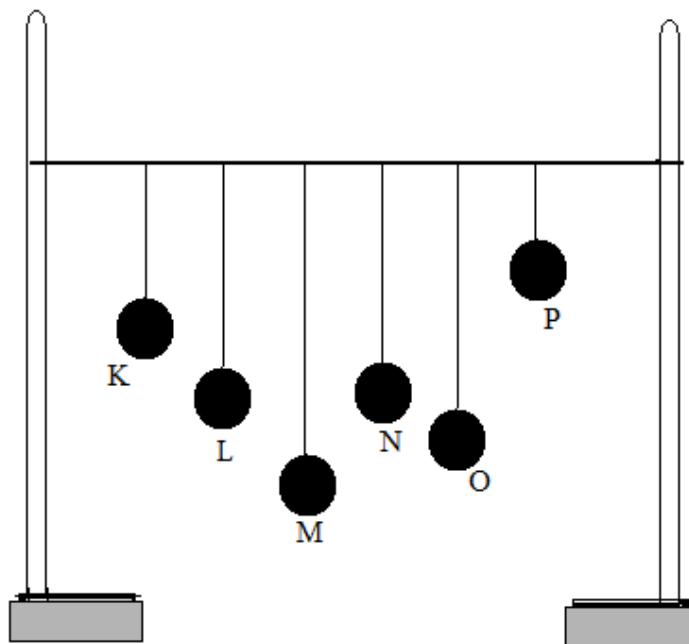
Diagram 6
Rajah 6

(a)   What is the meaning of amplitude?
       Apakah yang dimaksudkan dengan amplitud?

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

(b)   Observe Diagram 6, base from the diagram and the information given ;
       Perhatikan Rajah 6, berdasarkan pemerhatian dan maklumat yang diberikan ;

       (i)   Compare the length of the pendulums
              Bandingkan panjang bandul-bandul itu

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

6(a)

1

6(b)(i)

2

(ii) Relate the length of the pendulum L to N and the amplitude of the oscillation of the pendulum N.

Hubungkait panjang bandul L dengan N serta amplitud ayunan bandul N.

6(b)(ii)

1

....

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

(iii) Name the phenomenon involved

Namakan fenomena yang terlibat

6(b)(iii)

1

....

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

(c) Explain why the rest of the pendulums start to oscillate after pendulum L is oscillated and pendulum N oscillates at the maximum amplitude.

Terangkan mengapa setelah bandul L diayunkan bandul-bandul lain turut berayun dan bandul N pula berayun dengan amplitud maksimum.

6(c)

3

....

....

....

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

Total

A6

8

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7. Diagram 7.1 and 7.2 show two actions on landing activity by two athletes.
Rajah 7.1 dan 7.2 menunjukkan aksi aktiviti mendarat oleh dua orang atlit.

Diagram 7.1 Diagram 7.2
Rajah 7.1 *Rajah 7.2*

a) Both athletes jumped from the same height and fall on the same ground.
Kedua-dua atlit itu terjun dari ketinggian yang sama dan mendarat di kawasan yang sama.

(i) Name the force that causes the athlete to fall down
Namakan daya yang menyebabkan atlet-atlet itu jatuh?

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

(ii) State the name of the phenomenon given to (a)(i)
Apakah nama fenomena yang diberikan pada situasi (a)(i)

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

b) (i) Compare the impact on the athletes during the landing.
Bandingkan kesan hentaman ke atas atlit semasa pendaratan tersebut.

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

(ii) Explain your answer in (b)(i)
Terangkan jawapan anda dalam (b)(i)

....

....

....

[2 *marks*]
[2 *markah*]

7(a)(i)

1

7(a)(ii)

1

7(b)(i)

1

7(b)(ii)

2

(d) Diagram 7.3 shows a set of playing equipment to be placed in children playground.
*Rajah 7.3 menunjukkan satu set peralatan permainan yang hendak diletakkan pada satu taman permainan kanak-kanak.*

Diagram 7.3
Rajah 7.3

By referring to Diagram 7.3,
Dengan merujuk kepada Rajah 7.3,

(i) explain one modification to the set of the equipment so that it is safer for the kindergarten.
terangkan satu pengubahsuaian kepada set peralatan itu supaya lebih selamat bagi kegunaan tadika.

....

....

....

2 *marks*]
[2 *markah*]

(ii) describe a property for the playground base and explain how it can avoid from serius injury.
huraikan satu ciri tapak taman permainan ini dan terangkan bagaimana ia boleh mengelakkan kecederaan yang serius.

....

....

....

....

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

7(c)(i)

2

7(c)(ii)

3

Total
A7

10

8   Diagram 8 shows an electric kettle with specification of 240 V, 1.2 kW.
     Rajah 8 menunjukkan sebuah cerek elektrik dengan spesifikasi 240V, 1.2 kW.

Electric kettle
Cerek elektrik

Three-pin-plug
Plug-tiga-pin

Heating element
Elemen pemanas
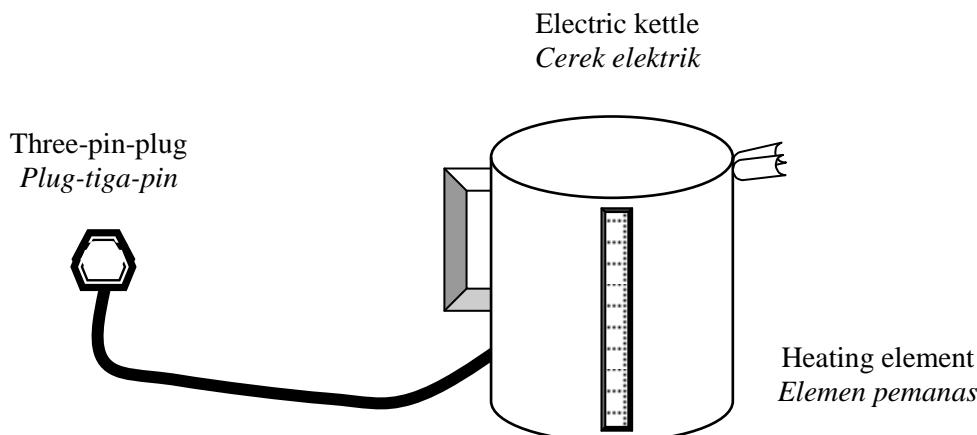
Diagram 8
Rajah 8

(a)   What is meant by the label 240V, 1.2 kW?
       Apakah yang dimaksudkan dengan label 240V, 1.2 kW?

       ....

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

8(a)

1

(b)   Calculate
       Hitungkan

       (i)   the current flows through the electric kettle.
               arus yang mengalir melalui cerek elektrik itu.

       [2 *marks*]
       [2 *markah*]

8(b)(i)

1

       (ii)   the resistance of the heating elements in the kettle.
               Rintangan elemen pemanas dalam cerek elektrik itu.

       [2 *marks*]
       [2 *markah*]

8(b)(ii)

1

(c) Four electric kettles W, X , Y and Z with specification 240 V, 2 kW are made   from materials with different characteristics. Table 8 shows the characteristics of the materials.
Empat cerek elektrik W, X ,Y dan Z dengan spesifikasi 240 V, 2 kW diperbuat daripada bahan-bahan dengan ciri yang berlainan. . Jadual 8 menunjukkan ciri-ciri bahan tersebut.

Kettle *Cerek*	The characteristics of the materials are used in the heating element in the kettle *Ciri-ciri bahan yang digunakan dalam elemen pemanas cerek .*		Fuse *Fius*
	Boiling point *Takat didih* /^{o}C	Resistivity/ *Kerintangan* $10^{-8} \Omega$ m	
W	3501	12.50	7A
X	1085	5.20	10 A
Y	3387	11.40	10 A
Z	1064	4.34	7A

TABLE 8
JADUAL 8

(i) Based on **the characteristics** of the heating elements in Table 8, suggest **two** electric kettles suitable to heat water. Give reason for your answer.
*Berdasarkan **ciri-ciri** elemen pemanas dalam Jadual 8, cadangkan **dua** cerek elektrik yang sesuai untuk memanaskan air. Berikan sebab bagi jawapan anda.*

....

.   ...

....

....

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

(ii) Based on **the fuse** used in the Table 8, suggest **two** electric kettles suitable to heat water.
Give one reason for your answer.
*Berdasarkan **fius** yang digunakan dalam Jadual 8, cadangkan **dua** cerek   elektrik yang sesuai digunakan untuk memanaskan air. Berikan sebab bagi jawapan anda.*

....

....

....

[2 *marks*]
[2*markah*]

8(c)(i)

3

8(c)(ii)

2

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(iii) Using your answer in (b)(i) and (b)(ii), suggest which electric kettle is the most
suitable to heat water. Give reason for your answer.
*Menggunakan jawapan anda dalam (b)(i) dan (b)(ii), cadangkan cerek elektrik yang
paling sesuai digunakan untuk memanaskan air. Berikan sebab bagi jawapan anda.*

....

....

8(c)(iii)

[2*marks*]
[2 *markah*]

2

Total
A8

12

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Section B

Bahagian B
[20 *marks*]

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

9.   Diagram 9.1 shows a phenomenon of light on mirror P.
     Diagram 9.2 shows the same phenomenon of light on Q.
     CX is the radius of curvature and F is the focal point.

