YAYASAN PERAK

JABATAN PELAJARAN NEGERI PERAK

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA
NEGERI PERAK 2012

PHYSICS

PAPER 1

One hour fifthteen minutes

DO NOT OPEN THIS BOOKLET UNTIL YOU HAVE BEEN TOLD TO DO SO

INFORMATION FOR CANDIDATES
MAKLUMAT UNTUK CALON

1.   This question paper consists of 50 questions.
      Kertas soalan ini mengandungi 50 soalan

2.   Answer all question
      *Jawab **semua** soalan*

3.   Blacken **only** one space for each question
      *Hitamkan **satu** ruangan sahaja bagi setiap soalan*

4.   A list formulae is provided on page 2
      Satu senarai rumus disediakan di halaman 2

Kertas soalan ini mengandungi 23 halaman bercetak dan 1 halaman tidak bercetak.

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The following information maybe useful. The symbols have their usual meaning
Maklumat berikut mungkin berfaedah. symbol-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. Kinetic energy $= \frac{1}{2}mv^2$

6. Gravitational potential energy $= mgh$

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

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

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

10. Pressure, $p = \dfrac{F}{A}$

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

12. Heat, $Q = mc\theta$

13. Heat, $Q = ml$

14. $P_1 V_1 = P_2 V_2$

15. $\dfrac{V_1}{T_1} = \dfrac{V_2}{T_2}$

16. $\dfrac{P_1}{T_1} = \dfrac{P_2}{T_2}$

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

18. $n = \dfrac{Sin\, i}{Sin\, r}$

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

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

21. Linear magification, $m = \dfrac{v}{u}$

22. $P = \dfrac{1}{f}$

23. $v = f\lambda$

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

25. $n\lambda = d\, Sin\, \theta_n$

26. $Q = It$

27. $E = VQ$

28. $V = IR$

29. $E = V + Ir$

30. Power, $P = IV$

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

32. Efficiency $= \dfrac{I_s V_s}{I_p V_p} \times 100\%$

33. $eV = \dfrac{1}{2}mv^2$

34. $E = mc^2$

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1. The following are three readings, P, Q and R obtained by three different measuring instruments.
   Berikut adalah tiga bacaan P, Q dan R didapati dari tiga alat pengukur yang berlainan.

   | P = 1.15 cm |
   | Q = 1.89 mm |
   | R = 4.2 cm |

   What measuring instrument was used to measure P, Q and R?
   Apakah alat yang digunakan untuk mengukur P, Q dan R?

 | | P | Q | R |
   |---|---|---|---|
   | A | Vernier caliper *Angkup vernier* | Micrometer Screw gauge *Tolok skru mikrometer* | Metre rule *Pembaris meter* |
   | B | Micrometer Screw gauge *Tolok skru mikrometer* | Vernier caliper *Angkup vernier* | Metre rule *Pembaris meter* |
   | C | Micrometer Screw gauge *Tolok skru mikrometer* | Metre rule *Pembaris meter* | Vernier caliper *Angkup vernier* |
   | D | Vernier caliper *Angkup vernier* | Metre rule *Pembaris meter* | Metre rule *Pembaris meter* |

2. Energy = force x distance. The unit for force is kg ms^{-2} and the unit for distance is m, what is the derived unit for energy?
   Tenaga adalah bersamaan dengan daya x sesaran. Unit bagi daya ialah kg ms^{-2} dan unit bagi sesaran ialah m, apakah unit terbitan bagi tenaga?

   A kg ms^{-2}
   B kg m^2 s^{-2}
   C kg m^2 s^2
   D kg m^{-1} s^{-2}

3. In a rifle shooting competition, Suresh was eliminated from the competition because his shots were not accurate even though they were consistent. Which target board below shows the shots made by Suresh?
   Dalam sebuah pertandingan menembak senjata, Suresh disingkirkan daripada pertandingan kerana tembakannya tidak jitu walaupun ianya persis. Papan sasaran yang manakah menunjukkan tembakan yang dilakukan oleh Suresh?

   A

   C

   B

   D

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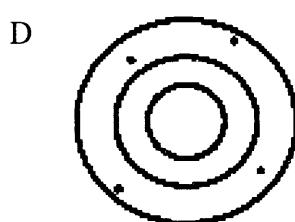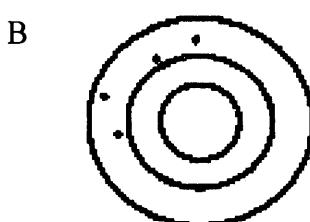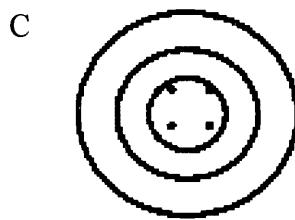
4.   Diagram 4 shows relationship between quantity P and Q
   *Rajah 4 menunjukkan hubungan antara kuantiti P dan Q.*
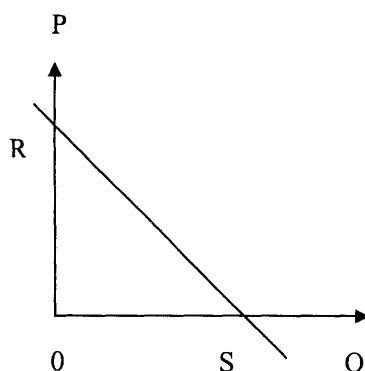
Diagram 4
Rajah 4

Which of the equation shows below is true based on the graph?
Antara berikut yang manakah menunjukkan persamaan yang betul?

A $P = \dfrac{-R}{S} Q + R$

B $P = \dfrac{-R}{S} Q$

C $P = \dfrac{-R}{S} Q + S$

5.   When the car is moving with uniform velocity, its acceleration will be
      Apabila sebuah kereta bergerak dengan halaju seragam, pecutannya akan

A   increase / *bertambah*   C   constant / *tetap*
B   decrease / *berkurang*   D   zero / *sifar*

6.   Diagram 6 shows two trolleys of the same mass approach each other with the same speed
      Rajah 6 menunjukkan dua troli yang sama jisim menuju satu sama lain dengan laju yang sama
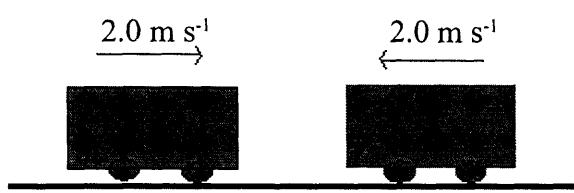

Diagram 6
Rajah 6

What happens to the trolleys after elastic collision?
Apakah yang akan berlaku kepada troli-troli selepas perlanggaran kenyal?

A   The trolleys stop
     Troli-troli itu berhenti
B   The trolleys move off together
     Troli-troli itu bergerak bersama-sama
C   The trolleys move off separately in opposite directions
     Troli-troli itu bergerak berasingan dalam arah berbeza

7. Which of the following situation is not a benefit of impulsive force?
   Antara situasi berikut yang manakah tidak menunjukkan kebaikan daya impuls?

   A   Hammer a nail into a wood
       Menukul paku ke dalam kayu
   B   Hit a ball using a racket
       Memukul bola menggunakan rakat
   C   Collision between two vehicles
       Perlanggaran diantara dua kenderaan
   D   Pushing a needle to sew a button onto a shirt
       Menolak jarum bagi menjahit butang baju

8. Graph shows a motion of a student.
   Graf menunjukkan pergerakan seorang pelajar

   Halaju/*velocity* /ms⁻¹
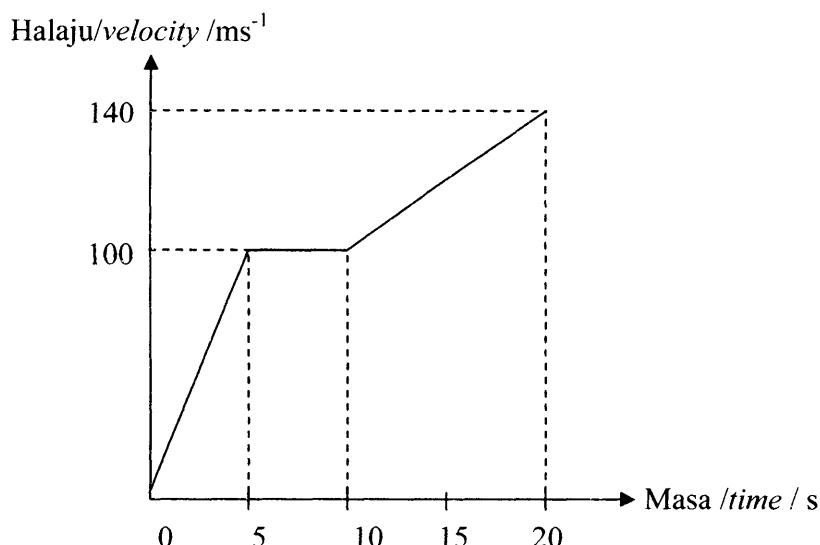
   What is the average velocity of the student?
   Berapakah halaju purata pelajar tersebut?

   A   16.5 m s⁻¹
   B   72.0 m s⁻¹
   C   97.5 m s⁻¹
   D   105.0 m s⁻¹

9. A spring has a force constant of 25 N cm⁻¹. What is the extension of the spring if a load of 50 N is hung from the end of the spring?
   Spring mempunyai pemalar spring 25 N cm⁻¹. Apakah pemanjangan spring jika berat beban 50 N di gantung dari hujung spring tersebut?

   A   2 cm
   B   4 cm
   C   10 cm
   D   100 cm

10. The diagram 10 shows 2 identical springs.
   *Rajah 10 di bawah menunjukkan 2 spring yang serupa.*
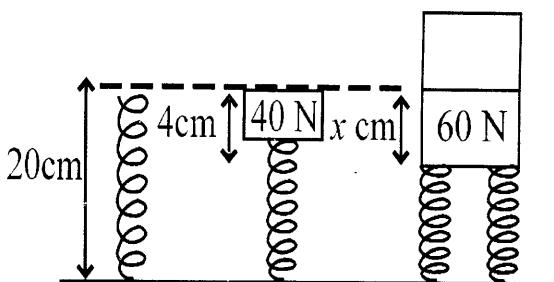
Diagram 10
Rajah 10

Calculate the value of x.
Kirakan nilai x.

A   3 cm
B   4 cm
C   5 cm
D   6 cm

11. Diagram 11 shows a coconut falling down.
   *Rajah 11 menunjukkan sebiji buah kelapa yang sedang jatuh.*
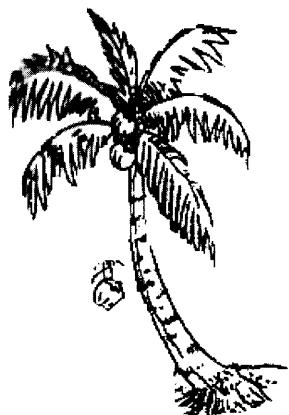
Diagram 11
Rajah 11

Which form of energy is increasing as it falls?
Apakah jenis tenaga yang bertambah semasa ia sedang jatuh?

A   Kinetic / *Kinetik*
B   Potential / *Keupayaan*
C   Chemical / *Kimia*
D   Gravitational / *Graviti*

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12. The functioning of the brake system of a motorcar is based on
    Fungsi sistem brek kereta adalah berasaskan

    A   Principle of conservation of momentum
        Prinsip keabadian momentum
    B   Archimedes' Principle
        Prinsip Archimedes
    C   Pascal's Principle
        Prinsip Pascal
    D   Principle of conservation of energy
        Prinsip keabadian tenaga

80 N   Object P / *Objek P*

X   Y
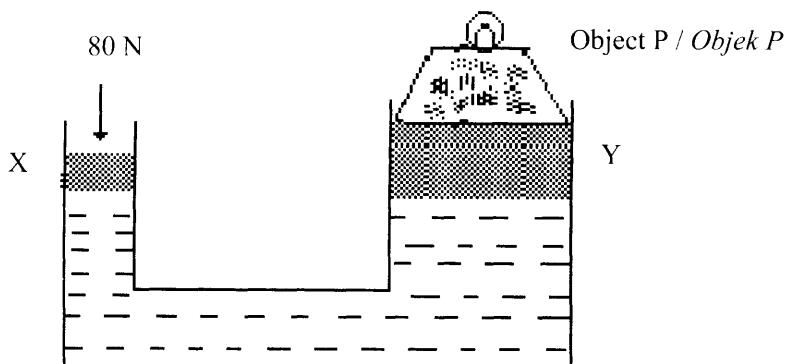
Diagram 12
Rajah 12

13. A force of 80 N is exerted on the liquid surface in column X through a piston which has a surface area of 0.03 m². What is the mass of the object P that can be supported by a larger piston which has a surface area of 0.90 m² in column Y?
    Daya 80 N dikenakan ke atas permukaan cecair pada turus X menggunakan omboh yang mempunyai luas permukaan 0.03 m². Berapakah nilai jisim object P yang boleh disokong oleh omboh besar yang mempunyai luas permukaan sebanyak 0.90 m² di turus Y?

    A   3.2 x 10² kg   C   2.0 x 10² kg
    B   2.4 x 10² kg   D   1.2 x 10² kg

14. Diagram 14 shows water rising up the tube X, Y and Z if the air is blown.
   *Rajah 14 menunjukkan aras air menaiki saluran X, Y and Z jika udara ditiup.*

X   Y   Z
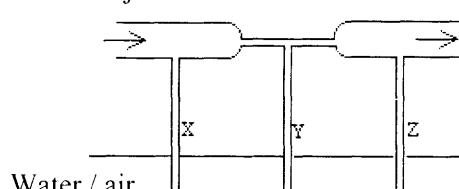
Water / air
Diagram 14
Rajah 14

Which of the following is true regarding the water level, h in the tube X, Y and Z?
*Yang manakah antara berikut yang benar mengenai aras air, h di dalam saluran X, Y dan Z?*

    A $h_x > h_y > h_z$
    B $h_y > h_x > h_z$
    C $h_y > h_z > h_x$
    D $h_z > h_y > h_x$

15. Which of the following applications is based on Bernoulli's principle?
   Yang manakah antara aplikasi berikut yang berdasarkan prinsip Bernoulli?

   A Syringe / *Picagari*
   B Perfume spray / S*pray minyak wangi*
   C Vacuum cleaner / *Peyedut hampagas*
   D Fortin barometer / *Barometer fortin*

16. The following diagrams show four different postures of an elephant performing in a circus. Which postures exerts the maximum pressure on the floor?
   Rajah berikut menunjukkan empat posisi berbeza gajah yang sedang membuat persembahan sarkas. Posisi yang manakah mengenakan tekanan maksimum di atas lantai?

   A
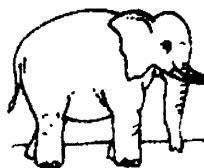
   B
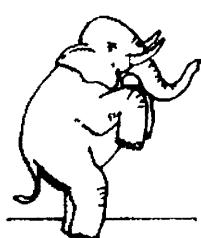
   C
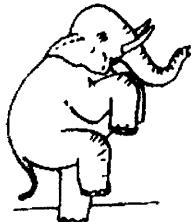
   D

17. Diagram 17 shows a coconut floating in the water.
   Rajah 17 menunjukkan sebiji buah kelapa terapung di atas permukaan air.
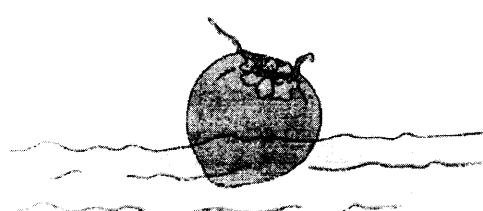
   Diagram 17
   Rajah 17

   Which statement is not true about the coconut?
   Manakah penyataan yang tidak benar mengenai buah kelapa?

