

2024 Physics Paper 1B

60 / 84
71.4%

Ethan Chan / 陳子朗

暫定成績 - 本卷仍在老師品質覆核中，以上分數尚未正式發布。

課題得分分佈

各課題得分佔該課題可得分數的比例

原卷 18 頁 • 已批註 46/46 題

熱和氣體

<60%

6/12 50.0%

力和運動

≥80%

19/22 86.4%

波動

60–79%

16/21 76.2%

電和磁

<60%

12/21 57.1%

放射現象和核能

≥80%

7/8 87.5%

點樣睇呢份批改

1 ✓ 得分 +n	呢分已俾。右欄短語講明原因；下面解說中英對照，有原句就附「學生寫」。
2 ✕ 失分	呢分冇俾。右欄短語講明原因；下面解說中英對照，有評分參考就附「應寫」。
3 ○ 未作答	卷上有對應作答。未用到嘅可選答案不列出。
已攞滿分或「任答 N 點」：未用到嘅可選答案不列出；未攞滿分就喺卡底寫「未有指出」。內容中文喺上、英文緊貼喺下（英文細一級）。右欄短語約 4-8 字，下面解說不刪節，放唔晒就接「第 N 頁解說（續）」。解說印喺氣泡所在個頁掃描下面，分兩欄；放唔落就緊接「第 N 頁解說（續）」，之後先到下一頁掃描。老師 view：有覆核旗標只顯示一粒「需老師覆核」，不印代碼。	

符號圖例

黑白符號：實線＝得分／正面，虛線＝扣分／問題，點線＝中性資料；實心 ref＝得分，空心＝問題，灰框＝中性。		1 實心圓＝得分	2 空心圓＝失分
3 點線圓＝未作答／中性	✕ 錯誤點	▣ 分數框	✓ 得分點

Section B: Answer ALL questions. Parts marked with * involve knowledge of the extension component. Write your answers in the spaces provided. Take $g = 9.81 \text{ m s}^{-2}$.

1. A bottle of water of temperature 4°C is taken out from a refrigerator and placed on a table. The room temperature is 30°C .

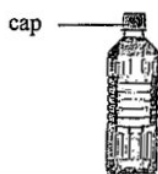


Figure 1.1

- (a) State one way of heat transfer from the surroundings to the bottle of water. (1 mark)

Radiation from Sun to bottle ✓

- (b) Explain whether wrapping the bottle with an aluminum foil will speed up the rate of temperature increase. (2 marks)

As Al foil is a good conductor of heat, which speed up the heat transfer from surrounding to bottle. ✗

- (c) After a period of time, water droplets form on the surface of the bottle.

- (i) State the source of the water droplets. (1 mark)

air ✗

- (ii) Suppose 0.40 g of water droplets are collected on the surface of the bottle. Estimate the latent heat released from these droplets. (2 marks)

Given: specific latent heat of vaporization of water = $2.26 \times 10^6 \text{ J kg}^{-1}$

$$E = (0.4)(2.26 \times 10^6) \text{ J} \text{ ✗}$$

$$= 9.04 \times 10^5 \text{ J} \text{ ✗}$$

第 1(a) 題 • 1/1

得分點 1 ✓ 指出傳導或輻射
conduction /
radiation

第 1(b) 題 • 0/2

1 ✗ 指出不會加快升溫

2 ✗ 指出銀色表面不良

第 1(c)(i) 題 • 0/1

1 ✗ 指出空氣中的水蒸

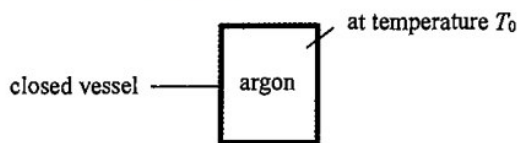
第 1(c)(ii) 題 • 0/2

1 ✗ 將 0.40 g 換成 kg 並

2 ✗ 得到 904 J
Answer: 904 J

- *2. Figure 2.1 shows a closed vessel of a fixed volume containing argon, a monatomic gas, maintained at temperature T_0 . The root-mean-square speed ($c_{\text{r.m.s.}}$) of the argon atoms inside is 500 m s^{-1} .

Figure 2.1



- (a) (i) Calculate the average kinetic energy of the argon atoms, E_k . Given that the mass of an argon atom is $6.63 \times 10^{-26} \text{ kg}$. (2 marks)

$$E_k = \frac{1}{2} (6.63 \times 10^{-26}) (500)^2$$

$$= 8.29 \times 10^{-21} \text{ J}$$

- (ii) Hence, or otherwise, find T_0 (in K). (2 marks)

$$nRT = \frac{1}{2} Nm \bar{c}^2$$

$$\sqrt{\frac{3RT}{2NA}} = \frac{1}{2} m \bar{c}^2 = E_k$$

$$T = 3.65 \times 10^{-18} \text{ K}$$

- (b) If some of the argon has been leaked from the vessel while the temperature remains at T_0 , state and explain the change, if any, in the root-mean-square speed of the argon atoms inside the vessel. (2 marks)

As temperature unchanged,
average kinetic energy of argon unchanged.
Thus, $c_{\text{r.m.s.}}$ also unchanged.