      Rajah 9.1 menunjukkan satu fenomena cahaya ke atas cermin P.
      Rajah 9.2 menunjukkan fenomena yang sama ke atas cermin Q.
      CX ialah jejari kelengkungan dan F ialah titik fokus cermin tersebut.
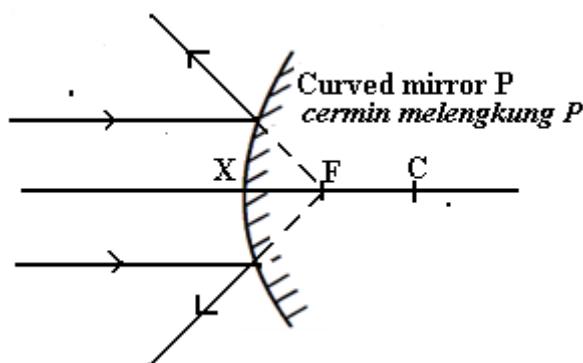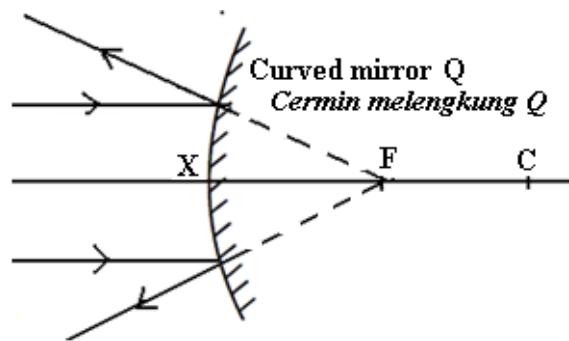
Diagram 9.1	Diagram 9.2
Rajah 9.1	*Rajah 9.2*

  (a) (i)   What is the meaning of focal point?   [1 *mark*]
             Apakah maksud titik fokus?   [1 *markah*]

      (ii)   Observe Diagrams 9.1 and Diagram 9.2. Compare the curvature of mirrors,
             the focal length and the effect on the angle of reflection. State the relationship
             between the curvature of the mirrors and their focal lengths.   [5 *marks*]

             Berdasarkan Rajah 9.1 dan 9.2, bandingkan kelengkungan cermin , panjang fokus dan
              kesan ke atas sinar cahaya yang dipantulkan. Nyatakan hubungan antara kelengkungan
              cermin dengan panjang fokus.   [5 markah]

(b) Diagram 9.3 shows two cars, R and S , travelling in the opposite directions, passing through a sharp band. A mirror is placed at X .

Rajah 9.3 menunjukkan dua kereta R dan S, bergerak dalam arah yang bertentangan di antara satu sama lain melalui satu selekoh tajam. Sebuah cermin diletakkan di X.
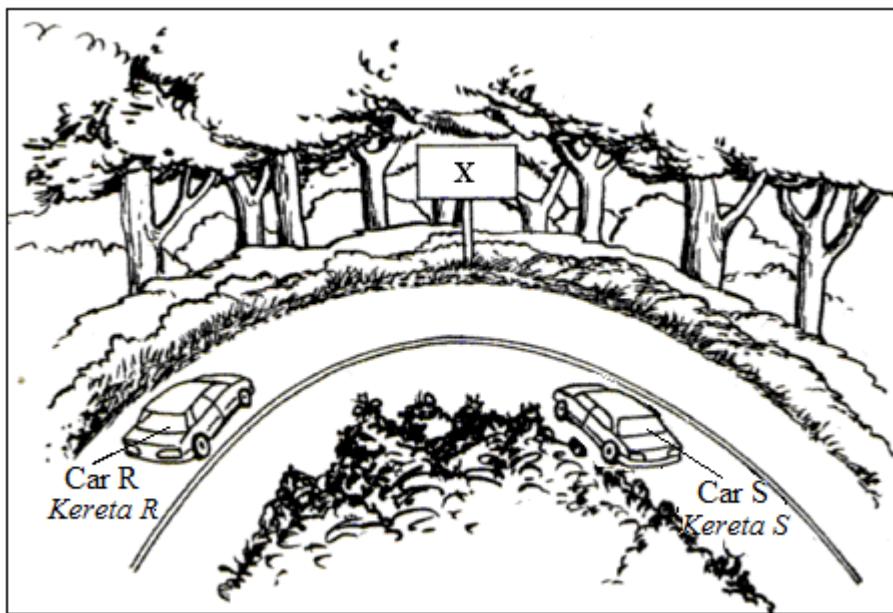
Diagram 9.3
Rajah 9.3

(i) Name the type of mirror at position X. [1 *mark*]
   Namakan jenis cermin pada kedudukan X. [1 *markah*]

(ii) Explain how the mirror is able to help the driver of R's car to see car S.
   Terangkan bagaimana cermin itu dapat membantu pemandu kereta R melihat kereta S. [3 marks]
   [3 *markah*]

(c) As a scout, you intend to design a solar cooker that can be used to boil water using direct sun light. Suggest and explain how to build a solar cooker which can boil water in shortest time, based on the following aspect:

Sebagai seorang pengakap, anda bercadang untuk mereka sebuah dapur solar yang boleh mendidihkan air menggunakan pancaran matahari secara terus. Cadang dan terangkan bagaimana untuk membina sebuah dapur solar yang boleh mendidihkan air dalam masa yang singkat berdasarkan aspek-aspek berikut:

(i) The type of a mirror used
   Jenis cermin yang digunakan

(ii) The position of the water container
   Kedudukan bekas air

(iii) The material used for the cooker compartment
   Bahan yang digunakan untuk komponen dapur

(iv) The colour painted on the outside and inside of the solar cooker.
   Warna yang dicat kan pada bahagian luar dan dalam dapur solar.

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[10 *marks*]
[10 *markah*]

10.   Diagram 10.1 (a) shows a simple wire pendulum that oscillate between two bars magnet.
       Rajah 10.1 (a) menunjukkan satu bandul dawai sedang berayun di antara dua magnet bar.
       Diagram 10.1 (b) shows the same simple pendulum oscillating from higher place.
       Rajah 10.1 (b) menunjukkan bandul diayun dari kedudukan lebih tinggi.

       Diagram 10.2 (a) shows a simple dynamo and it armature rotate between two bars magnet.
       Rajah 10.2(a) menunjukkan satu dinamo ringkas dan gegelungnya sedang berputar di antara dua magnet .
       Diagram 10.2 (b) shows the same simple dynamo and it armature rotating faster.
       Rajah 10.2(b) menunjukkan dinamo diputarkan lebih laju.
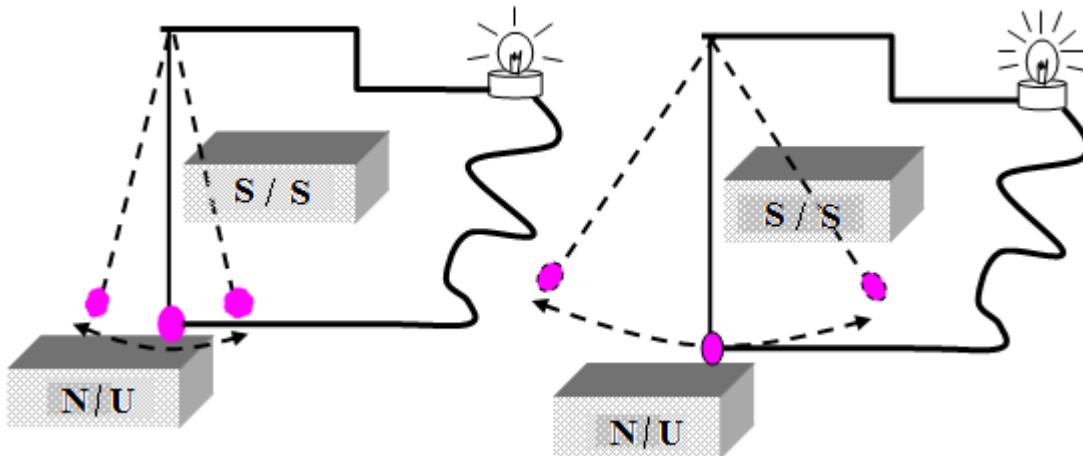
Diagram 10.1(a)
Rajah 10.1(a)

Diagram 10.1(b)
Rajah 10.1(b)
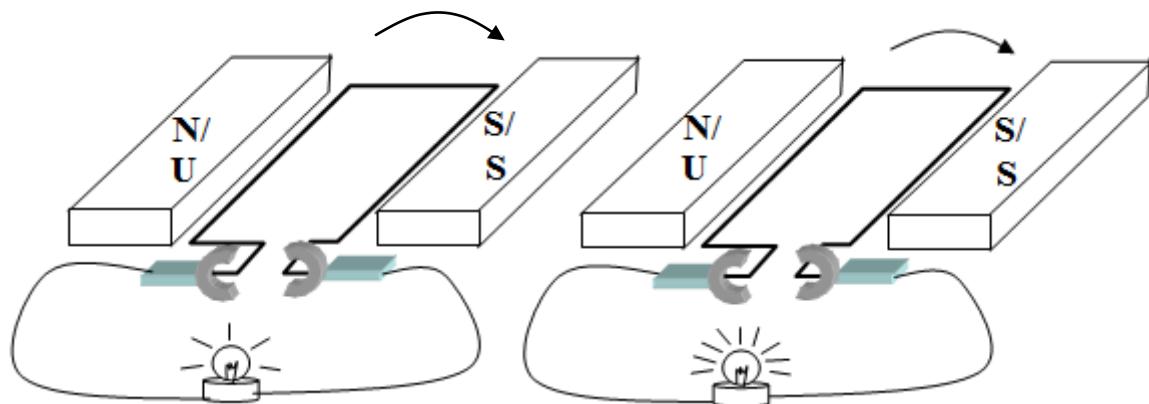
Diagram 10.2(a)
Rajah 10.2(a)

Diagram 10.2(b)
Rajah 10.2(b)

(a)(i)   What is the meaning of induce current?   [1 mark]
            Apakah yang dimaksudkan dengan arus aruhan?   [*1 markah*]

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(iii)   Observe Diagram 10.1(a), Diagram 10.1(b), Diagram 10.2(a) and
          Diagram 10.2(b). Compare the brightness of the bulb, the amplitude of
          pendulum bob and the rate of oscilating armature.
          Relate the brightness of the bulb with the induced current produced in the circuit
          to deduct a relationship between the induced current and the rate of cutting the
          magnetic field.