   A The weight of the coconut is equal to the buoyant force.
      Berat buah kelapa sama dengan daya apungan
   B The weight of the coconut is equal to the weight of the water displaced.
      Berat buah kelapa sama dengan berat air tersesar
   C The volume of the coconut is equal to the volume of the water displaced.
      Isipadu buah kelapa sama dengan isipadu air tersesar
   D The weight of the water displaced by the coconut is equal to the buoyant force.
      Berat air yang disesarkan oleh buah kelapa adalah sama dengan daya apungan

18. Diagram 18 shows a load hung from a spring balance is slowly submerged in water until it is immersed completely.

    Rajah 18 menunjukkan pemberat yang digantung pada neraca spring ditenggelamkan dengan perlahan sehingga ia sepenuhnya terendam di dalam air.
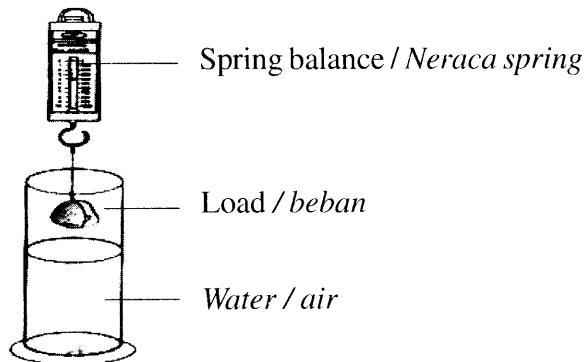
Diagram 18
Rajah 18

What will happen to the spring balance reading?
Apakah yang akan berlaku kepada bacaan neraca spring?

A   Increase / *Bertambah*
B   Decreases until zero / *Berkurang sehingga kosong*
C   Remains unchanged / *Tidak berubah*
D   Decreases until reaches a constant value / *Berkurang sehingga mencapai nilai tetap.*

19. The graph shows the heating curve of a substance.
    Graf menunjukkan lengkung pemanasan suatu bahan.
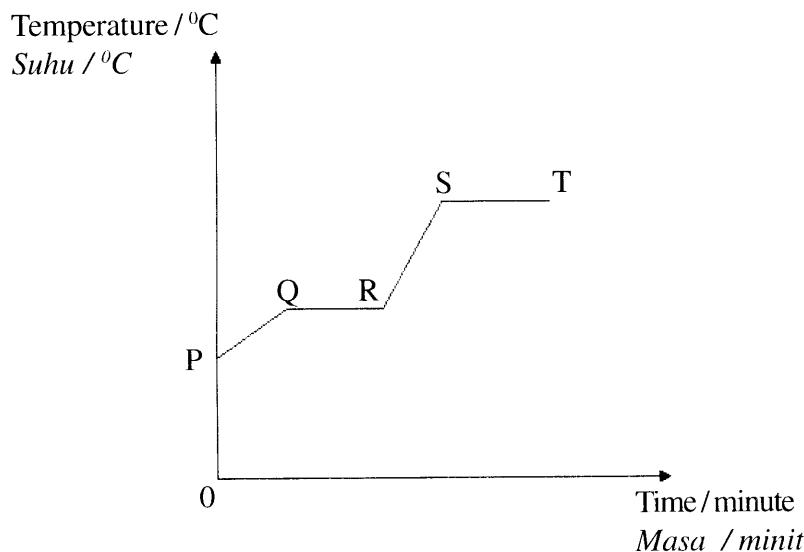
At which stage is the substance in the liquid and gaseous state at the same time?
Pada peringkat manakah bahan itu berada dalam keadaan cecair dan gas pada masa yang sama?

A   PQ
B   QR
C   RS
D   ST

20. At the start of a long journey, the pressure in a car tyre is measured to be 200 kPa. The pressure is measured again at the end of the journey and it is found to have increased to 215 kPa. If the temperature at the start of the journey is 27°C, what is its temperature at the end of the journey?
Pada permulaan perjalanan yang jauh, tekanan dalam tayar kereta diukur sebanyak 200kPa. Tekanan tersebut diukur semula pada penghujung perjalanan dan nilai tersebut telah bertambah kepada 215 kPa. Jika suhu pada awal perjalanan ialah 27°C, berapakah nilai suhu pada penghujung perjalanan?

A   35.0 °C
B   45.5 °C
C   49.5 °C
D   54.5 °C

21. Diagram 21 shows object L and object M are of temperature T_1 and T_2 respectively. There is a net flow of heat from L to M until thermal equilibrium is reached at a temperature T.
Rajah 21 menunjukkan objek L and objek M masing-masing berada pada suhu T_1 dan T_2. Haba berlebihan mengalir daripada L ke M sehingga keseimbangan terma tercapai pada suhu T.
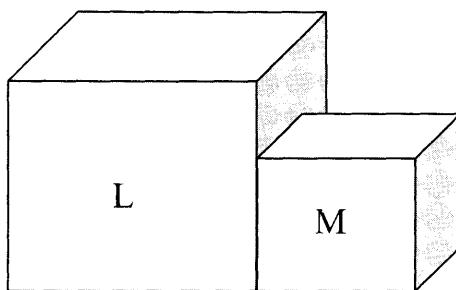

Diagram 21
Rajah 21

Which sequence between T_1, T_2 and T is true?
Susunan antara T_1, T_2 dan T yang manakah betul?

A $T_1 > T_2 > T$
B $T_2 > T_1 > T$
C $T_1 > T > T_2$
D $T_2 > T > T_1$

22. Diagram 22 represents two beakers containing liquid W and liquid X respectively. Each liquid is receiving the same amount of heat energy Q.
Rajah 22 menunjukkan dua bikar yang mengandungi cecair W dan cecair X. Setiap cecair menerima haba Q yang sama.


Mass/ *jisim* = 2m
Temperature rise = T
Kenaikan suhu

Mass/ *jisim* = m
Temperature rise = 2T
Kenaikan suhu
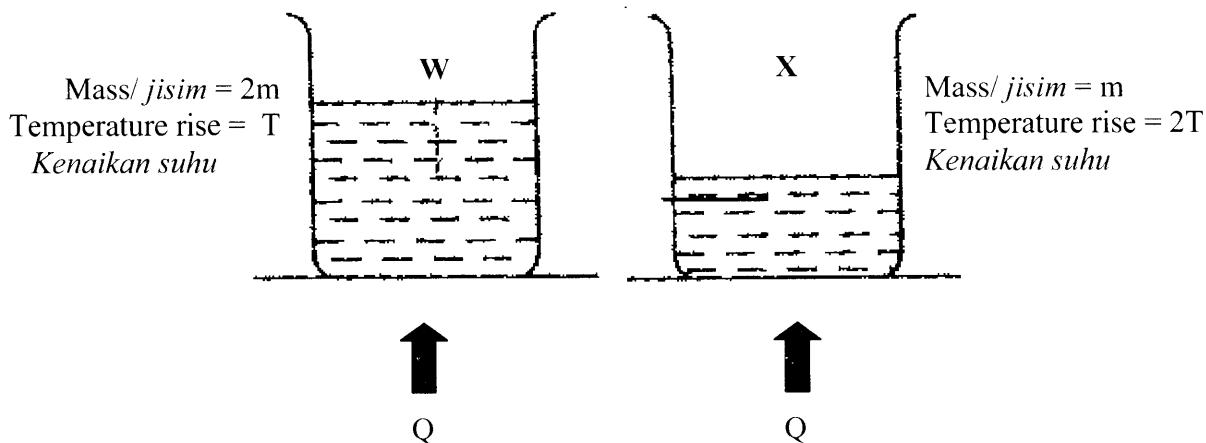
Diagram 22
Rajah 22

Which statement about W and X is correct?
Penyataan yang manakah benar mengenai W dan X?

A   The specific heat capacity of W is half the specific heat capacity of X.
Muatan haba tentu W adalah separuh daripada muatan haba tentu X.
B   The specific heat capacity of W is twice the specific heat capacity of X.
Muatan haba tentu W adalah dua kali ganda daripada muatan haba tentu X.
C   The specific heat capacity of W is the same as the specific heat capacity of X.
Muatan haba tentu W adalah sama dengan muatan haba tentu X.

23. Hot water at 100 °C is added to 5 g of ice at 0 °C. What is the minimum mass of hot water needed to melt the ice?
[Specific latent heat of fusion of ice is $3.36 \times 10^5 J\ kg^{-1}$]
[Specific heat capacity of water is $4.2 \times 10^3 J\ kg^{-1}\ °C^{-1}$]
Air panas pada suhu 100 °C dicampurkan kepada 5 g ais pada suhu 0 °C. Berapakan jisim minimum air panas yang diperlukan untuk mencairkan ais?
[Haba pendam tentu pelakuran ais $3.36 \times 10^5 J\ kg^{-1}$]
[Muatan haba tentu air $4.2 \times 10^3 J\ kg^{-1}\ °C^{-1}$]

A 8.0×10^{-4} kg
B 4.0×10^{-3} kg
C 1.68×10^{-2} kg
D 7.06×10^{-2} kg

24. Which of the following is a characteristic of the image formed by a concave lens?
Antara berikut yang manakah ciri imej yang terbentuk oleh kanta cekung?

A   Virtual / *Maya*
B   Inverted / *Tersongsang*
C   Magnified / *Dibesarkan*

25. Diagram 25 shows an image formed by a plane mirror. Where is the object placed?
    Rajah 25 menunjukkan satu imej dihasilkan oleh satu cermin satah. Di manakah objek itu mesti diletakkan?

A   D

D   B

                                 Image / *imej*
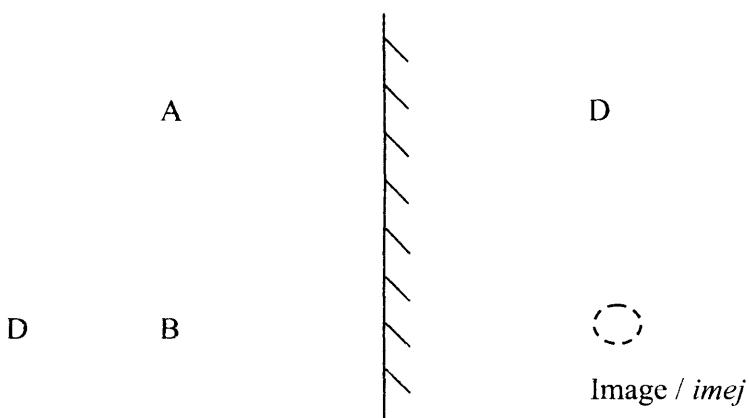
Diagram 25
Rajah 25

26 Diagram 26 shows a ray of light in air entering a semi-circular glass block at an angle of incidence $42°$. Which diagram shows the correct path of the ray?
    Rajah 26 menunjukkan satu sinar cahaya dalam udara memasuki sebuah blok kaca semi bulatan pada sudut tuju $42°$. Rajah manakah yang betul menunjukkan lintasan sinar itu?

ray
sinar   A

        $42°$

                                  B

                            semi-circular glass block
                            blok kaca semi bulatan

D   C
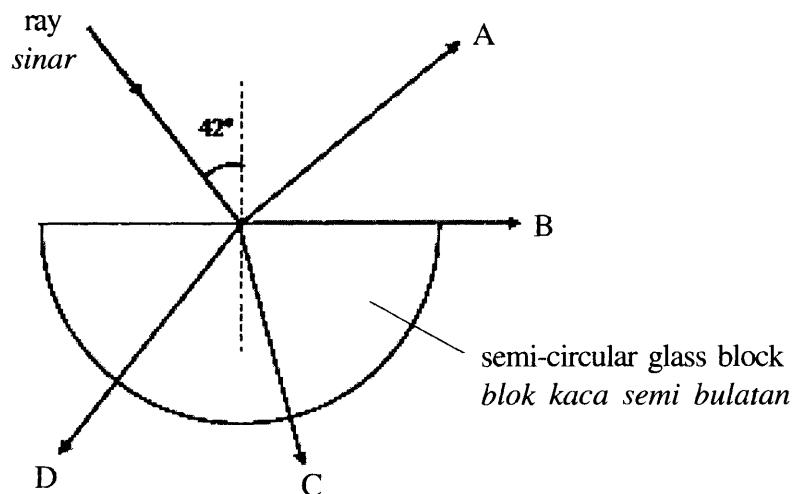
Diagram 26
Rajah 26

27 In the following ray Diagram 27, the image is formed in front of a screen.
Which of the following changes will produce a sharp image on the screen?
Dalam rajah sinar berikut, imej dihasilkan di hadapan skrin.
Antara berikut, yang manakah perubahan yang akan menghasilkan satu imej yang jelas pada skrin?

Screen / *Skrin*

Lense / *kanta*

Object / *Objek*

F F
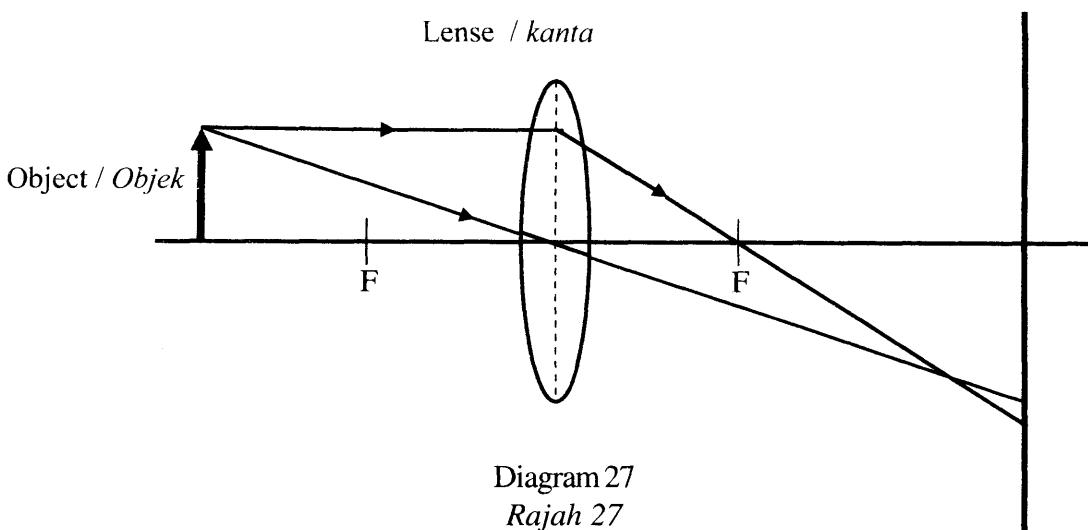
Diagram 27
Rajah 27

A Move the lens closer to the object.
Gerakkan kanta itu lebih dekat dengan objek

B Move the object further from the lens
Gerakan objek itu lebih jauh daripada kanta

C Replace the lens with another concave lens of shorter focal length
Gantikan kanta dengan sebuah kanta cekung yang mempunyai jarak fokus lebih pendek

28 Diagram 28 shows the path of light from P to O parallel to the principal axis.
Rajah 28 menunjukkan lintasan cahaya dari P ke O selari dengan paksi utama.