第2(a)(i) 題 • 2/2

- 得分點 1 ✓ 代入平均動能公式
得分點 2 ✓ 得到約 8.29×10^{-21}

第2(a)(ii) 題 • 1/2

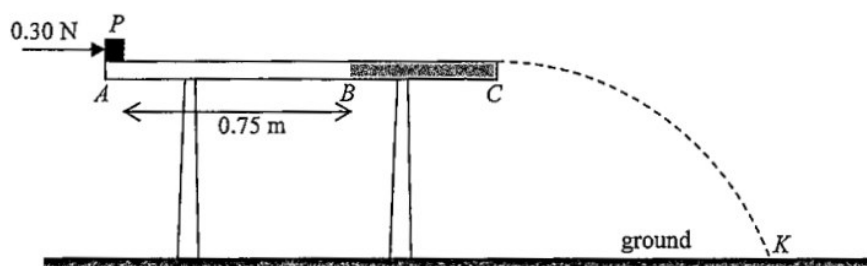
- 得分點 1 ✓ 運用平均動能與溫
2 ✗ 得到約 400 K
Answer: 400 (K)

第2(b) 題 • 2/2

- 得分點 1 ✓ 指出溫度不變
得分點 2 ✓ 推論平均動能及均

3. A small block P of mass 0.20 kg rests on side A of a horizontal table as shown. The surface of the table is smooth from A to B but is rough from B to C . Neglect air resistance.

Figure 3.1



第 3(a) 題 • 2/2

得分點 1 ✓ 代入功—動能關係或

得分點 2 ✓ 得到 1.5 m s^{-1}

第 3(b) 題 • 2/2

得分點 1 ✓ 支持力及重力的方

得分點 2 ✓ 摩擦力的方向與標

第 3(c) 題 • 2/2

得分點 1 ✓ 代入 $h = \frac{1}{2}gt^2$ 得分點 2 ✓ 得到約 0.601 m

A horizontal force of 0.30 N acts on the block as shown.

- (a) Find the speed of the block after it travels 0.75 m to point B .

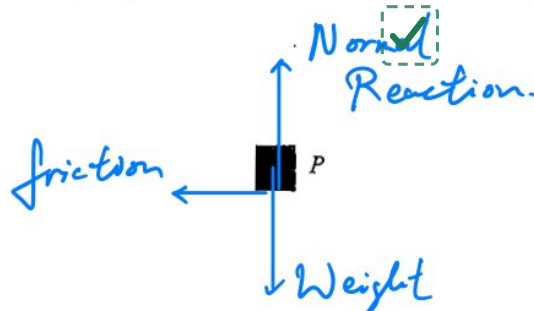
(2 marks)

$$WD = F \cdot s$$

$$\frac{1}{2}(0.2)v^2 = (0.3)(0.75) \quad \checkmark$$

$$v = 1.5 \text{ m s}^{-1} \quad \checkmark$$

- (b) The horizontal force is removed when block P just reaches B . When the block continues to travel from B to C , on the free-body diagram below indicate **2** name the **1** force(s) acting on the block. (2 marks)



- *(c) The block leaves side C of the table and takes 0.35 s to reach point K on the ground. Estimate the height of the table. (2 marks)

$$s_y = u_y t + \frac{1}{2} a_y t^2 \quad \checkmark$$

$$= 0 + \frac{1}{2}(9.81)(0.35)^2$$

$$\therefore \text{height} = 0.601 \text{ m} \quad \checkmark$$

- *4. A sphere of radius 0.50 m rotates about a vertical axis ACB with a constant angular speed of 6 rad s^{-1} , with C being the sphere's centre. A small plasticine P of mass 0.020 kg is stuck on the surface of the sphere such that it rotates on a horizontal plane containing C as shown in Figure 4.1(a).

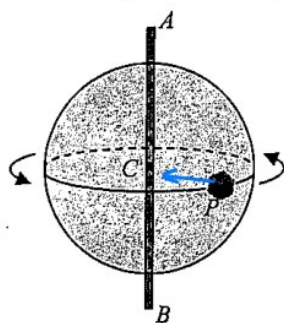


Figure 4.1(a)

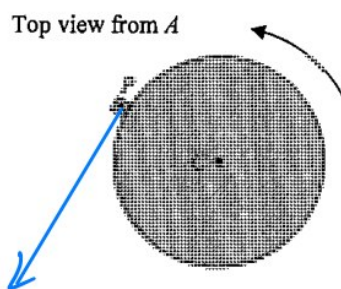


Figure 4.1(b)

- (a) (i) Find the magnitude of the centripetal force acting on P . (2 marks)

$$F_c = m\omega^2 r$$

$$= (0.02)(6)^2(0.5)$$

$$= 0.36 \text{ N}$$

第4(a)(i)題 • 2/2

得分點 1 ✓ 代入 $F = m\omega^2 r$
 得分點 2 ✓ 得到 0.36 N
 Final answer $F = 0.36 \text{ N}$.