[5 marks]

Perhatikan Rajah 10.1(a), Rajah 10.1(b), Rajah 10.2(a) dan Rajah
10.2(b). Bandingkan kecerahan mentol, amplitud ayunan bandul dan kadar
putaran gegelung.
Hubungkait kecerahan mentol dengan arus aruhan yang terhasil di dalam litar tersebut
seterusnya kaitkan hubungan antara arus aruhan dan kadar pemotongan fluks magnet.

[5 *markah*]

(b)   Explain the working principle of an electric bell.
        Huraikan prinsip kerja sebuah loceng elektrik

[4 marks]
[4 *markah*]

(j)   With the help of labeled diagram, describe the modification to change
        this dynamo to a high efficiency direct current (DC) motor .
        Dengan gambar rajah berlabel jelaskan bagaimanakah pengubahsuaian
        yang   perlu dilakukan untuk menukar dinamo di atas menjadi motor arus
        terus yang mempunyai kecekapan yang tinggi.

[10 marks]
[10 *markah*]

11.   Diagram 11 shows a doctor used a thermometer to measure the body temperature of a boy.
       Rajah 11 *menunjukkan seorang doktor menggunakan sebuah termometer untuk mengukur suhu badan seorang budak.*

Diagram 11
Rajah 11

(*a*)   What is the meaning of temperature?
        Apakah yang dimaksudkan suhu?   [1 *mark*]
                                                                                           [1 *markah*]

(b)   Explain, in terms of thermal equilibrium, how the termometer reads the
       body temperature of the boy .

                                                                                           [4 *marks*]
       Terangkan, dalam konteks keseimbangan terma, bagaimana termometer tersebut memberi bacaan suhu badan budak lelaki tersebut.

                                                                                           [4 *markah*]

(c)   Table 11 shows the characteristics of five thermometers, P, Q, R, S and T.
       Jadual 11 *menunjukkan ciri-ciri lima termometer, P, Q, R, S dan T.*

Thermometer *termometer*	Liquid used *Cecair yang digunakan*	Glass walled bulb Dinding bebuli kaca	Diameter of capillary tube *Diameter tiub kapilari*	Glass-bore stem and cross-section/ *Lubang batang kaca dan keratan rentas*
P	Mercury *Merkuri*	Thin *Nipis*	Big *Besar*	thick and curved *tebal dan melengkung/*
Q	Mercury *Merkuri*	Thick *Tebal*	Small *Kecil*	thin and plane
R	Mercury *Merkuri*	Thin *Nipis*	Small *Kecil*	thin and curved
S	Alcohol *Alkohol*	Thick *Tebal*	Big *Besar*	thick and plane
T	Alcohol *Alkohol*	Thin *Nipis*	Small *Kecil*	thick and curved

Freezing point of mercury = -39°C   Boiling point of mercury = 360°C
Takat beku merkuri   *takat didih merkuri*
Freezing point of alcohol = - 112°C   Boiling point of alcohol = 78°C
Takat beku alkohol   *takat didih alkohol*

Table 11
Jadual 11

A research project is carried out on the weather of a region with the surrounding temperature is between - 40° C to - 8° C. Thermometer is an equipment to be taken for the research project.

Satu projek penyelidikan hendak dijalankan di suatu kawasan dengan suhu sekitaran antara -40°C dan -8°C. Termometer adalah antara peralatan yang perlu dibawa dalam projek penyelidikan itu.

As a researcher, you are required to determine the most suitable thermometer to be taken with as one item of the equipment. Study the characteristics of all the five thermometers based on the following aspects:

Sebagai seorang penyelidik, anda diminta untuk menentukan termometer yang paling sesuai sebagai satu item peralatan yang perlu untuk dibawa bersama . Kaji ciri kelima-lima termometer itu berdasarkan aspek berikut:

- The liquid used
 Jenis cecair yang digunakan

- Glass wall bulb
 Dinding bebuli kaca

- Diameter of capillary tube
 Diameter tiub kapilari

- Glass bore stem and cross section
 Lubang batang kaca dan keratan rentas

 Explain the suitability of the aspects.
 Justify your choice.
 Terangkan kesesuaian aspek-aspek itu
 Beri sebab bagi pilihan anda.   [10 *marks*]
                                                         [10 *markah*]

(d)   A thermometer which is not calibrated has a mercury column of length 5.0 cm when the temperature is 0° C and 25.0 cm when the temperature is 100°C. The mercury column is 12.0 cm when put in liquid X.
         Sebuah termometer yang belum ditentukurkan mempunyai panjang turus 5.0 cm apabila suhu adalah 0°C dan 25.0 cm apabila suhu adalah 100°C. Turus merkuri adalah 12 cm apabila diletakkan ke dalam cecair X.
         (i)   Determine the temperature of liquid X in Kelvin.
                     Tentukan suhu cecair X itu dalam Kelvin   [4 *marks*]
                                                         [4 *markah*]

         (ii)   State a thermometric property used when making of a thermometer.
                    Nyatakan satu sifat termometri yang digunakan dalam membuat sebuat termometer   [1 *mark*]
                                                         [1 *markah*]

.

12. Diagram 12.1 shows part of Uranium-238 radioactive decay series.
   *Rajah 12.1 menunjukkan sebahagian daripada siri pereputan radioaktif bagi Uranium-238.*

$$_{92}^{238}U \rightarrow {}_{90}^{234}Th \rightarrow {}_{91}^{234}Pa \rightarrow {}_{92}^{234}U \rightarrow {}_{90}^{230}Th \rightarrow {}_{88}^{226}Ra$$
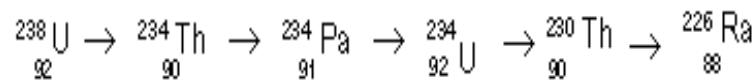
Diagram 12.1
Rajah 12.1

(a) What is the meaning of radioactive decay? [1 mark]

   Apakah maksud pereputan radioaktif? [1 *markah*]

(b) Based on Diagram 12.1;
   (i) Uranium $_{92}^{238}U$ decays to Thorium $_{90}^{234}Th$. Write an equation to show
       the decaying process. [1 mark]

       Uranium $_{92}^{238}U$ telah mereput kepada Thorium $_{90}^{234}Th$. Tulis satu persamaan
       untuk menunjukkan pereputan ini. [1 *markah*]

   (ii) Explain the changes in the nucleus of uranium-238
        during the decaying process [2 *marks*]
        Terangkan perubahan yang berlaku dalam nuklues uranium-238 semasa
        pereputan tersebut. [2 *markah*]

   (iii) Determine the number of alpha particles and beta particles produced by
         the radioactive decaying series shown in Diagram 12.1. [2 *marks*]

         Tentukan bilangan zarah alpha dan beta yang dihasilkan di dalam siri pereputan
         radioaktif yang ditunjukkan dalam Rajah 12.1. [2 *markah*]

   (iv) The half life of $_{91}^{234}Pa$ is 6.7 hours and initially has a mass 32 g. What is
        the mass of Pa-234 after 33.5 hours? [2 marks]

        Separuh hayat bagi $_{91}^{234}Pa$ adalah 6.7 jam dan pada awalnya mempunyai jisim
        sebanyak 32 g. Berapakah jisim $_{91}^{234}Pa$ selepas 33.5 jam? [2 *markah*]

http://chngtuition.blogspot.com

(c)   Diagram 12.2 shows a leakage of an underground water pipe line. Radioactive source is used to detect the spot of the water leakage.

Rajah 12.2 menunjukkan sebatang paip air bawah tanah mengalami kebocoran. Sumber radioaktif boleh digunakan untuk mengesan kebocoran air daripada paip di bawah tanah.
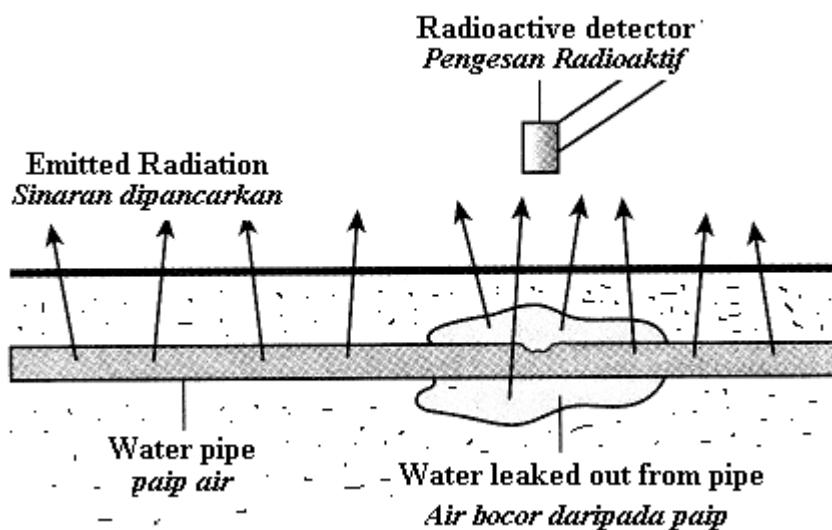

Diagram 12.2
Rajah 12.2

(i)   Explain how a radioactive source is used to detect the spot of the water leakage from the pipe.   [2 *marks*]

Terangkan bagaimana sumber radioaktif boleh digunakan untuk mengesan lokasi air yang bocor daripada paip.   [2 *markah*]

You are asked to investigate the characteristics of five radioactive sources shown in Table 12.

Explain the suitability of each characteristic of the radioactive sources and determine the most suitable radioactive source which can be used to locate the water leak.

Give reasons for your choice.   [10 marks]

Anda ditugaskan untuk mengkaji ciri-ciri bagi lima sumber radioaktif seperti ditunjukkan dalam Jadual 12

Terangkan kesesuaian setiap ciri sumber radioaktif itu dan tentukan sumber radioaktif yang paling sesuai untuk mengesan kebocoran air.