D

C

O

P

C

F F

A B

C
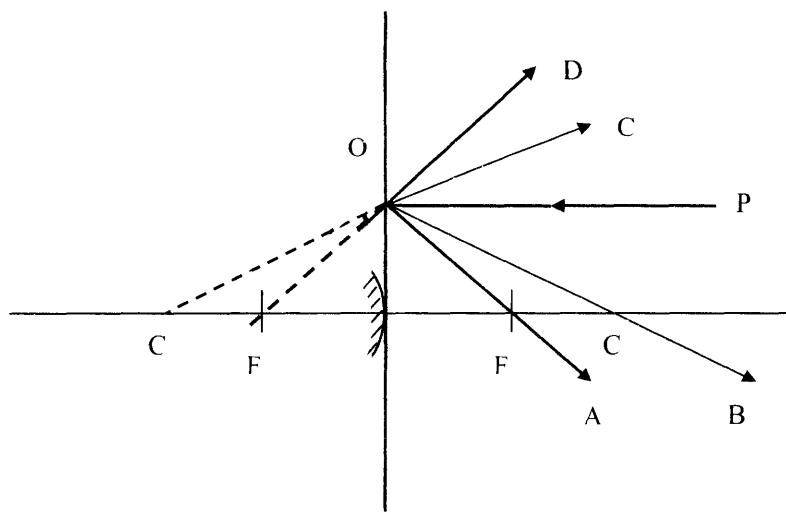
Convex mirror / *Cermin cembung*

Diagram 28
Rajah 28

Which is the correct reflected ray from the convex mirror?
Sinar pantulan yang manakah betul dari cermin cembung itu?

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29 A transverse wave and a longitudinal wave can only be differentiated by direction of propagation and
Gelombang melintang dan gelombang membujur hanya boleh dibezakan melalui arah perambatan dan

    A   amplitude / *amplitud*
    B   frequency / *frekuensi*
    C   wavelength / *jarak gelombang*
    D   vibration of particles / *getaran zarah medium*

30. Diagram 30 shows plane waves moving towards a slit.
    Rajah 30 menunjukkan gelombang satah bergerak menuju satu celah.
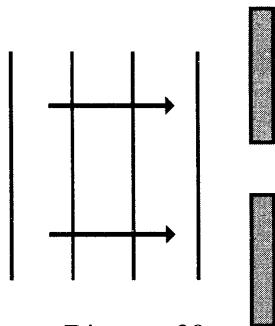
Diagram 30
Rajah 30

The motion of the waves through the slit will cause a change in the
Gerakan gelombang melalui celah itu akan menyebabkan perubahan pada

    A   Amplitude / *Amplitud*
    B   Frequency / *Frekuensi*
    C   Wave speed / *Laju gelombang*
    D   Wavelength / *Panjang gelombang*

31.   Diagram 31 shows plane waves head towards the border *XY* in a ripple tank.
      Rajah 31 menunjukkan gelombang satah menuju ke sempadan XY dalam satu tangki riak.
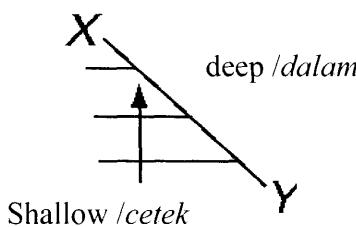
Diagram 31
Rajah 31

Which diagram gives the representation of the wave pattern in the tank after the waves cross border *XY*?
Manakah diantara rajah berikut mewakili corak gelombang selepas melintasi XY?
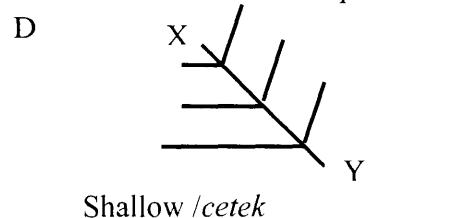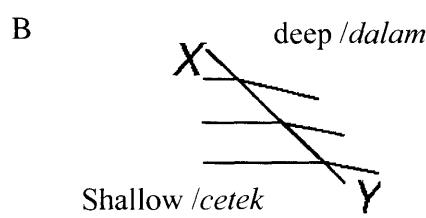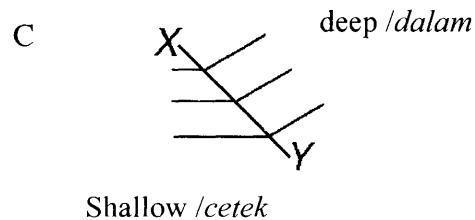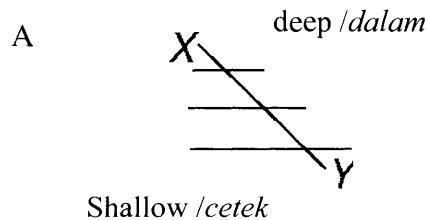
32.   Which diagram gives the **best** representation of the wave pattern after the waves have gone through a slit in which the width of the slit is less than the wave length?
      *Manakah rajah berikut yang **terbaik** mewakili bentuk gelombang selepas melalui celahan lebar celahan lebih kecil daripada panjang gelombang?*
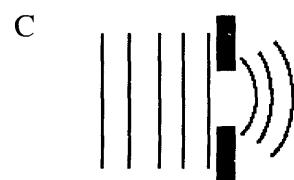
33. The Young double-slit interference experiment is carried out to determine the wavelength of yellow light. The separation distance of the two slits is 0.4 mm, the distance between the screen and the two slits is 3 m, and the separation distance between two consecutive bright fringes is 4 mm. What is the wavelength of the yellow light?

   Ujikaji Dwicelah Young dilakukan bagi mengira panjang gelombang cahaya kuning. Jarak antara celah ialah 0.4 mm, Jarak antara skrin dengan celah ialah 3 m. Jarak diantara dua pinggir cerah berturutan ialah 4 mm. Berapakah panjang gelombang cahaya kuning?

   A 1.20×10^{-7} m
   B 1.60×10^{-7} m
   C 4.80×10^{-7} m
   D 5.33×10^{-7} m

34. Which of the following graphs represents the relationship between λ and f for electromagnetic waves that are moving in a vacuum?

   Manakah antara graf berikut mewakili hubungan antara λ dand f bagi gelombang elektromagnet yang bergerak dalam vakum

   A

   C

   B

   D
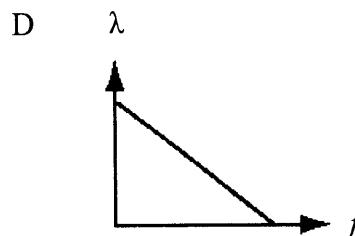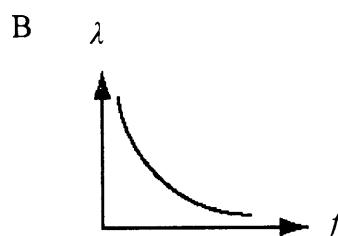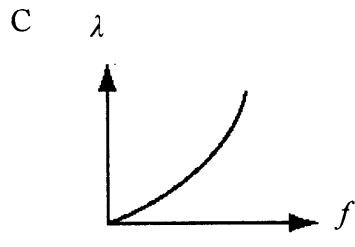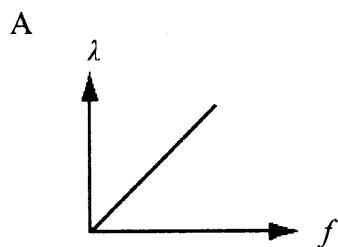
35. Electrical energy is transmitted at a high voltage because this high voltage
   Tenaga elektrik dihantar pada voltan tinggi kerana

   A   is less dangerous
       kurang bahaya
   B   is required by a lot of equipments
       diperlukan oleh banyak alat
   C   reduces the resistance of the cable
       mengurangkan rintangan kabel
   D   causes the transmitting current to be small
       menyebabkan arus dialirkan menjadi kecil

36. The electromotive force (emf) of a cell is 1.5 V. This means that the cell can supply 1.5
Daya gerak elektrik sel ialah 1.5 V. ini bermakna sel boleh membekalkan 1.5

    A   Coulombs of charge
        Coulombs cas
    B   Joules of energy
        Joules tenaga
    C   Joules of energy per amperes of current it delivers
        Joules tenaga per ampere arus dialirkan
    D   Joules of energy per coulomb of charge it delivers.
        Joule tenaga per coulomb cas dialirkan

37. Diagram 37 shows a high resistance voltmeter is placed in the circuit.
Calculate the voltage V if the electromotive force of the cells is 12 V and the internal resisitance
is 1 Ω.
Rajah 37 menunjukkan voltmeter perintang tinggi di dalam satu litar.
Hitungkan bacaan voltmeter jika daya gerak elektrik sel 12 V dan rintangan dalam 1 Ω.
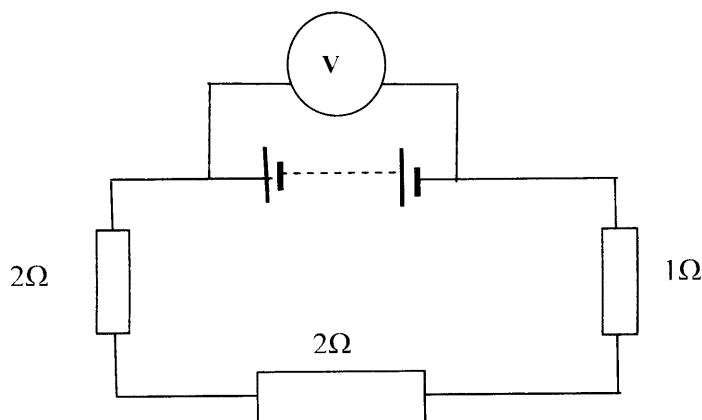
Diagram 37
Rajah 37

    A   2.0 V
    B   2.4 V
    C   10.0 V
    D   12.0 V

38.   Diagram 38 shows the structure of an electric motor
      Rajah 38 menunjukkan struktur binaan sebuah motor elektrik
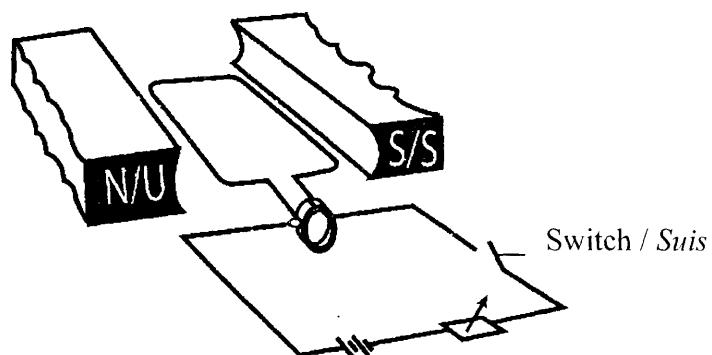
Diagram 38
Rajah 38

Which magnetic field pattern is produced when the switch is closed?
Corak medan magnet yang manakah terbentuk apabila suis dihidupkan

A

B

C

D
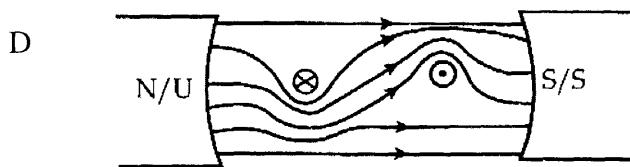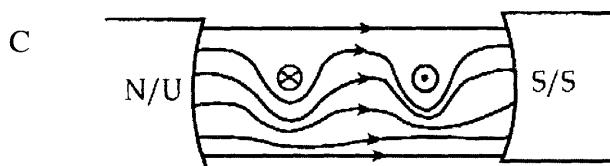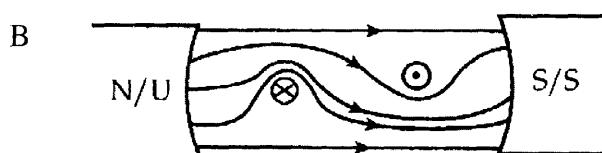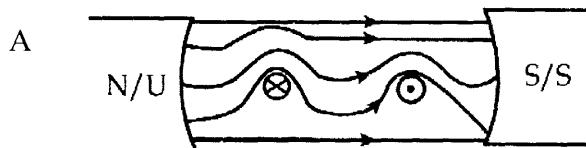
39. Diagram 39 shows a magnet oscillating in a solenoid.
     Rajah 39 menunjukkan sebatang magnet yang berayun didalam solenoid.
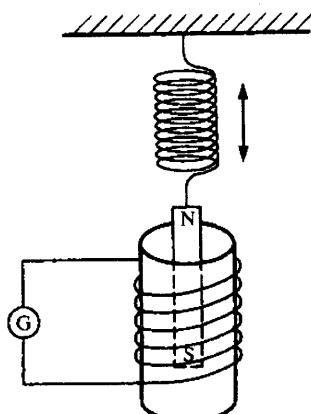
Diagram 39
Rajah 39

Which of these will **NOT** increase the deflection of the galvanometer pointer?
*Manakah berikut **TIDAK** akan menambah pesongan penunjuk galvanometer?*

A   Reversing the polarity of the magnet
     Menukar kutub magnet
B   Decreasing the diameter of the solenoid
     Mengurangkan diameter salenoid
C   Increasing the number of coils in the solenoid
     Menambah bilangan lilitan pada salenoid
D   Increasing the oscillation speed of the magnet.
     Menambah laju ayuanan magnet

40. Why is soft iron used in the core of a transformer?
     Mengapa besi lembut digunakan sebagai teras di dalam transformer?

A   It has a low electrical resistance.
     Ia mempunyai rintangan rendah
B   It conducts the induced current very well.
     Ia mengalirkan arus aruhan dengan baik.
C   It will not easily get hot when induced current increases,
     Ia tidak mudah panas bila arus aruhan bertambah.
D   It reduces the lost of magnetic flux linkage between the two coils.
     Ia mengurangkan kehilangan fluk magnet antara dua gegelung.

41. The function of a transformer in an electrical energy transmission system is to
     Fungsi sebuah transformer dalam sistem penghantaran tenaga elektrik adalah untuk

A   Increase the power
     Meningkatkan kuasa
B   Reduce the resistance
     Merendah rintangan
C   Change the voltage
     Mengubah voltan
D   Speed up the time of transmission
     Mempercepatkan masa penghantaran

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             http://fb.me/edu.joshuatly

42. Which type(s) of transformer(s) are used when power is transmitted from the power stations to the consumers?
Apakah jenis transformer yang digunakan untuk penghantaran elekktrik dari stesen kuasa kepada pengguna

    A   Step-up transformer only
        Transformer injak naik sahaja
    B   Step-down transformer only
        Transformer injak turun sahaja
    C   Step-up and step-down transformer only
        Transformer injak naik dan injak turun sahaja.

43. What is the function of a diode?
Apakah fungsi diod?

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

44. Which of the following electronic component can store charge and also smoothen the output current after rectification?
Antara komponen elektronik berikut yang manakah boleh menyimpan cas dan juga berfungsi perata arus dalam litar rektifikasi?