第4(a)(ii)題 • 1/1

得分點 1 ✓ 沿 P 點切線畫出離開

第4(b)(i)題 • 1/1

得分點 1 ✓ 指出相同角速度

第4(b)(ii)題 • 2/2

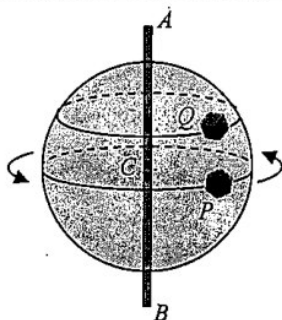
得分點 1 ✓ 指出 Q 的向心加速度

得分點 2 ✓ 以 Q 的半徑較小解釋

- (ii) The sphere's angular speed is increasing. If P finally leaves the sphere at the position shown in Figure 4.1(b) (Top view from A). Indicate on Figure 4.1(b) the direction of motion of P when it just leaves the sphere. (1 mark)

- (b) Another plasticine Q is stuck on the sphere's surface as shown in Figure 4.2.

Figure 4.2



- (i) State whether P and Q have the same angular speed. (1 mark)

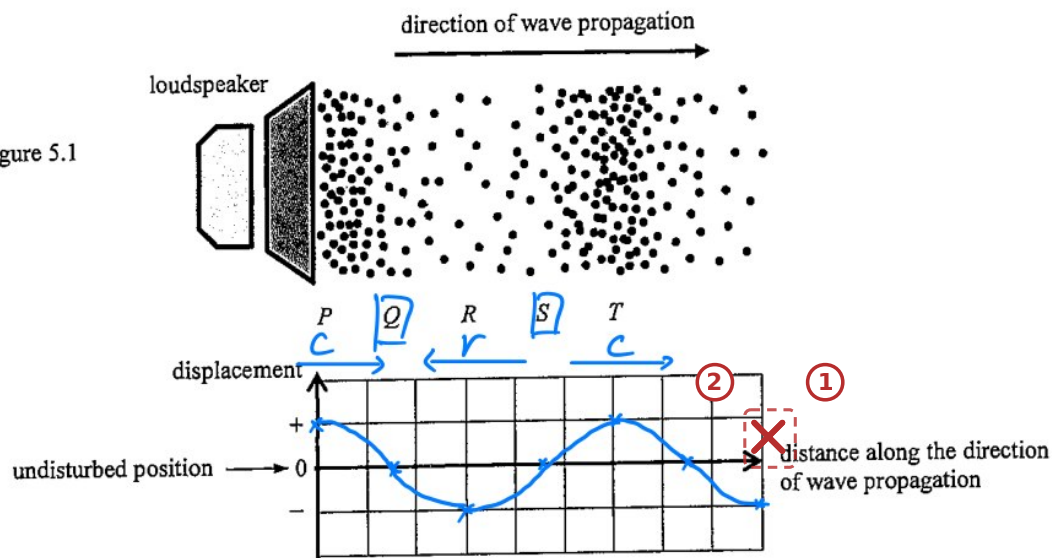
Yes ✓

- (ii) Explain whether P and Q have the same magnitude of centripetal acceleration. (2 marks)

NO. As $r_Q > r_P$ ✓
 $a_Q > a_P$

5. Figure 5.1 represents the distribution of air particles at a certain instant in a sound wave produced by a loudspeaker.

Figure 5.1



- (a) Sketch the displacement-distance graph of the air particles at that instant in the grid provided. Take the displacement to the right as positive (+). (2 marks)

- (b) At the instant shown, state a region (P, Q, R, S or T) in which

- (i) the air particles are moving with the highest speed: (1 mark)

P, R, T

- (ii) the air pressure is lowest. (1 mark)

R

第 5(a) 題 • 0/2

1 × 曲線起點及首段方

2 × 波長、零位移及極

第 5(b)(i) 題 • 0/1

1 × 指出 P、R、T 中其中

第 5(b)(ii) 題 • 1/1

得分點 1 ✓ 指出 R

- *6. After removing the protective coating and the reflective layer of a compact disc (CD), the CD becomes a diffraction grating with evenly spaced parallel slits (Figure 6.1(a)). The set-up in Figure 6.1(b) employs a laser beam which can be used to measure the slit separation d .