Beri sebab untuk pilihan anda.   [10 *markah*]

Radioactive source Sumber radioaktif	Penetrating power Kuasa Penembusan	Emitted Radiation Sinaran dipancarkan	Half-life Separuh Hayat	State of matter Keadaan jirim
P	Low Rendah	Alpha – α Alfa – α	16 hours 16 jam	Solid Pepejal
Q	Medium Tinggi	Beta – β Beta – β	20 days 20 hari	Liquid Cecair
R	Medium Sederhana	Beta – β Beta – β	15 hours 15 jam	Liquid Cecair
S	High Tinggi	Gamma – γ Gamma – γ	40 minutes 40 minit	Solid Pepejal
T	High Tinggi	Gamma – γ Gamma – γ	10 hours 10 jam	Liquid Cecair

Table 12
Jadual 12

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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NAMA:_____   TINGKATAN:_____

PERSIDANGAN KEBANGSAAN PENGETUA
SEKOLAH MENENGAH MALAYSIA (CAWANGAN MELAKA)

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2010   **4531/3**
PHYSICS
Kertas 3
Ogos/Sept.
1 ½ jam   **Satu jam tiga puluh minit**

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1.   *Tulis **nama** dan **angka giliran** anda pada petak 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 belakang kertas soalan ini.*

Nama Pemeriksa			
Bahagian	Soalan	Markah Penuh	Markah diperolehi
A	1	16	
	2	12	
B	3	12	
	4	12	
Jumlah			

Kertas soalan ini mengandungi 15 halaman bercetak.

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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 answers for Section A in the spaces provided in the question paper.
   Jawab **semua** *soalan dalam* **Bahagian A.** *Jawapan kepada* **Bahagian A** *hendaklah ditulis dalam ruang yang disediakan dalam kertas soalan.*

3. Answer one question from Section B. Write your answers for Section B on the lined pages provided at the end of this question paper. Answer questions in Section B in detail. You may use equations, diagrams, tables, graphs and other suitable methods to explain your answer.
   Jawab **satu** *soalan daripada* **Bahagian B.** *Jawapan kepada* **Bahagian B** *hendaklah ditulis pada kertas jawapan sendiri. Anda diminta menjawab dengan lebih terperinci. Jawapan mestilah jelas dan logik. Persamaan , gambar rajah, jadual, graf dan cara lain yang sesuai untuk menjelaskan jawapan anda boleh digunakan.*

4. Show your working, it may help you to get marks.
   Tunjukkan kerja mengira,ini membantu anda mendapatkan markah.

5. If you wish to cancel any answer, neatly cross out the answer.
   Sekiranya anda hendak membetulkan sesuatu jawapan, buatkan garisan di atas jawapan itu.

6. The diagrams in the questions are not drawn to scale unless stated.
   Rajah yang mengiringi soalan tidak dilukiskan mengikut skala kecuali dinyatakan.

7. Marks allocated for each question or part question are shown in brackets.
   Markah yang diperuntukkan bagi setiap soalan atau ceraian soalan ditunjukkan dalam kurungan.

8. A booklet of four-figure mathematical tables is provided.
   Buku sifir matematik empat angka disediakan.

9. You may use a non-programable scientific calculator.
   Anda dibenarkan menggunakan kalkulator saintifik yang tidak boleh diprogram.

10. The time suggested to answer Sectin A is 60 minutes and Section B is 30 minutes.
    Masa yang dicadangkan untuk menjawab **Bahagian A** *ialah 60 minit dan* **Bahagian B** *ialah 30 minit.*

11. Hand in this question paper at the end of the examination.
    Serah kertas soalan ini di akhir peperiksaan.

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 study the relationship between the speed of trolley, *v* and the height of the trolley on the inclined plane from the surface, *h*. The arrangement of apparatus is shown in Diagram 1.1. The frequency of the ticker timer is 50 Hz.
The height of the trolley on the inclined plane from the surface, *h* = the height of the block.

Seorang pelajar menjalankan satu eksperimen untuk mengkaji hubungan antara halaju troli, v dan ketinggian troli di atas landasan condong daripada permukaan lantai, h. Susunan radas eksperimen seperti yang ditunjukkan pada Rajah 1.1. Frekuensi jangka masa detik ialah 50 Hz.
Ketinggian troli di atas landasan condong daripada permukaan lantai, h = ketinggian tinggi bongkah.
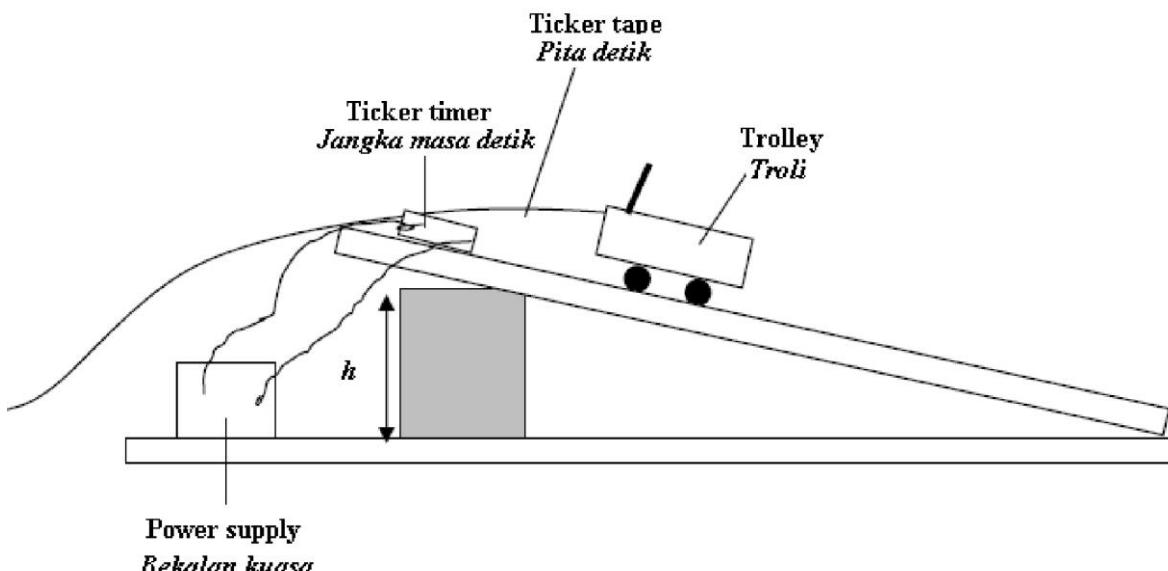
Diagram 1.1
Rajah 1.1

At the beginning of the experiment, the height of the block is started with *h* = 20.0 cm. 10 ticks is chosen from the centre of the ticker tape to calculate the speed as shown in Diagram 1.2. The experiment is repeated by varying the values of *h* to be 30.0 cm, 40.0 cm, 50.0 cm and 60.0 cm. Every section of 10 ticks at the centre of ticker tape can be obtained as shown in Diagram 1.3, 1.4, 1.5 and 1.6.

Pada awal eksperimen tinggi bongkah h dimulai dengan 20.0 cm. 10 detik dipilih daripada bahagian tengah pita detik untuk menghitung halaju seperti yang ditunjukkan di Rajah 1.2. Eksperimen diulangi dengan menggunakan ketinggian bongkah h = 30.0 cm, 40.0 cm, 50.0 cm dan 60.0 cm. Keratan 10 detik pada bahagian tengah pita detik yang diperolehi ditunjukkan seperti pada Rajah 1.3, 1.4, 1.5 dan 1.6.
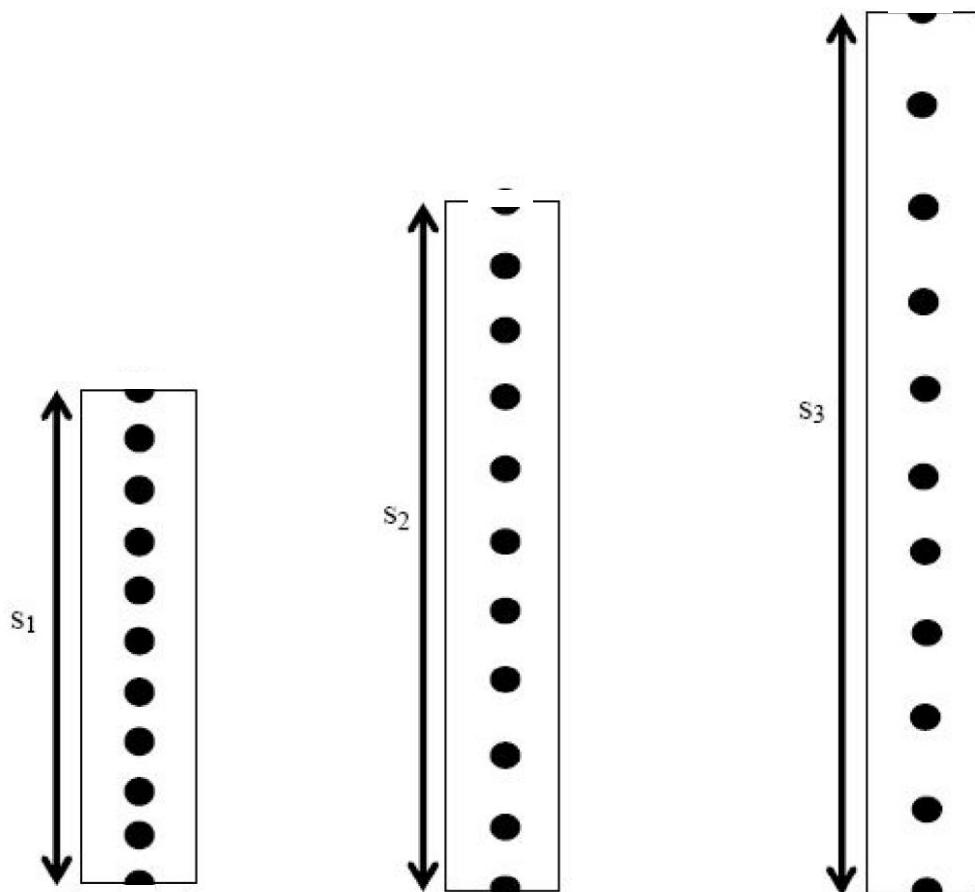
http://chngtuition.blogspot.com

| Diagram 1.2 | Diagram 1.3 | Diagram 1.4 |
| *Rajah 1.2* | *Rajah 1.3* | *Rajah 1.4* |