    A   Resistor
        Perintang
    B   Capasitor
        Kapasitor
    C   Diode
        Diod
    D   Thermistor
        Termistor

45. Diagram 45 shows a logic gate P and its truth table.
    Rajah 45 menunjukkan sebuah get logic P dan jadual kebenarannya
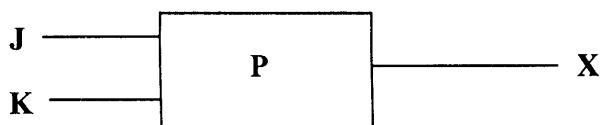
Input		Output
J	**K**	**X**
0	0	1
0	1	1
1	0	1
1	1	0

Diagram 45
Rajah 45

Name the logic gate P.
Namakan get logic P.

A   OR gate
    Get ATAU
B   AND gate
    Get DAN
C   NAND gate
    Get TAKDAN
D   NOR gate
    Get TAKATAU

46. The adding of impurity into pure semiconductor material is known as
    Penambahan bendasing ke dalam bahan semikonduktor tulen dikenali sebagai

A   Doping
    Pendopan
B   rectification
    rektifikasi
C   Amplification
    amplifikasi
D   Thermionic emission
    Pancaran termion

47. Diagram 47 shows a logic gate circuit with input signals X and Y.
    Rajah 47 menunjukkan satu litar get logic dengan isyarat input X dan Y.

Input
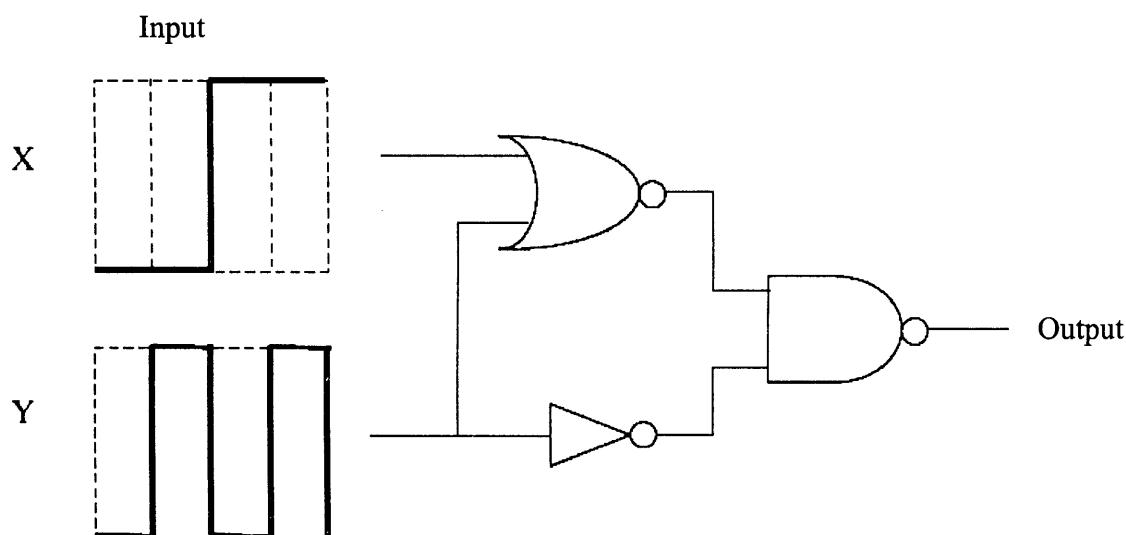
Diagram 47
Rajah 47

Which output signal produced by the logic gate circuit ?
Isyarat output yang manakah dihasilkan oleh litar get logic itu?
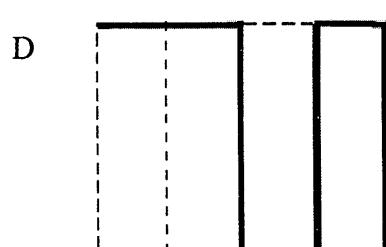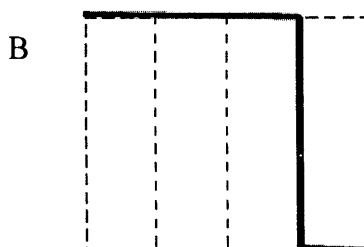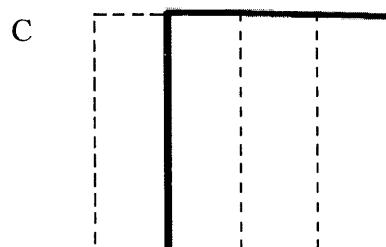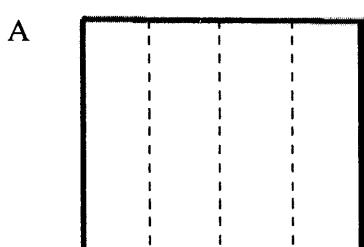
48. Which nuclide has the largest number of neutrons?
    Nuklida yang manakah mempunyai bilangan neutron yang paling banyak?

A $^{1}_{1}H$

B $^{4}_{2}He$

C $^{7}_{3}Li$

D $^{9}_{4}Be$
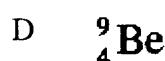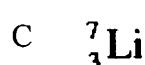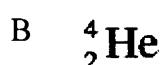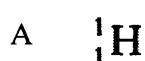
49. Diagram 49 shows three type of radioactive rays, X, Y and Z directed towards a sheet of paper, a sheet of aluminium and a sheet of lead.
   Rajah 49 menunjukka tiga jenis sinaran radioaktif X, Y dan Z dihalakan kepada kepingan kertas, kepingan aluminium dan kepingan plumbum.

Kertas   Aluminium
Paper   *Aluminium*

Diagram 49
Rajah 49
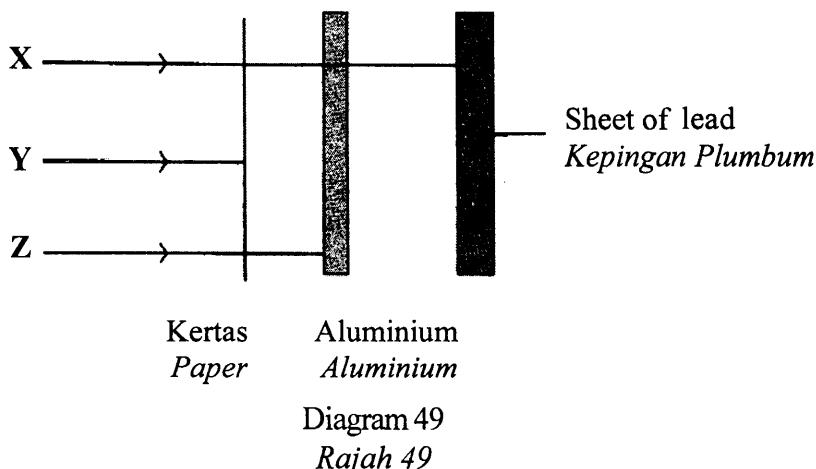
Which of the following rays are represented by X, Y and Z?
Antara sinaran berikut, yang manakah diwakili oleh X, Y dan Z?

	X	Y	Z
A	Alpha *Alfa*	Gamma *Gama*	Beta *Beta*
B	Beta *Beta*	Alpha *Alfa*	Gamma *Gama*
C	Gamma *Gama*	Alpha *Alfa*	Beta *Beta*
D	Gamma *Gama*	Beta *Beta*	Alpha *Alfa*

50. When a sample of Radium-226 decays, the energy released is 7.81×10^{-13} J
   What is mass defect?
   [Speed of light, $c = 3.0 \times 10^8$]
   Apabila satu sample Radium-226 mereput, tenaga yang dibebaskan ialah 7.81×10^{-13} J
   Berapakah cacat jisim?
   [Laju cahaya, $c = 3.0 \times 10^8$]

   A 8.68×10^{-30} kg
   B 2.60×10^{-21} kg
   C 3.84×10^{20} kg
   D 1.15×10^{29} kg

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

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4531/2
PHYSICS
Paper 2
Ogos/Sept.
2012
2½ hour

Name : ....

Class : ....

يايا ســن قيراق
YAYASAN PERAK

JABATAN PELAJARAN NEGERI PERAK

PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA
NEGERI PERAK 2012

PHYSICS

PAPER 2

Two hours thirty minutes

DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO

1. Write your **name** and **form** in the space provided.
   Tuliskan nama dan tingkatan dalam ruang yang disediakan

2. This question paper consist of three section:
   Section A, Section B and **Section C.**
   Kertas soalan ini mengandungi mengandungi 3 bahagian: **bahagian A, bahagian B dan bahagian C**

3. Answer all question in **section A**
   Jawab semua soalan bahagian A

4. Answer one question from **section B** and one question from **section C**
   Jawab satu soalan bahagian B dan satu soalan bahagian C.

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

Kertas soalan ini mengandungi 24 halaman bercetak.

The following information maybe useful. The symbols have their usual meaning
Maklumat berikut mungkin berfaedah. Symbol-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. Kinetic energy $= \frac{1}{2}mv^2$

6. Gravitational potential energy $= mgh$

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

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

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

10. Pressure, $p = \dfrac{F}{A}$

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

12. Heat, $Q = mc\theta$

13. Heat, $Q = ml$

14. $P_1 V_1 = P_2 V_2$

15. $\dfrac{V_1}{T_1} = \dfrac{V_2}{T_2}$

16. $\dfrac{P_1}{T_1} = \dfrac{P_2}{T_2}$

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

18. $n = \dfrac{Sin\,i}{Sin\,r}$

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

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

21. Linear magification, $m = \dfrac{v}{u}$

22. $P = \dfrac{1}{f}$

23. $v = f\lambda$

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

25. $n\lambda = d\,Sin\,\theta_n$

26. $Q = It$

27. $E = VQ$

28. $V = IR$

29. $E = V + Ir$

30. Power, $P = IV$

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

32. Efficiency $= \dfrac{I_s V_s}{I_p V_p} \times 100\%$

33. $eV = \dfrac{1}{2}mv^2$

34. $E = mc^2$

Section A
Bahagaian A
[60 marks/*markah*]

1. Diagram 1.1 shows the total thickness of 150 pieces of paper which was measured using instrument X. The thickness was found to be 0.95 cm.
   Rajah 1.1 menunjukkan jumlah ketebalan 150 helai kertas yang diukur menggunakan alat X. Ketebalan ukuran ialah 0.95 cm.

0.95 cm
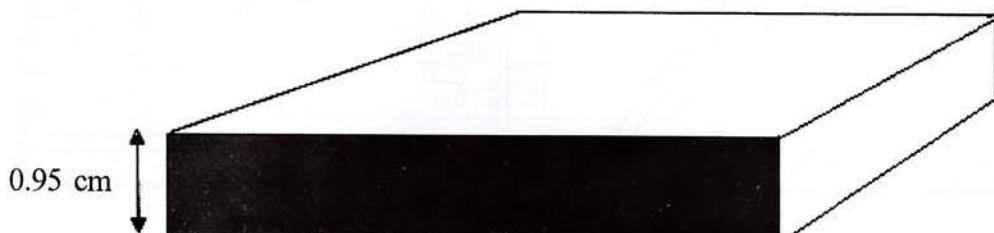
Diagram/Rajah 1.1

(a) Name the instrument X.
   Namakan alat X.

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

(b) What is the advantage of using the method?
   Apakah kebaikan menggunakan kaedah itu?

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

(c) Suggest other suitable instrument to measure the thickness of the paper.
   Cadangkan satu alat lain yang lebih sesuai untuk mengukur ketebalan kertas?

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

(d) Calculate the average thickness of a piece of paper.
   Hitung purata ketebalan sekeping kertas?

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

2.   Diagram 2.1 shows a water supply system.
      Rajah 2.1 menunjukkan sistem bekalan air.
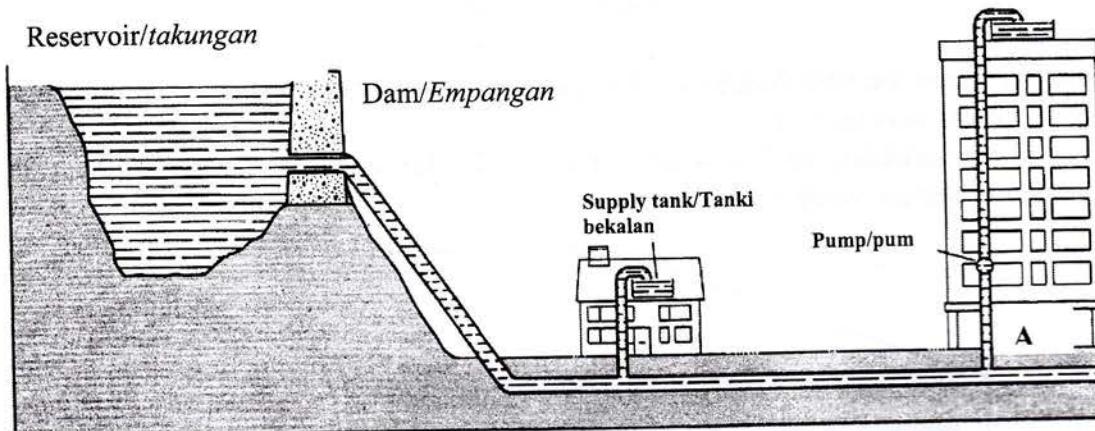
Diagram/Rajah 2.1

Water held in a high reservoir is fed along pipes to houses at lower levels
Air pada takungan tinggi di salurkan ke paip-paip rumah pada paras yang lebih rendah

(a)   Why it is necessary for a water pump to be fitted to the multistory building.
       Mengapakah perlu pam air dipasang pada bangunan tinggi?

       ....

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

(b)   (i)   Calculate the pressure of the water at the point **A** if the height of the building
              is 100 m.
              *Hitungkan tekanan air pada titik **A** jika ketinggian bangunan 100m*

                                                                                                  [2 marks/*markah*]

       (ii)   The occupants at higher floors of a building always complain about low water pressure.
              Give a reason for the low water pressure.
              *Penghuni pada tingkat yang lebih tinggi selalu mengadu tentang tekanan air yang
              rendah. Beri satu sebab mengapa tekanan air rendah?*

              ....

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

(c)   Diagram 2.2 shows the pressure of water is transmitted equally in all direction.
   *Rajah 2.2 menunjukkan air dipindah sama pada semua arah*
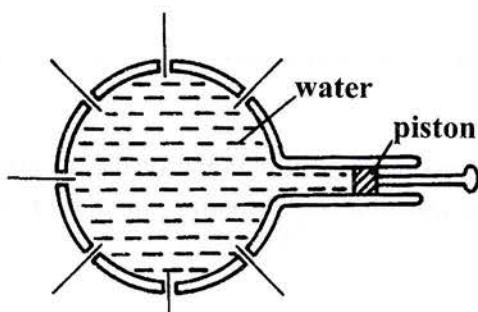
Diagram/Rajah 2.2

Name the physics principle in the above observation.
Namakah prinsip fizik dalam pemerhatian di atas.

....