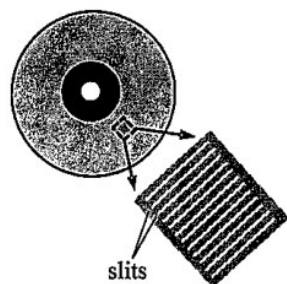


Figure 6.1(a)

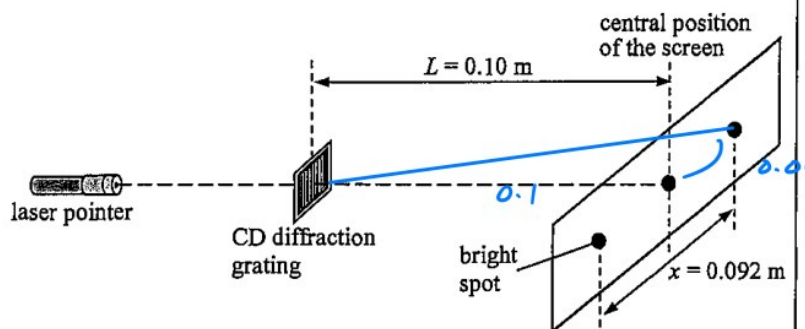


Figure 6.1(b)

Given that the separation between the CD diffraction grating and the screen, L , is 0.10 m, the separation between the first-order maxima, x , is 0.092 m and the wavelength λ of the red laser light beam used is 650 nm.

- (a) Estimate d .

$$d \sin \theta = n \lambda$$

$$d \sin \left(\tan^{-1} \left(\frac{0.092/2}{0.1} \right) \right) = (1)(650 \times 10^{-9})$$

$$d = 1.56 \times 10^{-6} \text{ m}$$

(3 marks)

- (b) State and explain the change in x if green laser light is used.

(2 marks)

Decrease
As green laser has shorter wavelength, $\sin \theta$ reduce
 θ reduce. Thus x reduce.

第 6(a) 題 • 3/3

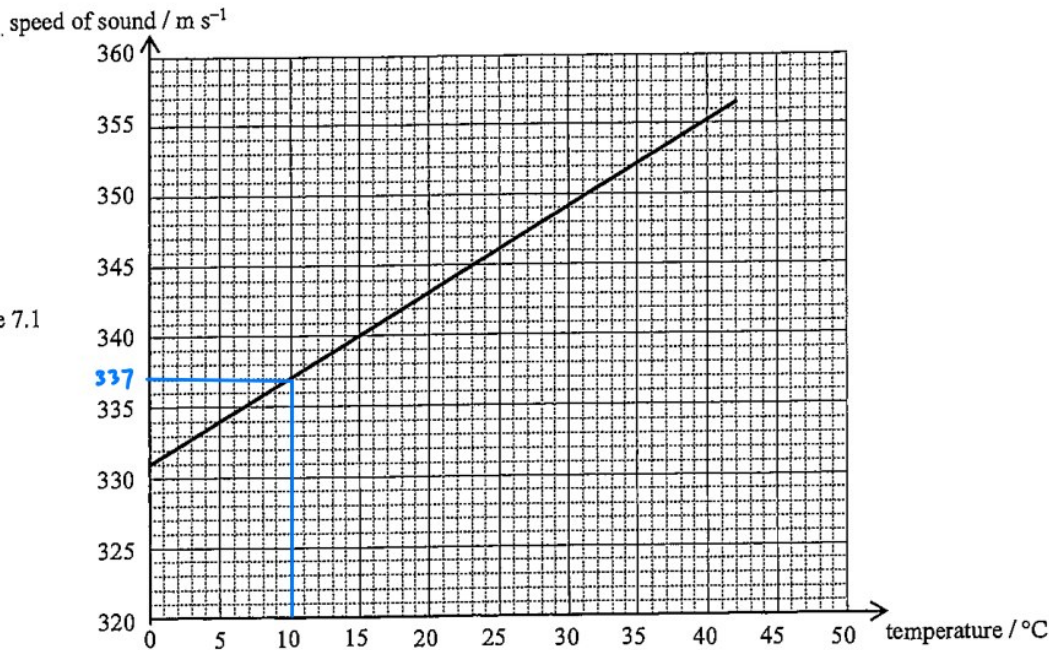
- 得分點 1 ✓ 正確計算衍射角
得分點 2 ✓ 代入光柵方程
得分點 3 ✓ 得到約 1.56 μm

第 6(b) 題 • 2/2

- 得分點 1 ✓ 指出 x 減少
得分點 2 ✓ 以波長及衍射角減

7. The graph below shows the speed of sound at different air temperatures.

Figure 7.1

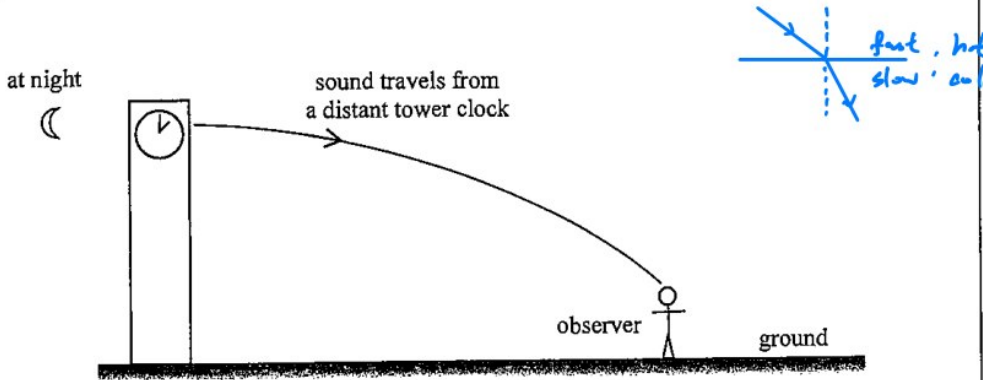


(a) With reference to the graph, state the relationship between the speed of sound and the air temperature. (1 mark)

Speed of sound increase when air temperature increase.