$h = 20.0\ cm$	$h = 30.0\ cm$	$h = 40.0\ cm$
s_1 = ……… cm	s_2 = ……… cm	s_3 = ……… cm
v_1 = ………$cm\ s^{-1}$	v_2 = ………$cm\ s^{-1}$	v_3 = ………$cm\ s^{-1}$
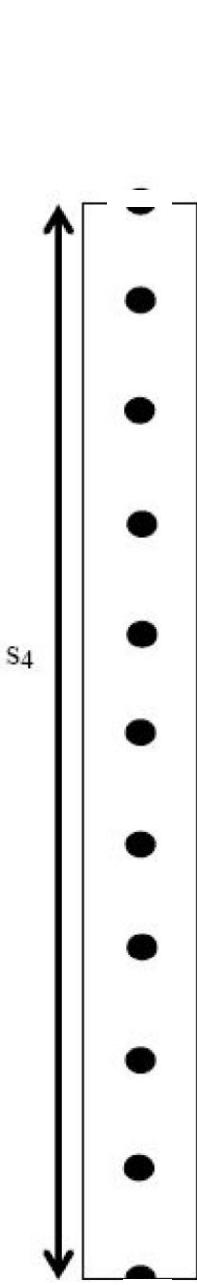
Diagram 1.5
Rajah 1.5
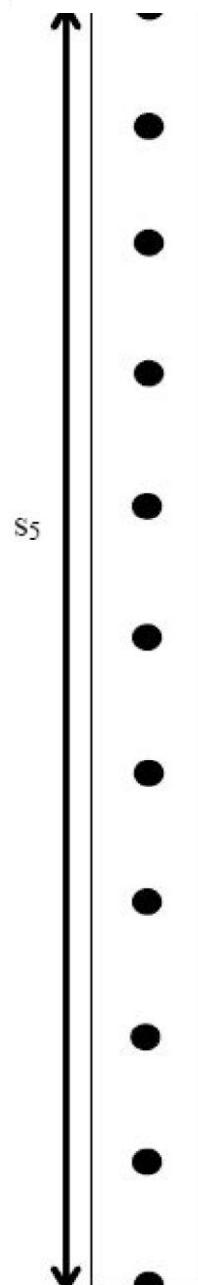
Diagram 1.6
Rajah 1.6

h = 50.0 cm

s_4 = ……… cm

v_4 = ………cm s^{-1}

h = 60.0 cm

s_5 = ……… cm

v_5 = ………cm s^{-1}

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(a) For the experiment described on page 3, identify
Bagi eksperimen yang diterangkan di halaman 3, kenal pasti ;

1(a)(i)

1
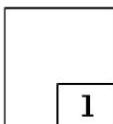
(i) The manipulated variable, *pembolehubah*
yang dimanipulasikan,

....
.

[1 mark]
[1 markah]

1(a)(ii)

1
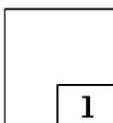
(ii) The responding variable
pembolehubah bergerak balas,

……………………………………………………………………………..

[1 mark]
[1 markah]

1(a)(iii)

1
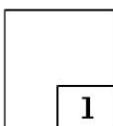
(iii) A fixed variable, *pembolehubah*
yang dimalarkan,

……………………………………………………………………………

[1 mark]
[1 markah]

(b) For this part of the question, write your answers in the spaces provided in the corresponding diagrams.
Untuk bahagian soalan ini, tulis jawapan anda dalam ruang yang disediakan dalam rajah-rajah yang sepadan.

1(b)(i)

2
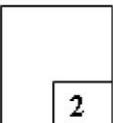
(i) Based on Diagrams 1.2, 1.3, 1.4, 1.5 and 1.6 on pages 4 and 5, record the readings of *s* .
Berdasarkan Rajah 1.2, 1.3, 1.4, 1.5 dan 1.6 di halaman 4 dan 5, catat bacaan s

[2 *marks*]
[2 *markah*]

1(b)(ii)

2

(ii) Calculate v for each value of *s* in 1(b)(i), using the formula $v = \dfrac{s}{0.2}$
Record the value of v.

Hitung v bagi setiap nilai s di **1**(b)(i), *menggunakan formula* $v = \dfrac{s}{0.2}$
Catat nilai v.

[2 *marks*]
[2 *markah*]

(c) Tabulate your results for all values of h, s and v in the space below.

Jadualkan keputusan anda bagi semua nilai h, s dan v dalam ruang di bawah. [2 *marks*]
[2 *markah*]

1(c)

2

(d) On the graph paper on page 5, draw a graph of v against *h*.

Pada kertas graf di halaman 5, lukiskan graf v melawan h.

[5 *marks*]
[5 *markah*]

1(d)

5

(e) Based on the graph on page 5, state the relationship between v and h.

Berdasarkan graf anda di halaman 5, nyatakan hubungan antara v dan h

....

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

1(e)

1

(f) State **one** precaution in this experiment.

*Nyatakan **satu** langkah berjaga-jaga dalam eksperimen ini*

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

1(f)

1

Total A1

16

Graph of *v* against *h*
Graf v melawan h
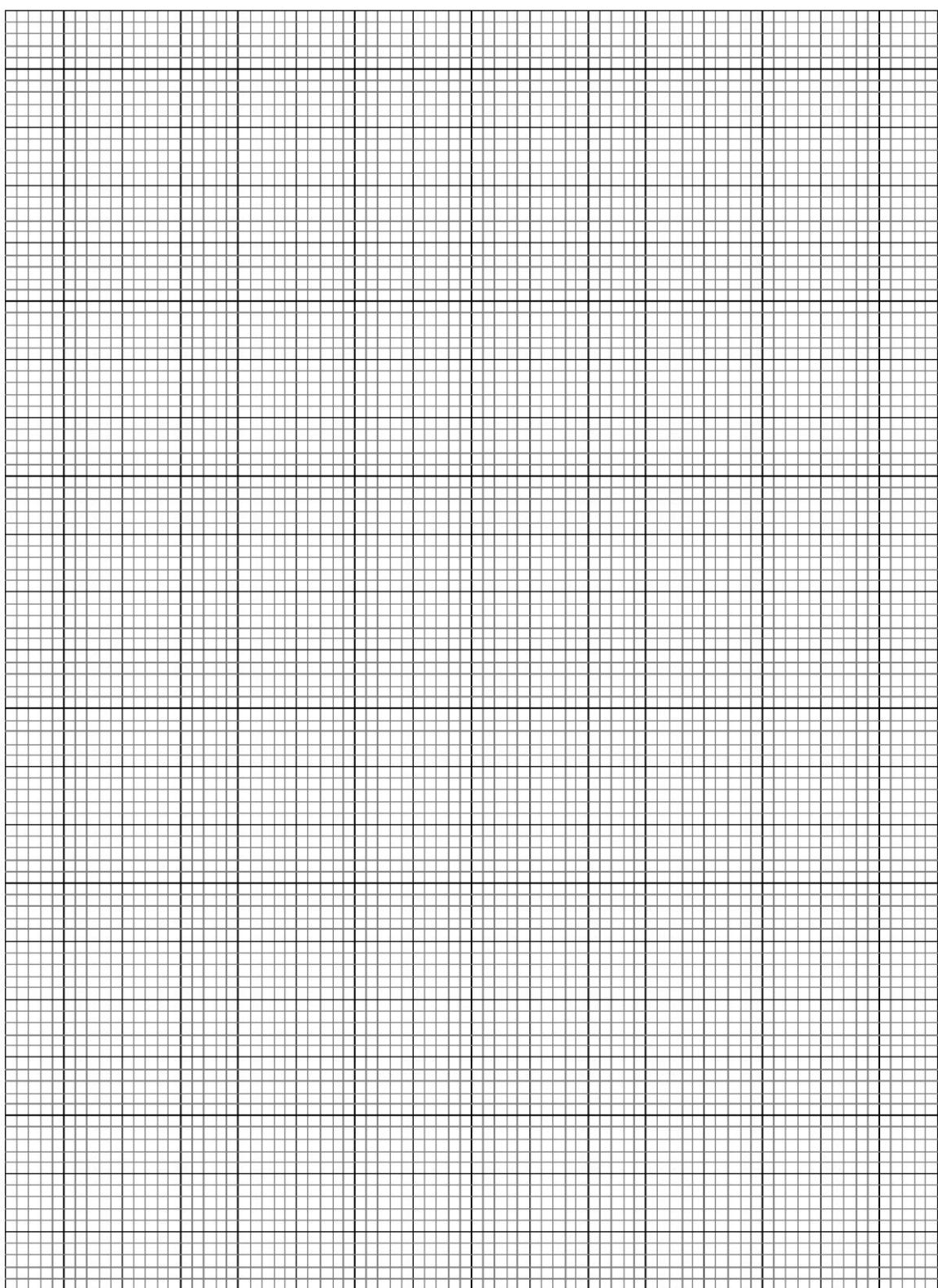
2. A student carries out an experiment to investigate the relationship between angle of incidence,*i* and angle of refraction, *r* of a glass block.

The results of this experiment are shown in the graph *sin r* against *sin i* in Diagram 2.1.

Seorang murid menjalankan satu eksperimen untuk menyiasat hubungan antara sudut tuju,i dengan sudut biasan,r bagi satu blok kaca.

Keputusan eksperimen ini ditunjukkan oleh graf sin r melawan sin i pada Rajah 2.1.

(a) Based on the graph in Diagram 2.1:
   Berdasarkan graf pada Rajah 2.1:

   (i)   State the relationship between *sin r* and *sin i*.
         Nyatakan hubungan antara sin r dengan sin i.