[1 mark/*markah*]

3   Diagram 3 shows an air bubble released by a diver at position X which then rises up to
    position Y.
    Rajah 3 menunjukkan satu gelembung udara yang dilepaskan oleh seorang penyelam pada
    kedudukan X dan bergerak ke arah Y.
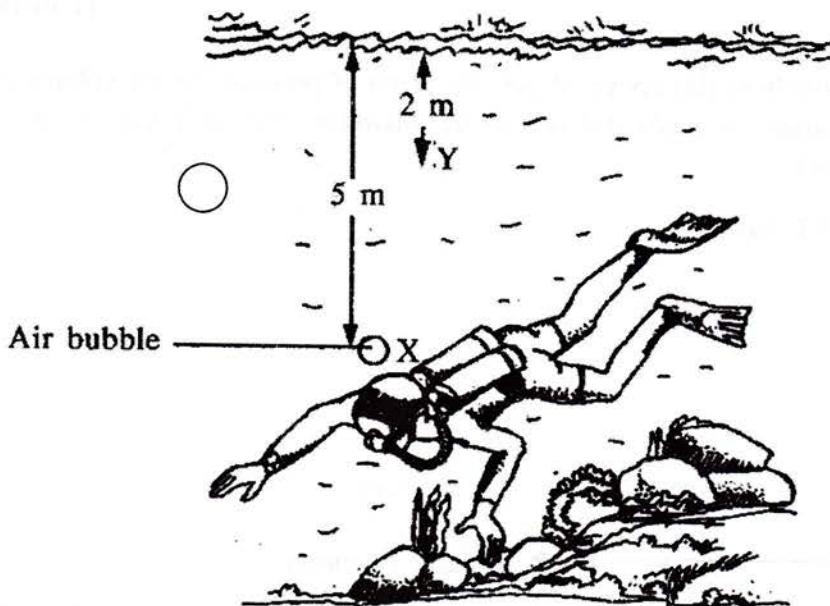
Diagram/Rajah 3

(a)   Based on the observation of the air bubble in Diagram 3,
      Berdasarkan pemerhatian gelembung udara pada Rajah 3,

      (i)   compare the volume of the air bubble at X and Y
            bandingkan isipadu gelembung udara pada kedudukan X dan Y.

....

[1 mark/*markah*]

(ii) compare the pressure of the air bubble at X and Y
      bandingkan tekanan gelembung udara pada kedudukan X dan Y.

....

[1 mark/*markah*]

(iii) relate the changes of the pressure and the volume of the air bubble at X and Y
      hubungkaitkan perubahan tekanan dan isipadu gelembung udara pada kedudukan X dan Y.

....

[1 mark/*markah*]

(iv) Name the physics law which is involved in the above observation.
      Namakan hukum fizik yang terlibat dalam pemerhatian di atas.

....

[1 mark/*markah*]

(v)   state **one** assumption made in the physics law in (a) (iv) above.
      *Nyatakan **satu** andaian yang dibuat dalam hukum (a) (iv) di atas.*

....

[1 mark/*markah*]

(b) Using your answer in (a)(iii) above, sketch the graph of pressure against volume of the gas.
     Menggunakan jawapan anda dalam (a)(iii), lakarkan graf tekanan melawan isipadu untuk gas tersbut.

Pressure / *Tekanan*

Volume / *Isipadu*
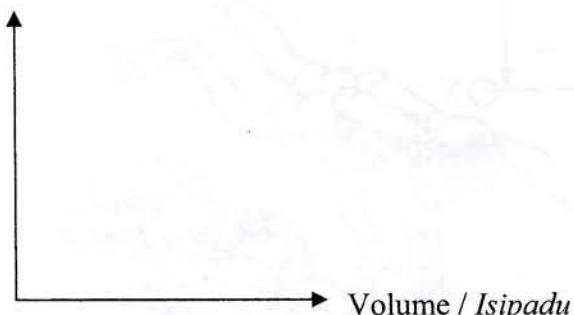
[1 mark/*markah*]

4.   Diagram 4 shows two block P and Q of masses 2m kg and 3m kg respectively tied with a string.
     The spring which attached to block P is compressed to 12 cm.
     Rajah 4 menunjukkan 2 bongkah P dan Q berjisim 2m kg dan 3m kg diikat dengan tali.
     Spring yang dihubungkan pada blok P dimampatkan kepada 12 cm.

String / *tali*

P   Q

2m   -000000000000   3m

←——— 12 cm ———→   Smooth floor
                                    Lantai licin
Diagram/*Rajah* 4
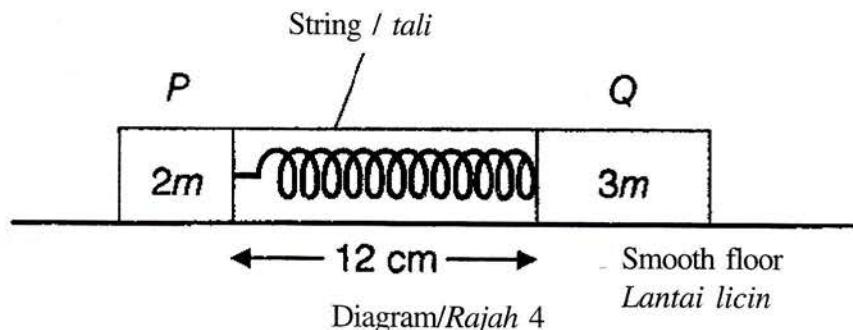
(a)   Given that the original length of the spring is 20 cm and the force constant, *k* for the spring
      is 5000 *N m⁻¹*
      Find the elastic potential energy stored in the spring.
      Diberi panjang asal spring ialah 20 cm, pemalar spring k ialah 5000 N m⁻¹
      Tentukan tenaga keupayaan kenyal yang tersimpan dalam spring.

[2 marks/*markah*]

(b)   The string is cut and P and Q are pushed apart from each other.
      Tali itu terputus, P dan Q menolak menjauhi antara satu sama lain.

      (i)   Name the physics principle in this motion.
            Namakan prinsip fizik dalam gerakan ini.

            ....

[1 mark/*markah*]

      (ii) If Q moves at a speed of 6 ms⁻¹, determine the speed of P.
            Jika Q bergerak dengan laju 6 ms⁻¹, tentukan laju P.

[2 marks/*markah*]

(c)   Determine the value of m.
       Tentukan nilai m.

[2 mark/*markah*]

5.   Diagram 5.1 shows a driver who is driving under the hot sun, sees a pool of water appearing on
      the road ahead, but the pool of water disappears as the car approaches it.
      *Rajah 5.1 menunjukkan seorang pemandu yang sedang memandu pada hari yang panas,
      ternampak tompokan air di hadapan, tetapi tompokan air itu hilang apabila pemandu itu
   menghampirinya.*
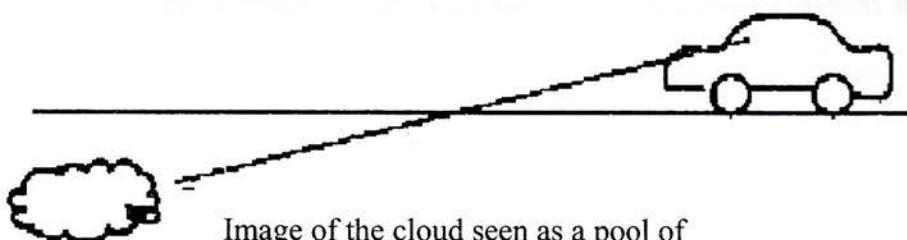
Image of the cloud seen as a pool of
of water .
*Imej awan kelihatan seperti
tompokan air.*

Diagram/*Rajah* 5.1

(a)   Name this natural phenomenon as observed by the driver.
       Namakan fenomena semula jadi ini.

....

[1 mark/*markah*]

(b)   State the physics concept that is involved in this phenomenon.
       Nyatakan konsep fizik yang terlibat dalam fenomena ini.

....

[1 mark/*markah*]

(c)   State the two conditions for the physics concept in (b) to occur?
       Nyatakan dua syarat yang diperlukan untuk berlakunya konsep dalam (b)?

   (i)   ....

       (ii) ....

[2 marks/*markah*]

(d) (i) Compare the density of cool air and warm air?

Bandingkan ketumpatan udara sejuk dan udara panas.

....

[1 mark/*markah*]

(ii) When light rays propagates from a denser medium to a less dense medium, state what happen to the direction of the refracted rays.

Apabila cahaya merambat dari medium lebih tumpat ke medium kurang tumpat, apakah yang akan berlaku kepada arah perambatan gelombang cahaya yang terbias

....

[1 mark/*markah*]

(iii) Complete the ray diagram as in Diagram 5.2 to show the formation of the natural phenomenon as shown in Diagram 5.1.

Lengkapkan rajah sinar pada Rajah 5.2 bagi menunjukkan kejadian semula jadi yang ditunjukkan dalam Rajah 5.1.

Light from the cloud
Cahaya dari awam

Cool air / *Udara sejuk*

Warm air / *Udara suam*

Hot air / *Udara panas*

Road / *Jalan*

Image of the clouds seen as a pool like of water
Imej awan kelihatan seperti tompokan air
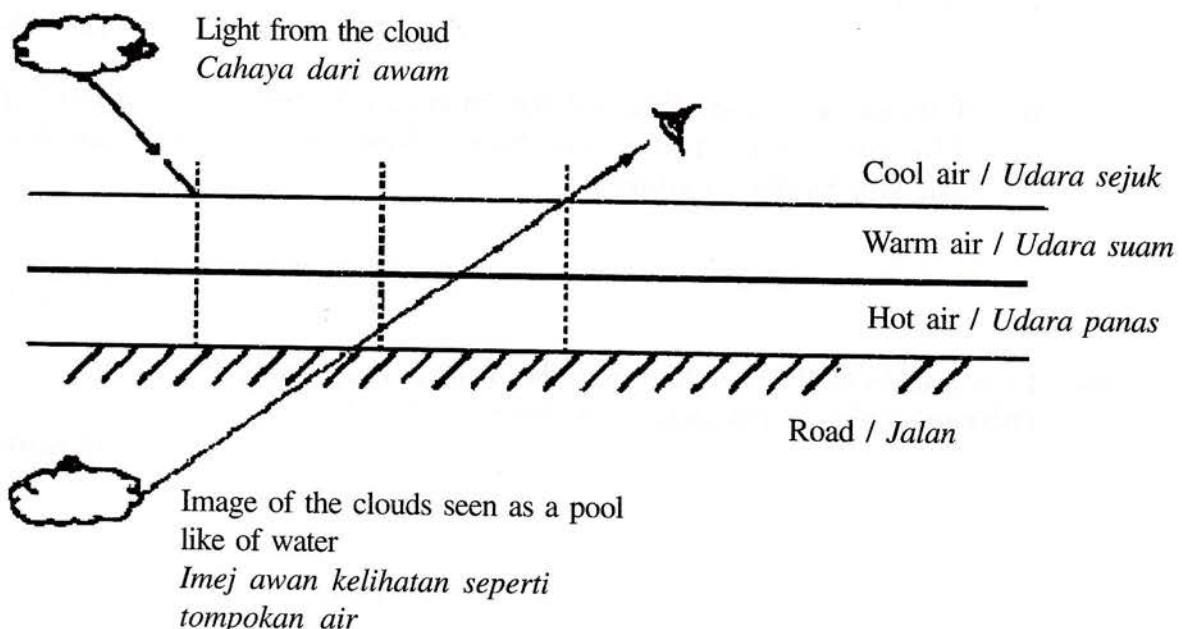
Diagram/*Rajah* 5.2

[2 marks/*markah*]

6. Diagram 6.1 and Diagram 6.2 show two electrical circuits.
Rajah 6.1 dan 6.2 menunjukkan dua litar elektrik.
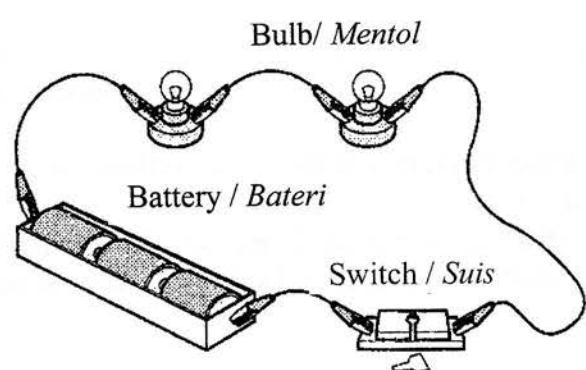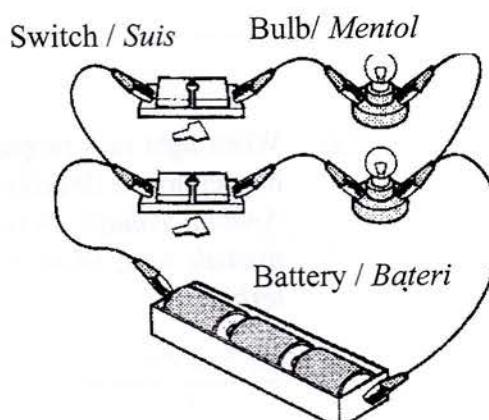
Diagram/*Rajah* 6.1

Diagram/*Rajah* 6.2

(a) (i) Which diagram shows a parallel circuit?
*Rajah yang manakah menunjukkan litar selari?*

....

[1 mark/*markah*]

(ii) If the circuit is closed. What will happen to the other bulbs in a (i) if one bulbs blows?
Jika litar lengkap. Apakah yang berlaku kepada mentol-mentol lain dalam a (i) jika satu mentol terbakar?

....

[1 mark/*markah*]

(b) Draw and electrical circuit diagram of the circuit in Diagram 6.2
Lukis rajah litar eletrik untuk litar dalam rajah 6.2

[1 mark/*markah*]

(c) Diagram 6.3 shows an electrical circuit. Assume that the internal resistance of the battery is negligible.
Rajah 6.3 menunjukkan sebuah litar elektrik. Anggapkan rintangan dalam bateri boleh diabaikan.
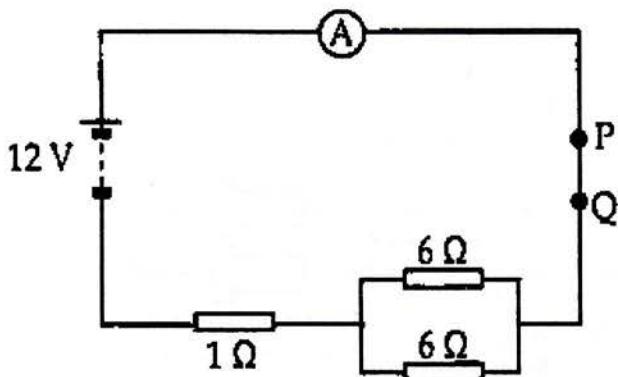
Diagram/*Rajah* 6.3

(i)   Calculate the effective resistance of the circuit?
Hitungkan rintangan berkesan litar tersebut.

[2 marks/*markah*]

(ii) What is the reading of the ammeter?
Apakah bacaan ammeter?

....

[1 mark/*markah*]

(iii) Another resistor of 2 Ω is fixed between points P and Q.
What happens to the ammeter reading?
Sebuah lagi perintang 2 Ω dipasang di antara titik P dan titik Q.
Apakah yang akan berlaku pada bacaan ammeter?

....