(b) Figure 7.2 shows sound travelling from a distant tower clock to an observer at night when the ground cools.

Figure 7.2



How does the temperature difference between air layers above the ground explain the situation in Figure 7.2? (2 marks)

Temperature decreases from sky to ground uniformly. ✓
As sound travel from fast region to slow region, it ✓
bends toward to normal of air layers.
Thus, sound moves toward ground.

(c) It is known that the air temperature is 10°C . Referring to the graph in Figure 7.1:

(i) estimate the ratio of speed of light to the speed of sound; $\frac{c}{v}$ (1 mark)

$$\frac{c}{v} = \frac{3 \times 10^8}{337} = 8.90 \times 10^5$$

(ii) estimate the distance of a thunderstorm from an observer O if thunder is heard 3.0 s after lightning is seen by O . (2 marks)

$$\Rightarrow \begin{cases} d = c \cdot t \\ d = v \cdot (t+3) \end{cases}$$

$$1 = \frac{c}{v} \cdot \frac{t}{t+3}$$

$$\frac{c}{v} t + \frac{c}{v} \cdot 3 = t$$

$$t = 3.37 \times 10^{-6} \text{ s}$$

$$\therefore d = c \cdot t = 1010 \text{ m}$$



$$v = \frac{d}{t}, d = vt$$

$$\begin{cases} d = c \cdot t \\ d = v \cdot (t+3) \end{cases}$$

第7(b)題 • 2/2

得分點 1 ✓ 指出近地面較冷

得分點 2 ✓ 以聲速差異及折射

第7(c)(i)題 • 0/1

1 ✗ 得到約 8.90×10^5

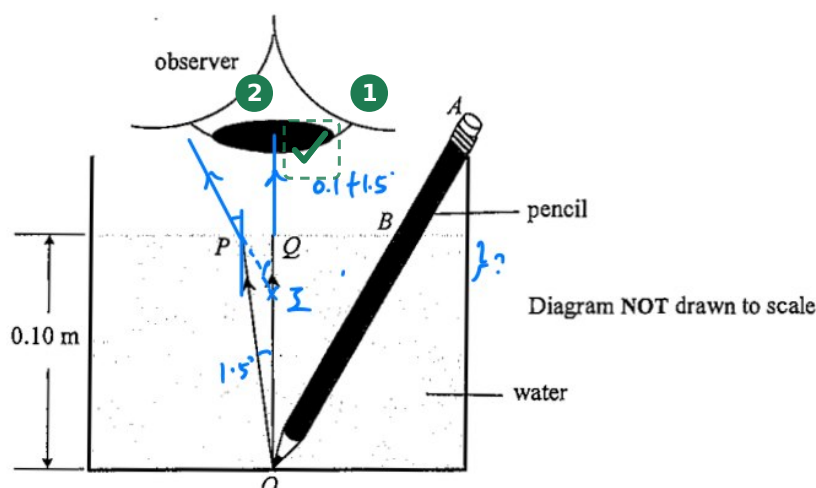
第7(c)(ii)題 • 1/2

1 ✗ 列出距離計算的代

得分點 2 ✓ 得到約 1010-1011 m

8. Figure 8.1 shows a pencil in a glass of water with an observer viewing vertically downwards. Given that the refractive index of water is 1.33.

Figure 8.1



Light rays P and Q come from the tip O of the pencil, with Q along the vertical.

- (a) On Figure 8.1, complete the paths of these light rays and indicate the image of O seen by the observer (label this as I). (2 marks)
- (b) The angle between ray P and ray Q is 1.5° . Find the angle of refraction of ray P . (2 marks)

$$1 \sin \theta = 1.33 \sin 1.5^\circ$$

$$\theta = 2.00^\circ$$

- (c) Hence, or otherwise, find the distance between image I and the water surface if the depth of water is 0.10 m. (2 marks)

$$\Rightarrow PQ = 0.1 \tan 1.5^\circ$$

$$\tan(2.00^\circ) = \frac{PQ}{d_{\text{ref.}}}$$

$$d_{\text{ref.}} = \frac{0.1 \tan 1.5^\circ}{\tan(2.00^\circ)}$$

$$d = 0.0752 \text{ m}$$

第8(a)題 • 2/2

- 得分點 1 ✓ 完成折射光線及方
- 得分點 2 ✓ 反向延長光線並標

第8(b)題 • 2/2

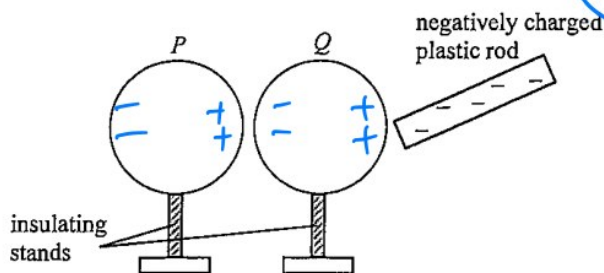
- 得分點 1 ✓ 代入斯涅爾定律
- 得分點 2 ✓ 得到約 2.00°
Final answer: $\theta \approx 2.00^\circ$.