         ……………………………………………………………………………
         [1 *mark*]
         [1 *markah*]
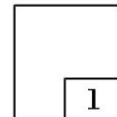
   (ii) Determine the value of *i* when sin r = 0.6.
         Show on the graph, how you determine the value of *i*.

         Tentukan nilai i apabila sin r = 0.6.
         Tunjukkan pada graf itu bagaimana anda menentukan nilai i.

         x = …………………
         [3 *marks*]
         [3 *markah*]
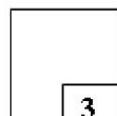
   (iii) Calculate the gradient, *m*. of the graph. Show on
         the graph how you calculate *m*.

         Hitung kecerunan, m, bagi graf itu.
         Tunjukkan pada graf itu bagaimana anda menghitung m.

         m = ……………………
         [3 *marks*]
         [3 *markah*]

2(a)(i)
1

2(a)(ii)
3

2(a)(iii)
3
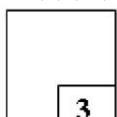
Graph of sin r against sin i

Graf Sin r melawan sin i

Diagram 2.1

Rajah 2.1

http://chngtuition.blogspot.com
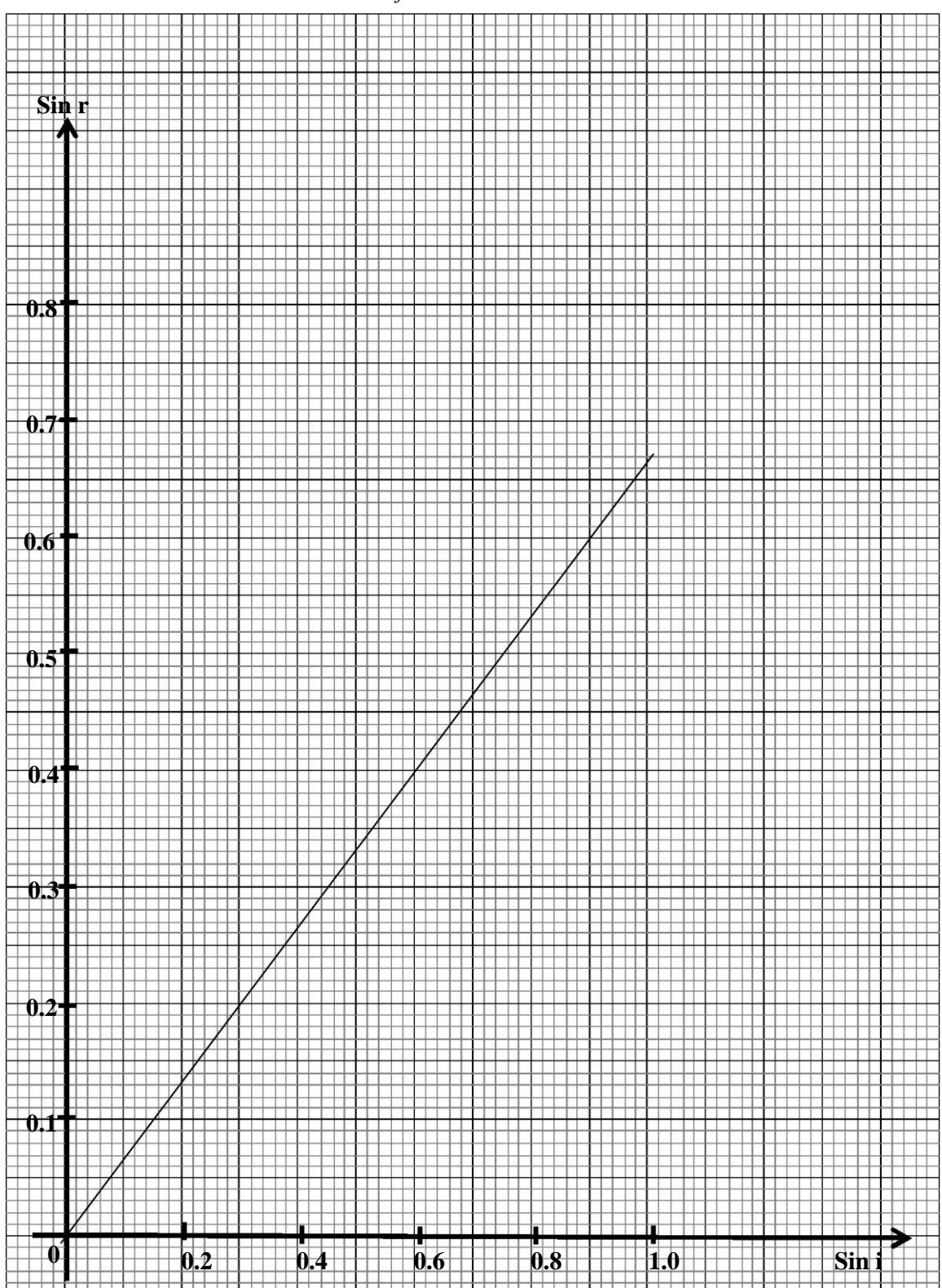
(b) The index of refraction, n, of the glass is given by the formula where $n = \dfrac{1}{m}$

m is the gradient of the graph. Calculate the value of η.

Indeks biasan,n, bagi kaca diberi oleh formula $n = \dfrac{1}{m}$ *, dengan keadaan m ialah kecerunan graf. Hitung nilai n.*

η = ……………………

[2 *marks*]
[2 *markah*]

2(b)

	2

(c) The relationship between the speed of light in glass, v and the speed of light in air, c, is ,

. $n = \dfrac{c}{v}$

where n is the index of refraction of the glass.
The speed of light in air, c = 3 x 10^{8} m s^{-1}. Using the answer in 2(b), calculate the speed of light in glass.

Hubungan antara laju cahaya di dalam kaca, v, dan laju cahaya di udara, c,

ialah $n = \dfrac{c}{v}$*, dengan keadaan η ialah index biasan bagi kaca.*
Laju cahaya di udara, c = 3 x 10^{8} m s^{-1}. Menggunakan jawapan di 2(b), hitung laju cahaya di dalam kaca itu.

2(c)

	2

v = …………………………………

[2 *marks*]
[2 *markah*]

2(d)

	1

(d) State one precaution that should be taken to improve the accuracy of the result of this experiment.
Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk memperbaiki ketepatan bacaan dalam eksperimen ini.

……………………………………………………………………………………

……………………………………………………………………………………

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

Total A2

	12

Section B
Bahagian B

[12 *marks*]
[12 *markah*]

Answer any **one** questions from this section
*Jawab mana-mana **satu** soalan daripada bahagian ini.*

3. Diagram 3 shows a dented ping pong ball then put in a basin that consist cold water
    (Diagram 3 (a)), warm water (Diagram 3 (b)), and hot water (Diagram 3 (c)).
    Observe the shape of ping pong ball and their surroundings.

    *Rajah 3 menunjukkan perubahan bentuk sebiji bola pingpong yang kemik setelah dimasukkan ke
    dalam besen yang mengandungi air sejuk(Rajah 3(a)), air suam(Rajah 3(b)) dan air panas(Rajah
    3(c)).*
    Perhatikan bentuk bola ping pong dan persekitaran.
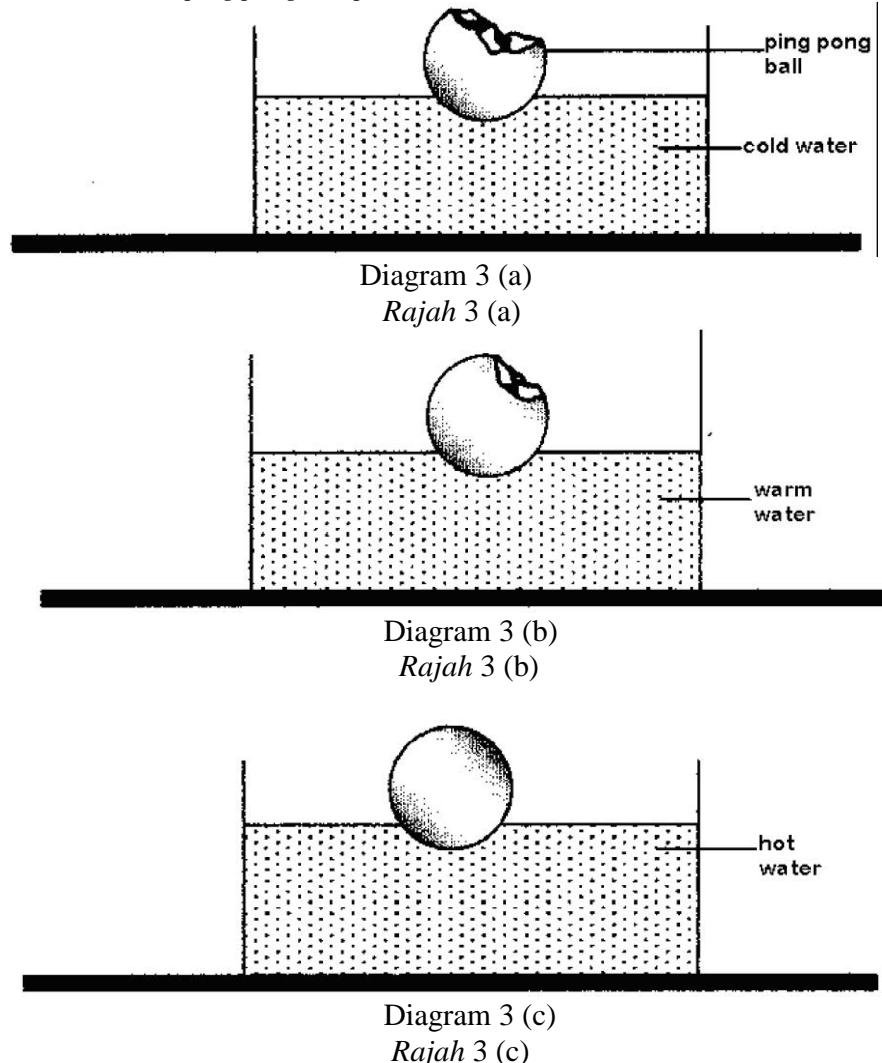
Diagram 3 (a)
Rajah 3 (a)

Diagram 3 (b)
Rajah 3 (b)

Diagram 3 (c)
Rajah 3 (c)

Based on the information and observation above:
Berdasarkan kepada maklumat dan pemerhatian di atas:

(a) State **one** suitable inference.
Nyatakan satu inferens yang sesuai.