[1 mark/*markah*]

7.   Diagram 7 shows a system used in a factory to ensure the volume of dragon fruit juice is uniform.
     (as stated on the bottle label)
     *Rajah 7 menunjukkan satu sistem yang digunakan di sebuah kilang membuat jus buah naga
     untuk memastikan ketepatan isipadu yang yang diisi. (seperti dicatat dalam label pelekat)*
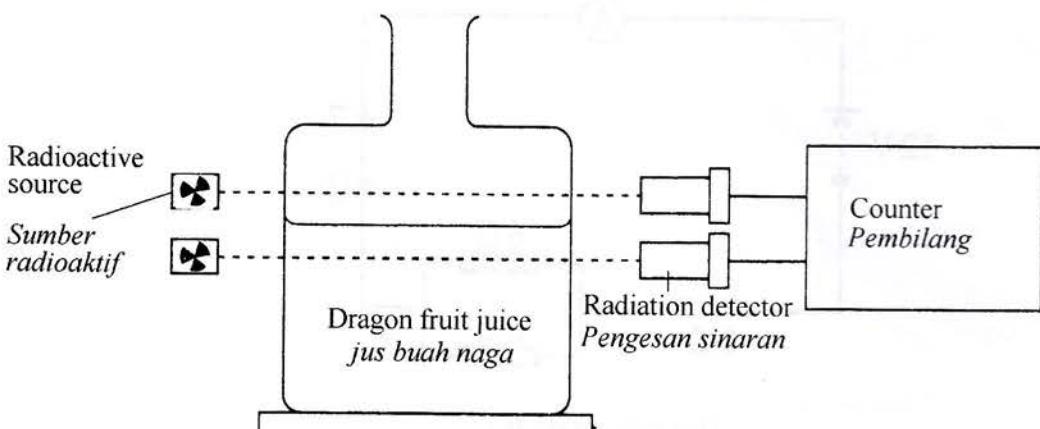
Diagram / *Rajah* 7

The radioactive source, radiation detector and counter are used to detect the volume of dragon
fruit juice. The radioactive source contains a radioisotope. β particle is radiated.
*Sumber radioaktif, pengesan sinaran dan pembilang digunakan untuk mengesan isipadu jus
buah naga. Sumber radioaktif itu mengandungi radioisotop. Zarah β dipancarkan.*

(a)   State two characteristics of a β particle?
      Nyatakan dua ciri-ciri zarah β ?

      ....

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

(b)   Table 7 shows reading of the rate meter for 6 bottles through detector and radioactive source?
      *Jadual 7 menunjukkan bacaan meter kadar bagi 6 botol yang melalui pengesan dan
      sumber radioaktif.*

Bottle/*Botol*	A	B	C	D	E	F
Rate meter reading/ *Bacaan meter kadar* (count per minute/ *bilangan per minit*)	464	468	467	462	568	470

Table/*Jadual* 7

      (i)   Which bottle shows least volume of juice?
            Botol yang manakah menunjukkan isipadu yang paling kurang?

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

(ii) State your reason for the answer in 7(b)(i).
Nyatakan sebab jawapan anda di 7(b)(i).

....

[1 mark/*markah*]

(c) Now, all the bottles and radioactive sources are removed.
Sekarang, semua botol dan sumber radioaktif dikeluarkan.

   (i) What can you observe at the rate meter reading?
     Apakah yang dapat diperhatikan pada bacaan meter kadar?

....

[1 mark/*markah*]

   (ii) State your reason for the answer in 7(c)(i).
     Nyatakan sebab jawapan anda di 7(c)(i).

....

....

[1 mark/*markah*]

(d) In a nuclear reactor, radium-226 decays to become radon-222 by releasing one alpha particle. This reaction experiences a mass defect.
Di sebuah reaktor nuklear, radium-226 mereput menjadi radon-222 sambil membebaskan zarah alfa. Reaksi ini mengalami cacat jisim.

   (i) The number 226 for radium is called its .... number.

     Nombor 226 untuk radium dipanggil sebagai nombor ....

[1 mark/*markah*]

   (ii) Complete the equation of the reaction by writing the appropriate number in the boxes provided.
     Lengkapkan persamaan untuk reaksi dengan menulis nombor yang sesuai di dalam kotak yang disediakan.

$$^{226}_{88}\text{Ra} \longrightarrow \boxed{}^{222}\text{Rn} + \boxed{}_{2}\text{He} + \text{Energy/Tenaga}$$
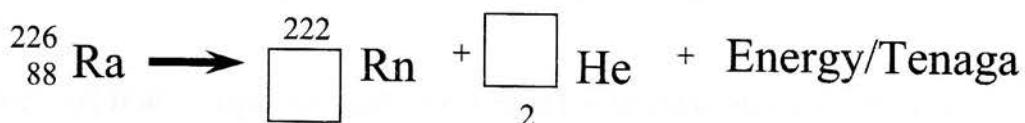
[1 mark/*markah*]

   (iii) The nuclear reaction of one nucleus of radium-226 experiences a mass defect of 8.6818×10^{-30} kg.
     Reaksi nuklear satu nukleus radium-226 mengalami cacat jisim sebanyak 8.6818×10^{-30} kg.

     Calculate the energy released in the nuclear reaction. The velocity of light is 3×10^8 ms^{-1}.
     Kirakan tenaga yang dibebaskan semasa reaksi nuklear. Halajau cahaya ialah 3×10^8 ms^{-1}.

[2 marks/*markah*]

8. Diagram 8.1 shows a simple electromagnet used for lifting and releasing a small metal ball.
    Rajah 8.1 menunjukkan sebuah elektromagnet ringkas digunakan untuk mengangkat dan melepaskan sebuah bola logam yang kecil.
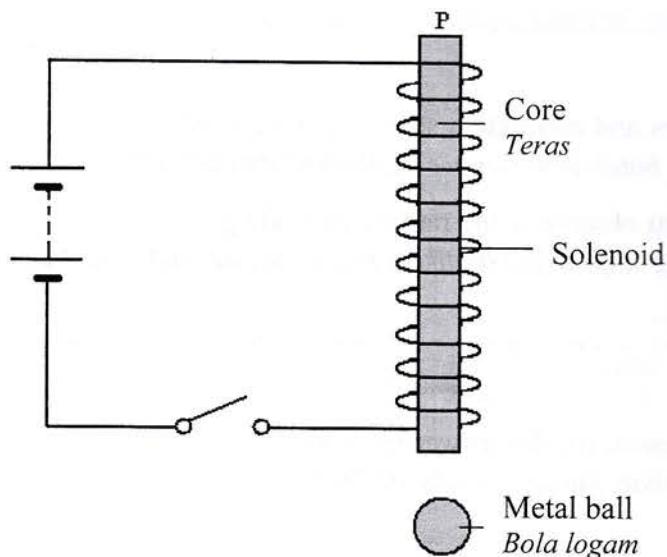
Diagram / *Rajah* 8.1

(a) In Diagram 8.1, mark the direction of the current flow in the solenoid when the switch is on.
Dalam Rajah 8.1, tandakan arah arus yang mengalir dalam solenoid apabila suis dihidupkan.

[1 mark/*markah*]

(i) Name the magnetic pole at the end of the core **P** when the switch is on?
*Namakan kutub magnet pada hujung teras **P** apabila suis dihidupkan?*

....

[1 mark/*markah*]

(ii) State the rule used to determine the pole of the magnetic field.
Nyatakan petua yang digunakan untuk menentukan kutub medan magnet.

....

[1 mark/*markah*]

(iii) Based on the solenoid in Diagram 8.1, draw the magnetic field lines that is form around the solenoid when the switch is on. In your diagram show the direction of the magnetic field lines.
Berdasarkan solenoid dalam Rajah 8.1, lukiskan garisan medan magnet yang terbentuk di sekitar solenoid apabila suis dihidupkan. Dalam rajah tunjukkan arah garisan medan magnet.

[2 marks/*markah*]

Material used for the core *Bahan yang digunakan untuk teras*	Shape of the core *Bentuk Teras*
Steel *Keluli*	
Soft iron *Besi lembut*	
Aluminium *Aluminium*	
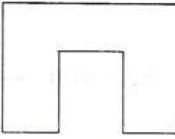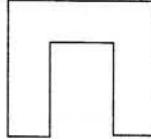
Table / *Jadual* 8

(b) Based on Table 8, state the suitable properties to be chosen to built an electromagnet and state the reason for your choice.

Berdasarkan Jadual 8, nyatakan sifat-sifat yang sesuai untuk dipilih bagi membina sebuah elektromagnet dan nyatakan sebab bagi pilihan anda.

(i) Material used for the core
Bahan yang digunakan untuk teras

....

[1 mark/*markah*]

Reason/*Sebab*

....

[1 mark/*markah*]

(ii) Shape of the core/*Bentuk teras*

....

[1 mark/*markah*]

Reason/*Sebab*

....

[1 mark/*markah*]

(c) The electromagnet in 8 (c) is used in an electric bell as shown in Diagram 8.2.
Elektromagnet dalam 8 (c) digunakan dalam loceng elektrik seperti dalam Rajah 8.2.
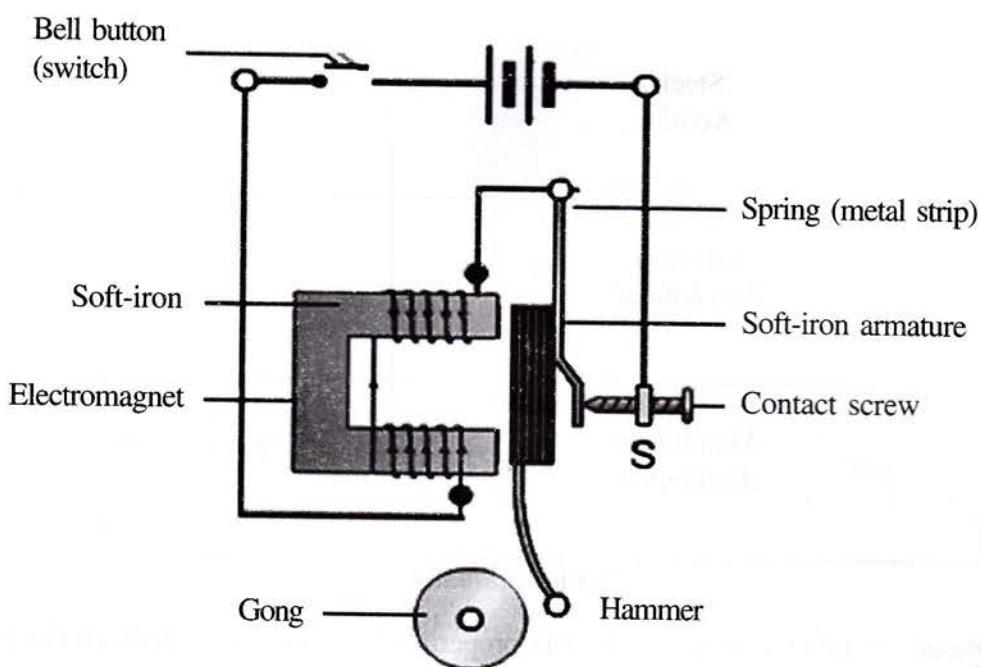
Diagram/*Rajah* 8.2

Explain the working principle of the electric bell.
Terangkan prinsip kerja loceng elektrik.

....

....

....

[3 *marks/markah*]

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

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

9 (a) A float shows different level in the sea and in the river while carrying the same load.
Satu pelampung menunjukkan perbezaan aras di laut dan di sungai walaupun membawa beban yang sama.
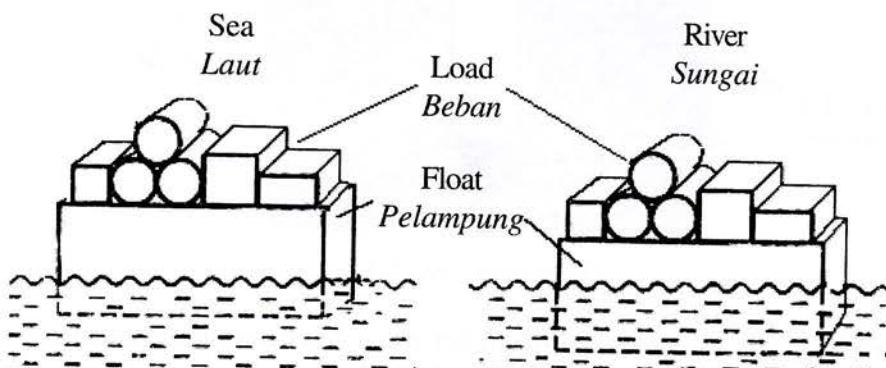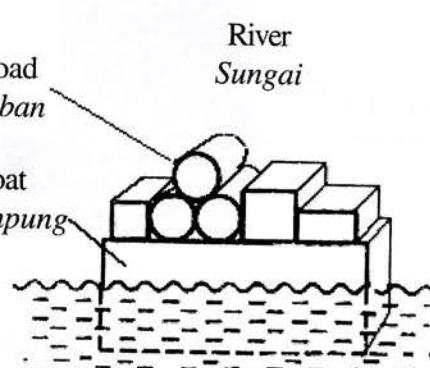
Diagram/*Rajah* 9.1   Diagram/*Rajah* 9.2

(i) What is the meaning of density?
Apakah yang di maksudkan dengan ketumpatan? [1 mark/*markah*]

(ii) Using Diagram 9.1 and Diagram 9.2, compare the level of the float and the volume of water displaced by the float.
Relate the mass of floats with load, volume of water displaced, the density of water and deduce a relevant physics concept.
Berdasarkan Rajah 9.1 dan Rajah 9.2, bandingkan paras pelampung dan isipadu air yang tersesar oleh pelampung.
Hubungkaitkan jisim pelampung, isipadu air tersesar, ketumpatan air dan nyatakan konsep fizik yang sesuai?

[5 marks/*markah*]

(iii) Name the physics principle in the above situation.
Namakan prinsip fizik dalam situasi diatas. [1 mark/*markah*]

(b) A submarine can sail on the surface and under the sea.
Explain how a submarine on the surface submerges.
Kapal selam boleh menyelam dan timbul di permukaan laut.
Terangkan bagaimana kapal selam menyelam dari permukaan laut. .

[3 marks/*markah*]

(c) Diagram 9.3 illustrate the test tube as a hydrometer. Depth of the test tube submerged depending on the surrounding liquid.

Diagram 9.3 adalah gambaran tabung uji sebagai hidrometer. Kedalaman tabung uji tenggelam bergantung kepada cecair sekelilingnya.