第8(c)題 • 2/2

- 得分點 1 ✓ 建立視深與三角比
- 得分點 2 ✓ 得到約 0.075 m

9. Figure 9.1 shows two identical conducting light spheres P and Q placed close to each other without touching.

Figure 9.1



Both spheres are uncharged initially. A negatively charged plastic rod is brought close to Q but without touching the sphere.

- (a) On Figure 9.1, sketch the distribution of charges on P and on Q . (2 marks)

A student touches sphere P momentarily with his finger while the plastic rod is in the position as shown. The plastic rod is removed afterwards.

- (b) Explain whether the amount of charges on the plastic rod would decrease. (2 marks)

NO. As plastic rod doesn't earthed.

- (c) The two light spheres are now suspended by nylon threads from fixed supports such that the spheres are far apart from each other. Explain how you would use one of the spheres to test for the unknown polarity of another charged rod. (2 marks)



By previous action, P is positively charged and Q is neutral.

Thus, use P .

If the rod is positive, P repulse. if rod is negative, P attracted.

第 9(a) 題 • 2/2

得分點 1 ✓ Q 球的電荷分佈

得分點 2 ✓ P 球的電荷分佈

第 9(b) 題 • 1/2

2 ✗ 以無接觸/無電荷

得分點 1 ✓ 指出棒上電荷量不

第 9(c) 題 • 1/2

1 ✗ 描述靠近但不接觸

得分點 2 ✓ 按排斥/吸引判別

10. (a) As shown in Figure 10.1, one end of an inextensible string is attached to a small metal ball while its upper end O is fixed to a stand. A protractor is fixed onto the stand behind the string.

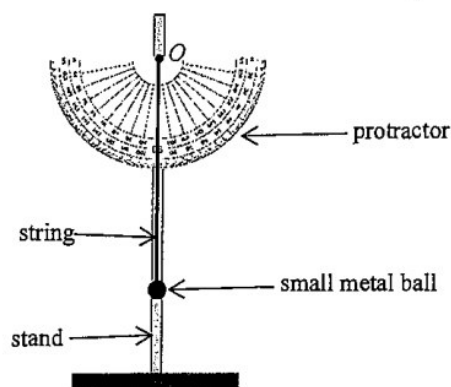


Figure 10.1

Write down the steps that you would take to demonstrate the conservation of energy using the set ^① given. (4 marks)

Place the small metal ball ^② at 0° of protractor with the string straight. ✓

Release the ball and record the maximum degree that ball can reach at another side of protractor. ✓

Repeat the experiment at different degree.

Note that ball must reach the other side with same degree (i.e. height) as released. ✓

Thus, Potential energy of ball is conserved.

- (b) Figure 10.2 shows a Newton's cradle which consists of five identical metal spheres suspended in a row by inextensible light strings of equal length from a fixed horizontal support.

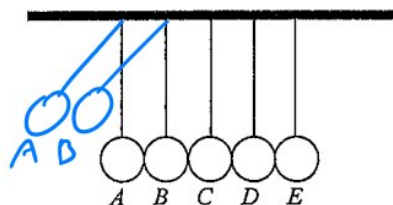


Figure 10.2

① × 記錄明確初始非零

得分點 2 ✓ 繩拉緊並由靜止釋

得分點 3 ✓ 量度另一側最高角

得分點 4 ✓ 比較角度/高度以

Sphere A and B together are displaced slightly to the left and then released from rest. Just after collision, both A and B come to rest while sphere D and E swing together to the right slightly. Neglect air resistance.

- (i) (I) Even though the tensions in the strings acting on the spheres are external forces, explain why the law of conservation of momentum can still be applied for this collision. (1 mark)

As the direction of tension and the direction of collision is perpendicular to each other.

- (II) Suppose that only one sphere (E) swings to the right with speed v_E just after collision. By finding v_E and hence explain why it is not possible for only one sphere to swing to the right. Given that the speed of sphere A and B just before collision is 0.50 m s^{-1} . The mass of each sphere is 0.020 kg . (3 marks)

$$p_{AB} = p_E$$

$$(0.02 \times 2)(0.5) = (0.02) v_E$$

$$v_E = 1 \text{ m s}^{-1}$$

$$KE_{AB} = \frac{1}{2}(0.02 \times 2)(0.5)^2 = 5 \times 10^{-3} \text{ J}$$

$$KE_E = \frac{1}{2}(0.02)(1)^2 = 0.01 \text{ J} \neq KE_{AB}$$

if only one ball out, energy of system does not conserved.