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

(b) State **one** suitable hypothesis.
Nyatakan satu hipotesis yang sesuai.

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

(c) With the use of apparatus such as a thermometer, capillary tube, bunsen
burner and other apparatus, describe an experiment framework to investigate the
hypothesis stated in 3 (b).
*Dengan menggunakan alat radas seperti termometer, tiub kapilari, penunu
bunsen dan lain-lain radas, terangkan satu rangka eksperimen untuk menyiasat hipotesis
yang anda nyatakan di 3(b)*

In your description, state clearly the following;
*Dalam penerangan anda sila nyatakan dengan jelas perkara-perkara
berikut;*

(i) Aim of the experiment.
Tujuan eksperimen.

(ii) Variables in the experiment.
Pembolehubah dalam eksperimen.

(iii) List of apparatus and materials.
Senarai radas dan bahan.

(iv) Arrangement of the apparatus.
Susunan radas.

(v) The procedures of the experiment include the method of
controlling the manipulated variable and the method of measuring the
responding variable.
*Prosedur eksperimen termasuk kaedah mengawal pembolehubah
dimanipulasikan dan kaedah mengukur pembolehubah bergerak balas.*

(vi) The way you would tabulate the data.
Cara anda akan menjadualkan data.

(vii) The way you would analyze the data.
Cara anda akan menganalisis data.

[*10 marks*]
[10 *markah*]

4531/3   **SULIT**

4. Diagram 4 shows the side view of two ripple tanks. When the motors are switched on, water waves with the same frequency are produced.

Rajah 4 menunjukkan pandangan sisi dua buah tangki riak . Apabila suis motor dihidupkan gelombang air dengan frekuensi yang sama dihasilkan.
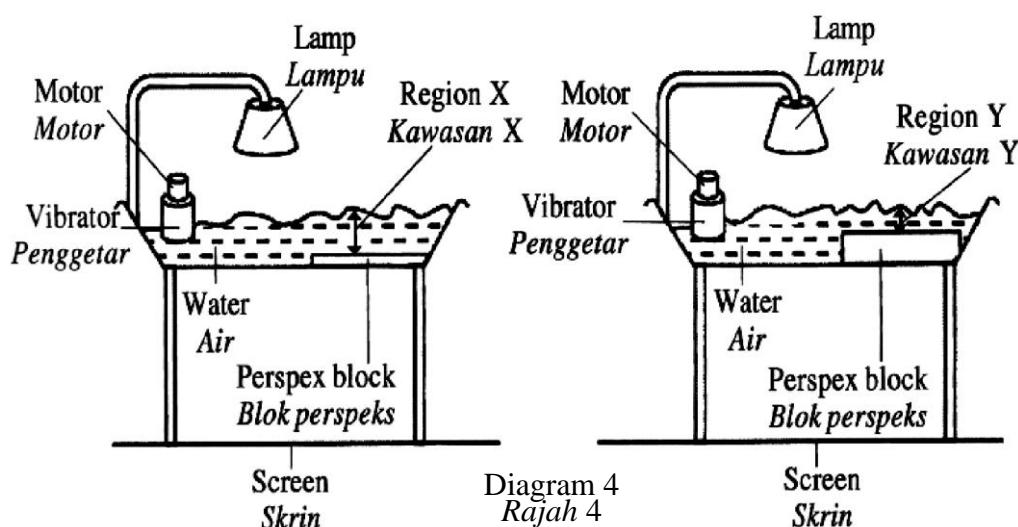
Diagram 4
Rajah 4

Based on the information and observation above:
Berdasarkan kepada maklumat dan pemerhatian di atas:

(a) State one suitable inference.
   Nyatakan satu inferens yang sesuai.

(1 mark)

(b) State one suitable hypothesis.
   Nyatakan satu hipotesis yang sesuai.

(1 mark)

(c) With the use of apparatus such as ripple tank, a vibrator motor and other apparatus, describe an experiment framework to investigate the hypothesis stated in 4 (b).
   Dengan menggunakan alat radas seperti sebuah tangki riak, sebuah motor penggetar lain-lain radas, terangkan satu rangka eksperimen untuk menyiasat hipotesis yang anda nyatakan di 4 (b).

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In your description, state clearly the following:
Dalam penerangan anda sila nyatakan jelas perkara-perkara berikut;

(i) Aim of the experiment.
     Tujuan eksperimen

(ii) Variables in the experiment.
      Pembolehubah dalam eksperimen

(iii) List of apparatus and materials.
       Senarai radas dan bahan.

(iv) Arrangement of the apparatus.
      Susunan radas

(v) The procedures of the experiment include the method of controlling the
     Manipulated variable and the method of measuring the responding variable.
     Prosedur eksperimen termasuk kaedah mengawal pembolehubah
     dimanipulasikan dan kaedah mengukur pembolehubah bergerak balas.

(vi) The way you would tabulate the data.
      Cara anda menjadualkan data.

(vii) The way you analyze the data.
       Cara anda menganalisis data.

(10 marks)

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

ANSWER FOR PHYSICS PAPER 1 SET 1 2010

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

Peperiksaan Percubaan SPM Melaka 2010
Kertas 2 Marking Scheme

No	Marking Scheme	Marks
1(a)	Quantity that can be measured	1
(b)(i)	Zero error	1
(b)(ii)	microampere	1
(c)	Subtracting the reading with the error reading	1
	TOTAL	**4**
2(a)	Bourdon Gauge	1
(b)	Pressure	1
(c)	1st : 27 + 273 = 300 K 2nd : $\dfrac{128}{300} = \dfrac{132}{T}$ 3rd : T = 309.38 K / 36.38 ˚C	3
	TOTAL	**5**
3(a)	Electromagnet Induction	1
(b)	1st : correct direction of current flows in either one solenoid is shown 2nd : direction of the galvanometer counter to left 3rd : angle of deflection of galvanometer in solenoid Q is greater 2ms⁻¹ galvanometer 2ms⁻¹	3
(c)(i)	Induced current	1
(c)(ii)	Cutting the magnetic field/flux	1
	TOTAL	**6**
4(a)(i)	Phosphorus / Arsenic /	1
(a)(ii)	Size of the atom more or less the same with the semiconductor	1
(a)(iii)	n-type	1
(a)(iv)	1st : excessive of electron 2nd : majority charge carrier is electron	2
(b)	1st : correct symbols for battery, bulb, diod and switch 2nd : all arrange in series with 2 batteries	2
	TOTAL	**7**
5(a)	Mass is the quantity of matter	1
(b)(i)	The level of the apple in the oil immerses more than in the water	1
(b)(ii)	Volume of oil displaced by the apple is larger than the water	1
(b)(iii)	Density of water is larger/ greater than oil.	1
(c)(i)	Inversely proportional	1
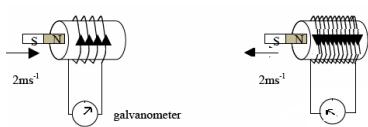
(c)(ii)	Equal	1
(d)	Archimedes principle	1
(e)	Empty the ballast tank / Remove the water	1
	TOTAL	**8**
6(a)	The maximum displacement from the equilibrium position	1
(b)(i)	1st : pendulums have different length 2nd : but L = N	2
(b)(ii)	L = N and oscillate at maximum amplitude	1
(b)(iii)	Resonance	1
(c)	1st : energy is transferred 2nd : N has the same (natural) frequency with L 3rd : N and L are resonate	3
	TOTAL	**8**
7(a)(i)	Gravitational force	1
(a)(ii)	Free fall	1
(b)(i)	Impact on Diagram 7.2 is greater or vice versa	1
(b)(ii)	1st :In Diagram 7.1 lengthen the time of impact / or bending the leg to lengthen time of impact 2nd : reduce the impulsive force	2
(c)(i)	1st :Shorten the pole / lower the swing 2nd : avoid children falling from high place	2
(c)(ii)	1st : sand / rough and soft landing pad 2nd : lengthen time of impact 3rd : reduce impulsive force	3
	TOTAL	**10**
8(a)	Consumes 240 V and produce energy of 1200 J/s	1
(b)(i)	1st : 1200/240 2nd : 5 A	2
(b)(ii)	1st : R = 240/5 2nd : 48 Ω	2
(c)(i)	1st : W and Y 2nd : High boiling// high resistivity 3rd : does not melt easily // higher heat produced/ better heating effect	3
(c)(ii)	1st : X and Y 2nd : the value of the fius is a bit higher than 8.3 A.	2
(c)(iii)	1st : Y 2nd : high boiling point, high resistivity and use 10 A fuse / suitable fuse	2
	TOTAL	12
9(a)(i)	Focal point of a convex mirror is a point on principal axis from which a beam of light parallel to the principal axis converge /diverge.	1
(a)(ii)	1st : The radius of curvature in Diagram 9.1 is greater than in Diagram	5