Plumbum
Plumbum

River water
Air Sungai
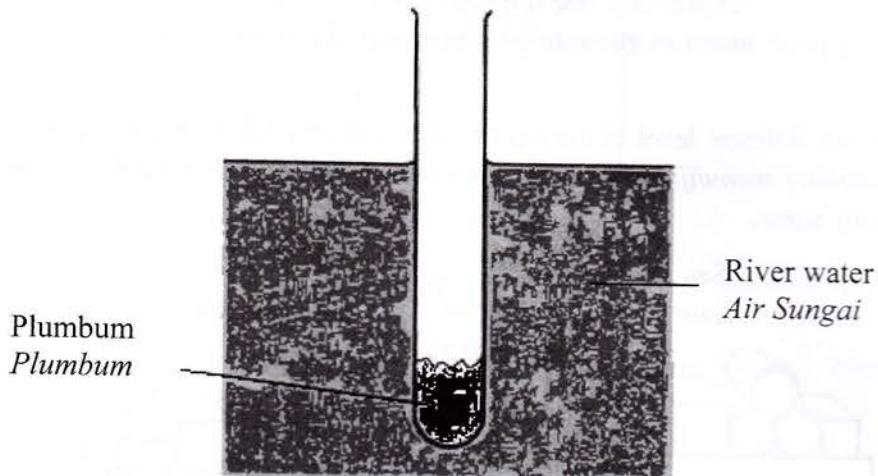
Diagram/*Rajah* 9.3

Explain how you would design hydrometer that can determine the density of various liquids, by using the idea of the working principle of the hydrometer as shown above.
Draw a diagram that shows the design of your hydrometer in your description, give emphasis to the following aspects:

Terangkan bagaimana anda merekabentuk sebuah hidrometer untuk menentukan ketumpatan pelbagai jenis cecair, dengan menggunakan idea prinsip kerja hidrometer seperti rajah di atas. Lukis gambarajah yang menunjukkan hidrometer anda dan dalam penerangan, anda berikan penekanan bagi aspek-aspek berikut.

(i) Stability of hydrometers.
Kestabilan hidrometer,
(ii) Sensitivity of the hydrometer,
Kepekaan hidrometer itu,
(iii) Ability to measure density of various liquids,
Kebolehan menentukan pelbagai jenis ketumpatan cecair,
(iv) Calibration of the hydrometer.
Penentukan hidrometer itu.

[10 marks/*markah*]

10. Diagram 10.1 and diagram 10.2 shows the wire is moved downward faster between two magnadur same type of magnet with opposite polarity facing each other. The wire is connected to a galvanometer.

Rajah 10.1 dan Rajah 10.2 menunjukkan wayar yang digerakkan ke bawah dengan pantas antara dua magnadur same jenis dengan kutub bertentangan antara satu sama lain. Wayar disambungkan kepada galvanometer.
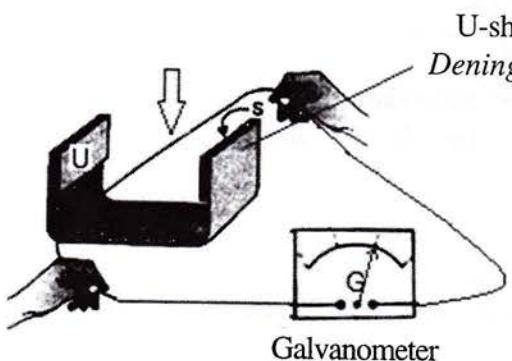
Diagram/*Rajah* 10.1
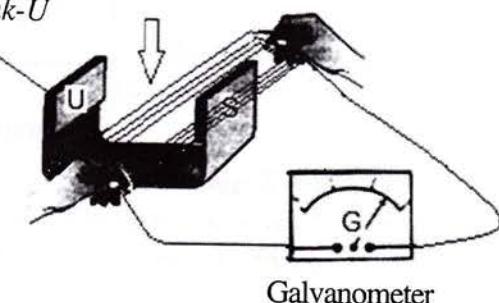
Diagram/*Rajah* 10.2

(a) (i) States the Faraday's Law?

Nyatakan Hukum Faraday?

[1 mark/*markah*]

(ii) Using Diagram 10.1 and Diagram 10.2, compare the number of wire, the deflection of galvanometer and the number of magnet.
Relate the deflection of galvanometer with the number of wire on the electromagnet to make deductions relevant physics concept.

Menggunakan Rajah 10.1 dan Rajah 10.2, bandingkan bilangan wayar, pesongan galvanometer dan bilangan magnet.

Hubungkaitkan pesongan galvanometer dengan bilangan wayar pada elektromagnet untuk membuat satu konsep fizik.

[5 marks/*markah*]

(b) Diagram 10.3 shows a simple transformer.
Rajah 10.3 menunjukkan transformer ringkas.
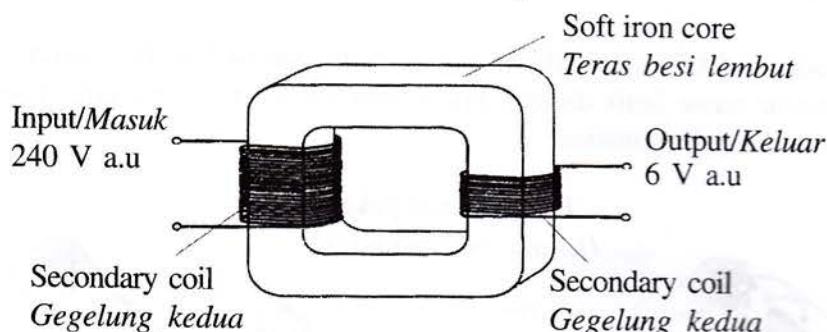
Diagram/*Rajah* 10.3

Explain/ *Terangkan.*

(i)   Why soft iron is used as transformer core?
      Mengapa teras besi lembut digunakan pada transformer?   [1 mark/*markah*]

(ii) How the transformer functions.
      Bagaimanakah transformer berfungsi?   [3 marks/*markah*]

(c) Diagram 10.4 shows an electric motor which is supplied with a 3 V d.c. When the switch is on, the motor rotate.
     Rajah 10.4 menunjukkan motor elektrik dengan bekalan kuasa 3V d.c. Bila suis dibuka, motor akan berputar.
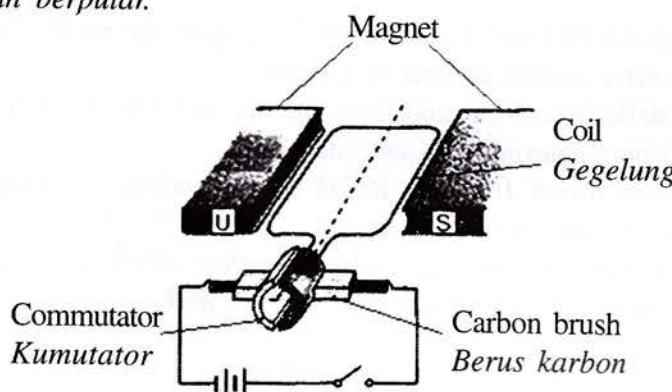
Diagram/*Rajah* 10.4

Suggest and explain the modification that needs to be done on the motor and the external circuit to enable the alternating current generator a.u. electric and produced high current. Your answer should include the following aspects:

Terangkan pengubahsuian yang diperlukan pada motor dan litar luaran untuk membolehkan penjanaan arus aruhan a.u dihasilkan pada nilai arus yang tinggi. Jawapan anda mesti memasukkan perkara-perkara berikut:

(i)   Component needs.
      Komponen yang diperlukan.
(ii) Coils and coil wire.
      Gegelung dan wayar gegelung.
(iii) Magnet.
      Magnet.
(iv) Iron core.
      Teras besi.   [10 marks/*markah*]

Section C
Bahagaian C
[20 marks/*markah*]

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

11.   Diagram 11.1 shows a spring cradle which is used to make sure the baby sleep soundly.
       Rajah 11.1 menunjukkan buaian yang digunakan untuk memastikan bayi tidur lena.
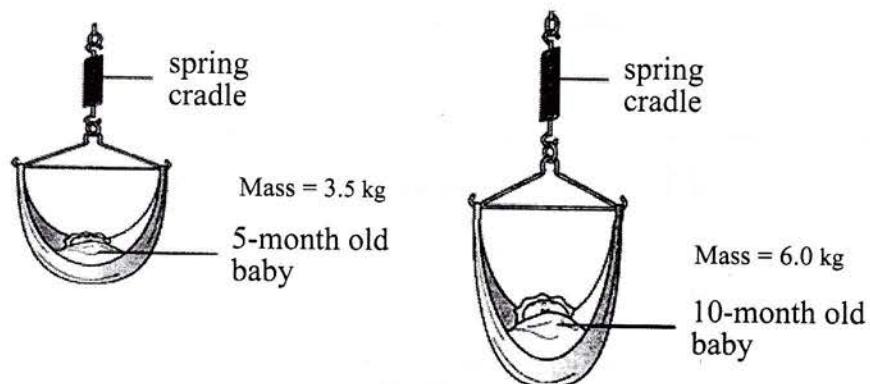
Diagram/*Rajah* 11.1

(a)   State the Hooke Law.
       Nyatakan hukum Hooke.

[1 marks/*markah*]

(b)   Diagram 11.1 shows different babies with different mass. Sketch a graph extension against
       force based on the diagram.
       Rajah 11.1 menunjukkan bayi yang berbeza jisim. Lakarkan graf pemanjangan
       melawan daya berdasarkan diagram 11.1.
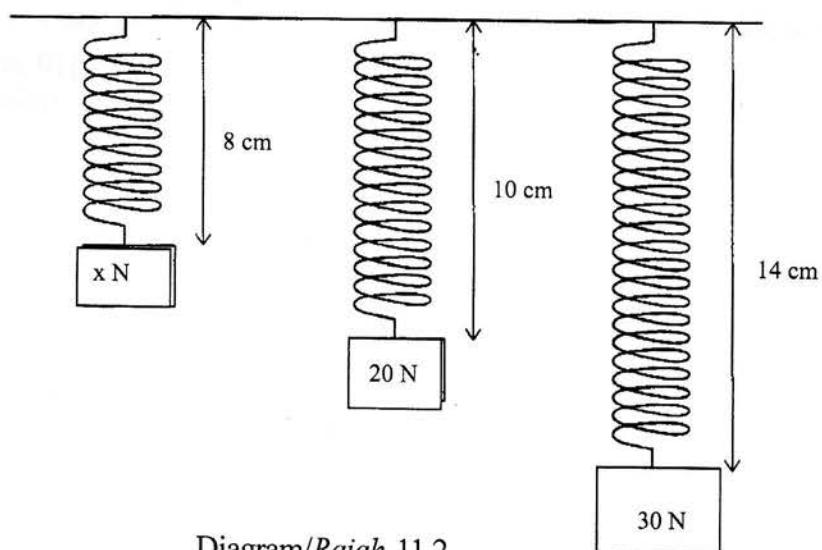
Diagram/*Rajah* 11.2

(c)   Diagram 11.2 shows extension of identical springs with the different load. Calculate
       Rajah 11.2 menunjukkan pemanjangan spring yang sama jenis oleh beban yang
       berlainan. Hitungkan
       (i)   The original length / *Panjang asal spring*
       (ii)   Value of x/ *Nilai beban x*

[5 marks/*markah*]

[Lihat sebelah
SULIT

(d) Table 11.3 shows the characteristics of 4 types of spring A, B, C and D.
Jadual 11.3 menunjukkan ciri-ciri bagi empat jenis spring A, B, C dan D.

Spring Spring	Spring Constant / Nm^{-1} Pemalar spring / Nm^{-1}	Density / kg m^{-3} Ketumpatan / kg m^{-3}	Elastic Limit / N Had kenyal / N	Strength Kekuatan
A	170	2700	35	Low Rendah
B	540	7860	40	Low Rendah
C	270	8920	45	High Tinggi
D	900	19300	50	High Tinggi

Table/Jadual 11.3

You are assign to design a cradle for a baby of mass 10 kg.
Anda ditugaskan untuk merekabentuk sebuah buaian untuk bayi berjisim 10 kg.

(i) Explain the suitable characteristics of the spring to be used to make a swing.
Terangkan kesesuaian ciri-ciri spring untuk digunakan sebagai spring buaian tersebut.

(ii) Decide which spring is most suitable to be used to make the cradle and give reasons.
Tentukan spring yang paling sesuai digunakan sebagai spring buaian tersebut dan berikan sebab.

[10 marks/*markah*]

12 Diagram 12.1 shows a plane water wave propagates from deep water to shallow water.
Rajah 12.1 menunjukkan satu gelombang satah merambat dari kawasan dalam ke kawasan cetek yang berbentuk cembung.

Deep
Dalam
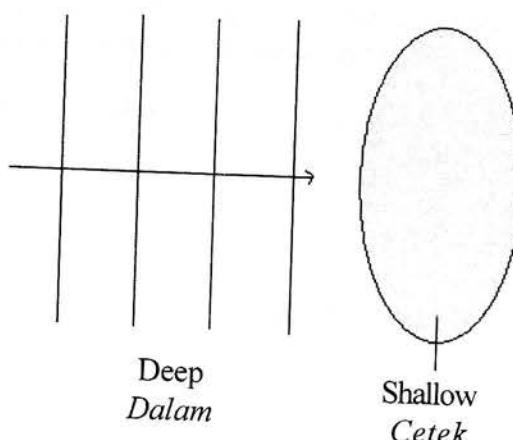
Shallow
Cetek

Diagram/*Rajah* 12.1

(a) Define wavelength
Apakah maksud panjang gelombang.

[1 mark/*markah*]

(b) Explain what happens to the plane water wave before and after passing through the shallow water. You can use a diagram to explain your answer.
Terangkan apa yang akan berlaku kepada gelombang satah apabila melalui kawasan air cetek dan selepas melaluinya. Anda boleh menggunakan gambar rajah untuk menjelaskan jawapan.

[4 marks/*markah*]

(c) In a Young's double slit experiment, a light of wavelength 633 nm passes through two slit which are 0.5 mm apart. Vertical fringes are observed on a screen placed 4 m from the slits.
Dalam eksperimen dwi celah Young, panjang gelombang cahaya 633 nm melalui dua celah yang jarak di antaranya 0.5 mm. Pinggir-pinggir secara tegak diperhatikan pada skrin yang berjarak 4 m dari celah.

(i) Calculate the distance between two adjacent bright fringes
Kirakan jarak antara dua pinggir cerah yang berturutan.

(ii) What will happen to the distance between two adjacent bright fringes if a light of shorter wavelength is used
Apakah yang berlaku jarak antara dua pinggir berturutan, jika panjang gelombang yang lebih pendek digunakan.

[5 marks/*markah*]

(d) Diagram 12.2 shows a displacement-time graph for sound wave P, Q, R and S.
Rajah 12.2 menunjukkan graf sesaran melawan masa bagi gelombang bunyi P, Q, R dan S.

You are assigned to investigate the suitable wave to be used in an ambulance siren.
Study waves P, Q, R and S in Diagram 12.2 and consider the following aspects.
Anda ditugaskan untuk mengkaji gelombang yang sesuai digunakan sebagai siren ambulans
Kaji gelombang P, Q, R dan S dalam Rajah 12.2 dan pertimbangkan aspek berikut;

- wave amplitude
  amplitud gelombang
- wave length
  panjang gelombang
- damping effect
  kesan pelembapan
- frequency of wave
  frekuensi gelombang

Explain the aspect's suitability and identify the most suitable wave to be used in an ambulance siren. Justify your answer.
Terangkan kesesuaian aspek-aspek itu dan seterusnya tentukan gelombang yang paling sesuai digunakan sebagai siren ambulans itu. Berikan sebab bagi pilihan anda.