- (ii) The collision repeats alternately from either side for a period of time before the system eventually returns to a rest. Discuss whether the collisions are perfectly elastic. (2 marks)

NO. As external force act on the system (i.e. air resistance) then eventually returns to rest.

第 10(b)(i)(I) 題 • 1/1

得分點 1 ✓ 指出張力與碰撞方

第 10(b)(i)(II) 題 • 2/3

得分點 1 ✓ 用動量守恆求 v_E

得分點 2 ✓ 計算初、末動能

3 ✗ 指出末動能較大，

第 10(b)(ii) 題 • 1/2

得分點 1 ✓ 指出不完全彈性

2 ✗ 指出碰撞時動能轉

11. Read the following passage about deformation sensors and answer the questions that follow.

Figure 11.1(a) shows a simple sensing device consisting of a thin, flat rectangular metal foil attached to a plastic backing plate. When this foil, length l and width w , is stretched to deform as shown in Figure 11.1(b), its resistance will change.

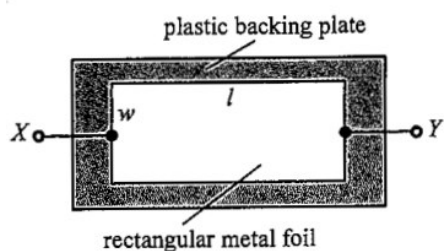


Figure 11.1(a)

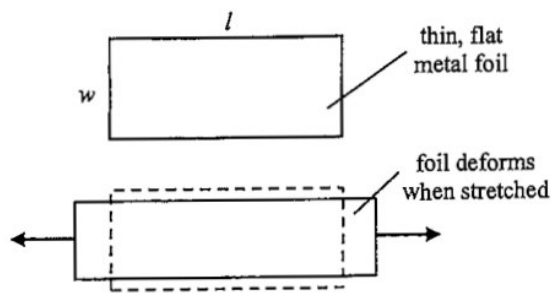


Figure 11.1(b)

When this device is connected to a suitable circuit, it can serve as a sensor to monitor deformation which results in a change in parameters of the circuit (such as voltage).

- (a) Referring to Figure 11.1(a) and (b), state and explain how the metal foil's resistance across XY changes when the foil is stretched. (2) Assume that the thickness and resistivity of the foil remain unchanged. (2 marks)

$$R = \frac{\rho l}{A}$$

$$R \propto l$$

When foil is stretched, length XY increases.

$\therefore$ Resistance increases.

- (b) Figure 11.2 shows a circuit with four resistors of resistance R_1 , R_2 , R_3 and R_4 connected to an input voltage V_{in} . V_{out} is the voltage across DB .

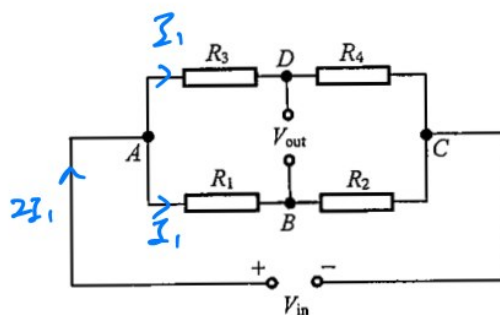


Figure 11.2

第 11(a) 題 • 0/2

2 × 根據 $R = \rho l/A$ 解釋電阻

1 × 同時指出長度增加

- (i) Current I_1 flows through branch ABC . Write an equation relating V_{in} , I_1 , R_1 and R_2 . (1 mark)

$$V_{in} = I_1 (R_1 + R_2) \quad \checkmark$$

- (ii) R_4 in the circuit is the sensing device described in the passage, with unstretched resistance 500Ω . Find the corresponding percentage change in V_{out}/V_{in} when R_4 increases 0.2% (i.e. becomes 501Ω). (2 marks)

Given: $\frac{V_{out}}{V_{in}} = \frac{R_4}{R_3 + R_4} - \frac{R_2}{R_1 + R_2}$; $R_1 = R_2 = R_3 = 470 \Omega$ ①

$$\left(\frac{V_{out}}{V_{in}}\right)' = \frac{501}{470 + 501} - \frac{470}{470 + 470} \quad \checkmark$$

$$\frac{V_{out}}{V_{in}} = \frac{500}{470 + 500} - \frac{470}{470 + 470}$$

$$\% \Delta \frac{V_{out}}{V_{in}} = \frac{\left(\frac{V_{out}}{V_{in}}\right)' - \frac{V_{out}}{V_{in}}}{\frac{V_{out}}{V_{in}}} \times 100\% \quad \text{②}$$

$$= 0.0972\% \quad \times$$

- (iii) Sensing devices S_1 , S_2 , S_3 and S_4 connected to a suitable circuit are attached to ceiling $ABCD$ as shown in Figure 11.3 in order to monitor the growth of the cracks ①, ② and ③. After a few weeks, the extent of deformation detected is in the order $S_1 > S_2 > S_3 > S_4$.