	9.2 . 2nd : XF/ FC is the focal length/ focal length equal distance between X and F. 3rd : The focal length for mirror P /Diagram 9.1 is smaller/nearer than for mirror Q/Diagram 9.1. 4th : The angle of reflection in Diagram 9.1 is greater than in Diagram 9.2. 5th : When curvature of the mirror increases, the focal length decreases / the curvature of a mirror is inversely proportional to the focal length.	
(b)(i)	Convex mirror	1
(b)(ii)	1st : Light rays from car Q is reflected by the mirror to the driver in car P. 2nd : The driver will see an upright image of car Q inside the mirror. 3rd : The mirror has a wider field of vision	3
(c)	Design a solar cooker: 1st : Use concave mirror 2nd : Converge / focus the sun light 3rd : Put the water container at the focal point of the concave mirror. 4th : All the light rays can be reflected and focus at the focal point // get maximum heat 5th : Paint the outside part of the cooker with black colour 6th : To absorb heat 7th : Wrap / use aluminium foil / silver colour inside 8th : So sun light can be reflected back into the cooker 9th : Wrap the cooker with plastic or glass 10th : To trap heat 11th : Put small stones/ pebbles / marbles inside the cooker 12th : Absorb heat 13th : metal 14th : good conductor	10 max
	TOTAL	20
10(a)(i)	Induce current is a current produced by changing the magnetic field	1
(a)(ii)	1st : Diagram 10.1(b) is brighter than Diagram 10.1(a) 2nd : Amplitude in Diagram 10.1(b) is greater than Diagram 10.1(a). 3rd : Diagram 10.2(b) is brighter than Diagram 10.2(a) 4th : The brighter the bulb, the higher the induced current 5th : The higher the induced current the higher the cutting of the magnetic field.	5

(b)	1st : When the bell is <u>pressed</u>, a <u>current</u> flows in the coils of the electromagnet, causing the electromagnet to be <u>magnetized</u>. 2nd :The magnetized electromagnet <u>attracts</u> the soft-iron armature, causing the hammer to strike the <u>gong</u>. 3rd :The movement of the armature <u>breaks</u> the circuit and causes the electromagnet to <u>lose</u> it magnetism. 4th :The light <u>spring</u> pulls the armature back, remaking the contact and <u>completing</u> the circuit again. 5th :The cycle is <u>repeated</u> so long as the bell push is pressed and <u>continuous</u> ringing occurs.	Max 4
(c)	1st : change bulb with dc power supply 2nd : to provide dc current to the motor 3rd : use stronger magnet 4th : increase the strength of the magnetic field/flux 5th : increase the number of turn 6th : increase the rate of change of the magnetic flux 7th : use cylinder magnet 8th : to produce uniform radial magnetic field 9th : wound the wire to soft iron core 10th : concentrate the magnetic field/flux	10
	TOTAL	20
11(a)	Temperature is the degree of hotness	1
(b)	1st : the thermometer is put under the tounge/ inside mouth/under the armpit 2nd : the heat is transferred from the body to the thermometer 3rd : mercury expand until it reaches a state of thermal equilibrium 4th : the temperature of the thermometer is the same as the body	4
(c)	1st : use alchohol 2nd : able to record low temperature / low freezing point 3rd : thin glass wall bulb 4th : more sensitive to heat 5th : small diameter of capillary tube 6th : more sensitive to heat / get a wider range 7th : thick and curve glass bore stem 8th : not easily to break / easy to read 9th : choose T 10th : because it uses alchohol, thin glass wall bulb, small diameter of capillary tube and thick and curve glass bore stem.	10
(d)(i)	1st : $\dfrac{l_\theta - l_0}{l_{100} - l_0} \times 100$	4

	$2^{nd}: \dfrac{12-5}{25-5} x\ 100$ $3^{rd}:\ 35\ °C$ $4^{th}:\ 308\ K$	
(d)(ii)	Volume expand with temperature..	1
	TOTAL	20
12(a)	Radioactive decay is a process which unstable nucleus emit radiation to become stable	1
(b)(i)	$^{238}_{92}U \rightarrow\ ^{234}_{90}Th + ^{4}_{2}He$	1
(ii)	1st : During the alpha decay, the number of proton will decrease by 2/ proton number decrease by 2 2nd : and the number of neutron will also decrease by 2 / nucleon decreases by 4	2
(iii)	1st :4 alpha particles 2nd : 2 beta particles	2
(iv)	1st : t = 33.5 /6.7 = 5 T$_{1/2}$ 2nd : 32 → 16 → 8 → 4 → 2 → 1 g	2
(c)(i)	1st : put a radioactive substance into the water and let the water flow to the location of the leak. 2nd : The location of the leak has the highest / increase activity / reading on detector.	2
(c)(ii)	1st : has medium penetrating power \ 2nd : can penetrate the soil and emerge from the ground 3rd : beta ray 4th : medium penetrating power /less dangerous to the worker. 5th : Has a short half-life 6th : Short but enough time to detect the radioactive /active in water for a short time so not harmful to the water consumer 7th : Liquid 8th : dissolved easily in water 9th Substance R is the most suitable 10th with short half-life, emits beta ray , liquid and has medium penetrating power.	10
	TOTAL	20

END OF MARKING SCHEME

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Question	Marking Scheme	Marks
1(a)(i)	**State the manipulated variable correctly** ; Height of inclined plane from the surface, h	1
1(a)(ii)	**State the responding variable correctly** ; Velocity of the trolley, v	1
1(a)(iii)	**State one fixed variable;** Mass of troley // No. of trolley // frequency of power supply, f	1
1(b)(i)	All Values of s are correct.(1 dp) Values of s are consistant 1 decimal point	2
1(b)(ii)	All values of v are correct. Values of v are consistant (1 decimal point)	2
1(c)	**Tabulate h, s and v correctly in the table.** **A** Shows a table which have h, s and v. **B** State the correct unit of d/cm, s/cm and v/cms^{-1}. <table><tr><th>h/cm</th><th>s /cm</th><th>v / cm s^{-1}</th></tr><tr><td>20.0</td><td>5.9</td><td>29.5</td></tr><tr><td>30.0</td><td>8.2</td><td>41.0</td></tr><tr><td>40.0</td><td>10.5</td><td>52.5</td></tr><tr><td>50.0</td><td>11.9</td><td>59.5</td></tr><tr><td>60.0</td><td>15.5</td><td>76.5</td></tr></table>	2

1(d)	**Draw the graph of v against d.**
	    A - Label y-axis and x-axis correctly
	    B - States the unit at both axis correctly
	    C - Both axes with the even and uniform scale
	    D - 5 points correctly plotted
	    E - a smooth best straight line
	    F - minimum size of the graph is 5 x 4
	  (Squares of 2 x 2 cm)
	
	<table><tr><th>Number of √</th><th>Score</th></tr><tr><td>6</td><td>5</td></tr><tr><td>5</td><td>4</td></tr><tr><td>3-4</td><td>3</td></tr><tr><td>2</td><td>2</td></tr><tr><td>1</td><td>1</td></tr></table>
		5

1(e)	**State the correct relationship based on the candidate's graph** v increase linearly to d	1
1(f)	**State ONE correct precaution so as to produce an accurate result of the experiment** The position of the eye perpendicular to the scale when takes the reading to avoid errors due to parallax/systematic error.	1
	TOTAL	16
2(a)(i)	Directly proportional	1

2(a)(ii)	1st : show on graph 2nd : sin i = 0.9 3rd : i = 64.16° $\frac{0.6 - 0}{0.9}$	3
2(a)(iii)	1st : show on graph triangle 2nd : show how to calculate: 3rd : answer 0.67 no unit	3
2(b)	1st : n = 1/0.67 2nd : = 1.493 / 1.49 / 1.5	2
2(c)	1st : v = 3 x 10⁸ / 1.49 2nd : = 2.01 x 10⁸ ms⁻¹	2
2(d)	The position of the eyes must be perpendicular to the reading on the protactor. Make sure the experiment is conducted in a dark room	1
	TOTAL	12
3(a)	Temperature influence the size of pingpong ball.	
3(b)	When the temperature increases, the height of air trapped also increases.	
3(c)(i)	To study the relationship between temperature and volume/height	
3(c)(ii)	MV – temperature RV – Height of air traped/volume FV – pressure	
3(c)(iii)	Capillary tube, thermometer, beaker, ruler, stirrer, tripod stand, bunsen burner, rubber bands and retort stand with clamp.	
3(c)(iv)	Charles' Law experiment.	
3(c)(v)	The experiment is set up as shown. When the thermometer is θ = 30 °C, the height of the air column, h is read on the ruler scale and record. Repeated the experiment for values of temperature, θ = 40 °C, 50 °C, 60 °C and 70 °C.	
3(c)(vi)		

Temperature, θ/°C	Height of air trapped,h/cm
30 40 50 60 70	

3(c)(vii)	height of trapped air/ panjang turus udara terperangkap θ/ °C temperature suhu h/cm	
	TOTAL	12
4(a)	**State a suitable inference** The wave length is influence by the depth of water	1
4(b)	**States a relevant hypothesis** The wave length increases when the depth of water increase.	1
4(c)(i)	**Describe a relevant and workable experimental framework** **State the aim of experiment** To study the relationship between the depth of water and the wave length.	1
4(c)(ii)	**State the manipulated variable and the responding variable** Manipulated variable : The depth of water Responding variable : The wave length.	1
4(c)(iii)	**State ONE variable that kept constant** Fixed variable : The frequency of waves.	1
4(c)(iv)	**Complete list of apparatus and materials** Ripple tank, stroboscope, metre rule, Perspex plate and vibrator motor **Note:** **A complete apparatus and materials means, with the apparatus and materials a set of data (manipulated and responding variables) can be obtained from the experiment**	
4(c)(v)	**State the workable arrangement of the**	1

apparatus

4(c)(vi)	**State the method of controlling the manipulated variable** 1. The apparatus is set up as shown in figure. 2. Arrange a ripple tank, and placed a piece of perspex with h = 1.0 cm placed in the centre of the tank. **State the method of measuring the responding variable** The waves are freeze by a mechanical stroboscope and the wave length is measured by using metre rule and recorded. **Repeat the experiment at least 2 times** The experiment is repeated with h = 2.0 cm, 3.0 cm, 4.0 cm, 5.0 cm	1
4(c)(vii)	**Tabulating of data** <table><tr><th>Depth/cm</th><th>The wave length/cm</th></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>	1
4(c)(viii)	**State how data will be analysed** Wavelength/cm Depth/cm	1
	TOTAL	12

END OF MARKING SCHEME