[10 marks/*markah*]

Diagram/*Rajah* 12.2

END OF QUESTION PAPER
KERTAS SOALAN TAMAT

Physics Paper 1

Marking Scheme

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

SKEMA KERTAS 2
BAHAGIAN A

QUESTIONS SOALAN			MARKING SCHEME SKEMA PEMARKAHAN	MARK MARKAH	TOTAL JUMLAH
1	a		Vernier calliper	1	
	b		Reading more accurate	1	
	c		Micrometer gauge	1	
	d		0,0063 cm	1	4
2	a		To move water up so can flow up the builing	1	
	b	(i)	$P = h\rho g$ $= 100 \times 1\,000 \times 10$ $= 1\,000\,000$ Pa	1 1	
		(ii)	The depth of the water decrease	1	
	c		Prinsip Pascal	1	5
3	a	(i)	Volume at X is smaller than at Y	1	
		(ii)	Pressure at X is higher than at Y	1	
		(iii)	The lower the pressure, the bigger the volume	1	
		(iv)	Boyle's Law	1	
		(v)	Temperature constant	1	
	b			1	6
4	a		$E_p = \dfrac{1}{2} kx^2$ $= \dfrac{1}{2} \times 5000 \times 0.08^2$ $= 16$ J	1 1	
	b	(i)	Principle of the conservation of momentum	1	
		(ii)	Momentum to the left = momentum to the right $2m \times v = 3m \times 6$ $v = 9$ m s^{-1}	1 1	
	c		Total kinetic energy = elastic potential energy $\dfrac{1}{2} \times 3m \times 6^2 + \dfrac{1}{2} \times 2m \times 9^2 = 16$ $135m = 16$ $m = 0.12$ kg	1 1	7
5	a		Mirage / *logamaya*	1	
	b		Total internal reflection / *pantulan dalam penuh*	1	
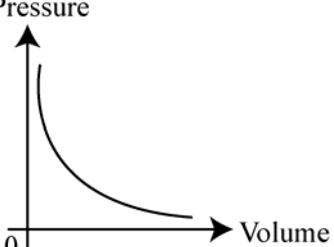
	c (i)	Light must travel from a denser to a less dense medium *Cahaya mesti merambat dari medium yang lebih tumpat ke medium yang kurang tumpat*	1	
	(ii)	Angle of incidence, i must be greater than the critical angle, c / *Sudut tuju, i mesti lebih besar daripada sudut genting, c*	1	
	d (i)	Density of the cool air is greater than the density of the warm air / *Ketumpatan udara sejuk lebih besar daripada ketumpatan udara panas*	1	
	(ii)	The light rays will be refracted away from the norma / *Sinar-sinar cahaya akan terbias menjauhi garisan normal*	1	
	(iii_		2	8
6	a (i)	Diagram / *Rajah* 6.2	1	
	(ii)	Still light up / *masih menyala*	1	
	b		1	
	c (i)	$\dfrac{1}{R'} = \dfrac{1}{6} + \dfrac{1}{6} = \dfrac{1}{3}$ $R' = 3\ \Omega$ Effective resistance = $1\ \Omega + 3\ \Omega$ *Rintangan berkesan* = $4\ \Omega$	1 1 1	
	(ii)	$I = \dfrac{V}{R}$ $= \dfrac{12V}{4\Omega}$ $= 3\ A$	1	
	(iii)	Decrease /*berkurang*	1	7
7	a	- β particle is made up of fast-moving electrons - β particle has very small mass	1 1	
	b (i)	E	1	
	(ii)	the most radioactive emission pass through the juice	1	
	c (i)	still there is reading shown	1	
	(ii)	because of the back ground reading	1	
	d (i)	no nucleon/no jisim	1	
			1	
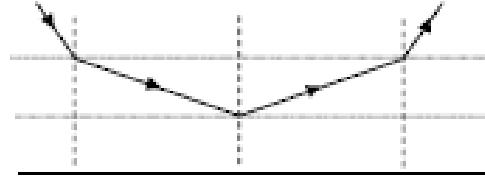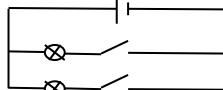
	(ii)	$_{88}^{226}$ Ra $\longrightarrow$ $_{86}^{222}$ + $_{2}$ He + Energy		
	(iii)	$E = mc^2$	1	
		$= (8.6818 \times 10^{-30}) \times (3 \times 10^8)^2$		
		$= 7.8 \times 10^{-13}$ J	1	10
8	a	Show the direction of current correctly on the solenoid.	1	
	b (i)	North pole	1	
	(ii)	Right hand grip rule	1	
	(iii)	1. Draw the pattern correctly.	1	
		2. Draw the direction of magnetic field correctly.	1	
	c (i)	Soft iron core	1	
	(ii)	Can be easily magnetised and demagnetised	1	
	(iii)	U shaped core	1	
	(iv)	Strength of electromagnet is higher	1	
	d	1. When the switch is pressed, the cicuit is closed	3	
		2. Current flow through solenoid, the iron core is magnetised		
		3. Soft iron core is attracted to the electromagnet and strikes the gong		12

BAHAGIAN B

QUESTIONS SOALAN			MARKING SCHEME SKEMA PERMAKAHAN	MARK MARKAH	TOTAL JUMLAH
9	a)	(i)	Mass per volume unit.	1	
		(ii)	Float level in diagram 9.1 is higher than in 9.2.	1	
			Volume of water displaced by the float in Diagram 9.1 is is less than in 9.2.	1	
			The larger the mass, the greater the volume of water displaced.	1	
			Buoyant force = weight of water displaced by the float.	1	
			The greater the density of water, the smaller the volume of water displaced.	1	
		(iii)	Archimedes' principle.	1	
	b)		When the ballast tanks filled with sea water, the density of the submarine increase.	1	
			Weight of the submarine more than the weight of the displaced water.	1	
			This weight difference causing it to sink into the sea water.	1	
	c)				

Sugestion	Reason	
Cylinder with a larger diameter at the lower part/diagram	To sink the hydrometer and prevent the overturned .	1,1
Lead shots / diagram	To enable it stand upright	1,1
Cylinder with small diameter at the top / diagram	Small scale reading can be combined	1,1
Glass bulb at the lower part	Scale can be made larger or smaller from the density of water	1,1
Filled with air / diagram	Can measure the density of the higher and lower than the water	1,1
Hydrometer is placed in low density liquid	Mark the low level	1,1
Hydrometer is placed in high density liquid	Mark the high level	max 10

JUMLAH	20

10	a)	(i)	Magnitude of the induced e.m.f in a conductor is directly proportional to the rate of cutting of magnetic flux.	1	

		(ii)	- Number of wire in diagram 10.1 is less than diagram 10.2
			- Number of magnet in diagram 10.1 is similar to diagram 10.2
			- Deflection of galvanometer in diagram 10.1 is less
			- Increase the number of wire cutting the magnetif field, increase the -
			  deflection of galvanometer or induced current.
			- Faraday's Law state magnitude of the induced current directly
			  proportional to the rate of cutting of magnetic flux.
				1
				1
				1
				1
				1	

	b)	(i)	- Easily magnetized and demagnetized	1	
		(ii)	- Alternating current from the power supply flows in the primary coil. - Primary coil forming the magnetic flux. - The secondary coil cut the magnetic flux of the primary coil. - The secondary coil having electromagnetic induction.	1 1 1 1 **Max 3**	
	c)		 - Change cumutator by two slip rings/diagram – current flow as a.u - Add the number of coils/diagram – increase the induced current - Increase the thickness of wire – reduce resistance/ more induce current. - Increase the strength of magnet – increase the induce current - Curved magnet - catapult field more stronge - Cylinder shaped iron core - increase the strength of electromagnet	1,1 1,1 1,1 1,1 1,1 1,1 **Max 10**	
			JUMLAH		**20**
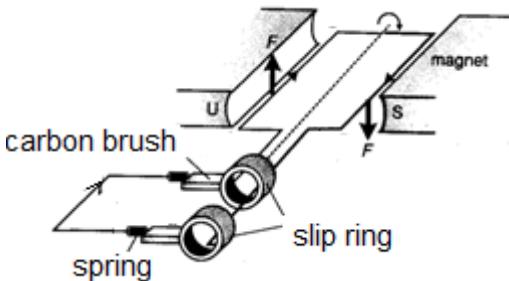
BAHAGIAN C

QUESTIONS SOALAN		MARKING SCHEME SKEMA PERMAKAHAN	MARK MARKAH	TOTAL JUMLAH
11	a	Force directly proportional with extension *Daya berkadar terus dengan pemanjangan*	1	
	b	 Force directly proportional with extension// When mass increase the extansion will increase too because the constant spring is constant. *Daya berkadar terus dengan pemanjangan// Apabila jisim bertambah maka pemanjangan bertambah sebab pemalar spring adalah tetap.*	2 1 1	
	c (i)	$\dfrac{20}{10-l}=\dfrac{30}{14-l}$ 2(14- *l*) = 3 (10 − *l*) *l* = 2 cm	1 1 1	
	(ii)	$\dfrac{20}{8}=\dfrac{x}{6}$ x = 15 N	1 1	
	d	<table><tr><td>Characteristic *Ciri-ciri*</td><td>Reason / Explanation *Sebab/ Penerangan*</td></tr><tr><td>Spring constant is small *Pemalar spring kecil*</td><td>More elastic *Lebih elastic*</td></tr><tr><td>Density is small *Ketumpatan yang kecil*</td><td>The spring is lighter *Spring lebih ringan*</td></tr><tr><td>Elastic limit is high *Had kenyal yang tinggi*</td><td>Elastic for a large range of fore / Can support the large force *Kekenyalan tinggi untuk daya yang besar/ Boleh menampung daya yang besar*</td></tr><tr><td>The strength is high *Kekuatanyang tinggi*</td><td>Can support the large force *Boleh menampung daya yang besar*</td></tr></table> The most suitable spring is C *C paling sesuai*	2 2 2 2 1 1	

		Because more elastic, lighter, elastic for a large range of force and can support the large force force and can support the large force *Kerana lebih elastic, ringan, kekenyalan yang tinggi dan boleh menampung daya yang besar*		
		JUMLAH		**20**
12	a	Distance between two successive points of the same phase in a wave *Jarak natara dua titik berturutan yang sama fasa bagi gelombang*	1	
	b	When the wave passing through shallow water// convex area,the wavelength and speed decrease *Apabila gelombang melalui kawasan cetek // cembung panjang gelombang dan lajunya berkurang*	2	
		After the wave passing through shallow water// convex area, the circular waves converge at focal point an then diverge from the focal point *Selepas melepasi kawasan cetek //cembung gelombang membulat terbentuk dan menumpu pada titik focus dan kemudian mencapah dari titik focus* *OR/ATAU* Diagram/ Rajah	2	
	c (i)	λ = 633 nm = 633 x 10-9 a = 0.5 mm = 0.5 x 10^{-3} m D = 4 m	1	
		$x = \dfrac{633 x 10^{-9} x 4}{0.5 x 10^{-3}}$	1	
		x = 5.064 x 10^{-3} mm	2	
	(ii)	Decrease *berkurang*	1	

	d	Characteristic	Reason			
		High amplitude *Amplitud yang tinggi*	louder *kuat*		2	
		Longer wavelength *Panjang gelombang yang besar*	Can diffract easily *Boleh dibelaukan dengan mudah*			
		Low damping *Pelembapan yang rendah*	Can be heard clearly *Boleh dengar dengan jelas*		2	
		Low frequency Frequensi rendah	Low pitch/ distinguished from other sound/can be heard by human *Pic rendah/beza daripada bunyi lain/boleh di dengar oleh manusia*		2 2	
		I choose Q *Saya pilih Q* Because high amplitude , long wavelength, low damping and there is medium *Kerana amplitude yang tinggi, panjang gelombang yang besar. Pelebapan yang rendah dan mempunyai medium*			1 1	
JUMLAH					**20**	

JABATAN PELAJARAN PERAK

_____

**PEPERIKSAAN PERCUBAAN
SIJIL PELAJARAN MALAYSIA 2012**

FIZIK (4531)

SKEMA PEMARKAHAN

Kertas soalan ini mengandungi   halaman bercetak

PHYSICS PAPER 3 (4531/3)

SECTION A			
NO	**MARKING SCHEME**	**MARK**	
		SUB	**TOTAL**
1 (a)(i)	- Base current / I_B	**1**	**1**
(ii)	- Collector current / I_C	**1**	**1**
(iii)	-Length of the connection wire	**1**	**1**
(b)(i)			
(ii)			
		SUB	**TOTAL**

(b)(i)

Diagram	I_C / mA
1.2	0.5
1.3	1.0
1.4	1.5
1.5	2.0
1.6	2.5

- 3 or 4 values of I_C are correct **1**
- All the values of I_C are correct **1**   **2**

(ii)

I_B / μA	I_C / mA
10.0	0.5
20.0	1.0
30.0	1.5
40.0	2.0
50.0	2.5

- Values of I_B and I_C shown in the table **1**
- State the units of I_B and I_C correctly **1**
- The values of I_B and I_C are consistent to one decimal place. **1**   **3**

SECTION A				
NO	**MARKING SCHEME**	**MARK**		
		SUB	**TOTAL**	
(c)	Draw a complete graph of I_C against I_B Tick √ based on the following aspects : - A. Show I_B on Y-axis and I_C on X-axis - B. State the units of the variables correctly - C. Both axes are marked with uniform scale - D. All five points are plotted correctly - E. Best straight line is drawn - F. Show the minimum size of graph at least 5 x 4 (2 cm x 2 cm) square (counted from the origin until the furthest point) **Score**	√ √ √ √√ √ √		

Number of ticks	**Score**
7	5
5-6	4
3-4	3
2	2
1	1

		5	**5**	
(d)	- I_C is directly proportional to I_B	**1**		
(e)	-Ensure all connections in the circuit are tight -Repeat the experiment to get more accurate average readings. -Avoid parallax error by placing the eye perpendicular to the scale of readings. (Accept any suitable answer.)	**1** **1**	**2**	

Graph of I_C against I_B

NO	MARKING SCHEME	MARK	
		SUB	**TOTAL**
2 a)	Increases linearly	1	1
2 b)	$f = \dfrac{350 - 50}{70 - 10}$ $= \dfrac{300}{60}$ $= 5$ cm		
	Show a gradient triangle on graph paper Note: Show the minimum size of triangle at least 5 x 4 (10cm x 8cm) Correct substitution	1 1	
	Correct answer with unit = 5 cm *Jawapan dengan unit yang betul = 5 cm*	1	3
2 c) i)	Show the method to determine the value of *u+v* by showing the corresponding horizontal line with *uv*. *u* + *v* = 70 cm	1 1	2
2 c) ii)	$v = \dfrac{70 + 59.16}{2}$ $= 64.58$ cm		
	- Show the correct substitution	1	
	-State the correct answer with unit *64.58 cm.* ± 0.1	1	2
2 c) iii)	$P = \dfrac{1}{0.05 \text{ m}}$ @ $\dfrac{1}{5 \text{ cm}}$ $= 20$ m^{-1} @ 0.2cm^{-1} @ +20D		
	-Correct substitution	1	
	-Correct answer with unit	1	
			2
2 d)	- Position of eye must perpendicular to the metre rule scale when reading is taken to avoid parallax error.	1	
	- Image produced has to be as sharp as possible. (Accept any suitable answer.)	1	2

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