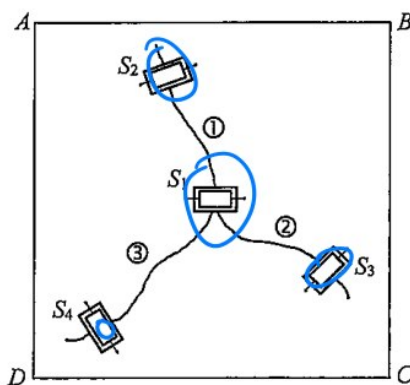


Figure 11.3

- (I) Deduce which crack ①, ② or ③ has grown the most. (1 mark)

① ☒

- (II) Deduce the most probable stretching direction (AB , BC or AC) along the ceiling. (1 mark)

AC ☒

第11(b)(i) 題 • 1/1

得分點 1 ☒ 寫出 $V_{in} = I_1(R_1 + R_2)$

第11(b)(ii) 題 • 1/2

得分點 1 ☒ 代入前後兩個電壓

② ☒ 得到增加約 3.23%

第11(b)(iii)(I) 題 • 1/1

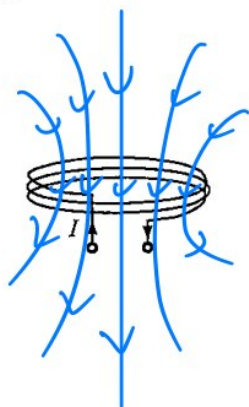
得分點 1 ☒ 指出裂紋 ①

第11(b)(iii)(II) 題 • 0/1

① ☒ 指出方向 AB

12. Figure 12.1 shows a coil of several turns.

Figure 12.1



(a) Sketch the magnetic field pattern produced by the coil when it carries a current I as shown. (2 marks)

(b) As shown in Figure 12.2(a), this coil is now connected to an a.c. source to serve as a transmitter coil (T). A receiver coil (R) connected to a CRO is placed directly above T . The time variation of the voltage of coil R is displayed on the CRO (Figure 12.2(b)).

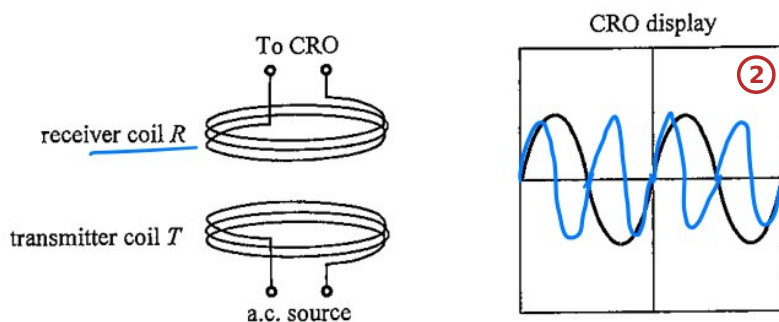


Figure 12.2(a)

Figure 12.2(b)

$\Delta B \rightarrow \text{induced } \mathcal{E} \rightarrow \text{induced } I \rightarrow \text{induced } V$

(i) Explain how the voltage of the receiver coil R is produced. (1 marks)

As coil T is connected to an a.c., current is induced in coil R due to changing of B field from T .
Thus, voltage is induced in R .

*(ii) On Figure 12.2(b), sketch the CRO display when the frequency of the a.c. source is doubled. (2 marks)

第 12(a) 題 • 2/2

得分點 1 ✓ 磁力線圖樣正確

得分點 2 ✓ 線圈中心磁場方向

第 12(b)(ii) 題 • 1/2

得分點 1 ✓ 週期減半 / 頻率加

2 ✗ 感應電壓振幅加倍

第 12(b)(i) 題 • 2/2

得分點 1 ✓ 指出交流電產生

得分點 2 ✓ 指出磁通改變產生

- (c) A mobile phone with a receiver coil inside can be charged wirelessly by placing it on a charging pad equipped with a built-in transmitter coil, which is connected to a power source.



charging pad

cable connecting
the power source
to the charging pad

Explain why wirelessly charging of phones need phone cases with non-metallic back covers. (2 marks)

As principle of wirelessly charging is to induce current
this voltage on a electrical conduction metal, i.e. cell. ② ①
Thus, non-metallic back covers will not disturb the effect of induction. X

1 x 指出金屬中產生渦

2 x 指出發熱/能量損

13. Radon (Rn-222) is a radioactive gas with no colour, no smell and no taste. It is released from bedrock material underground or from concrete composed of granite. Rn-222 decays with a half-life of 3.82 days by giving out α particles.

(a) * (i) Find the decay constant (unit: s^{-1}) of Rn-222.

1

(2 marks)

$$\lambda = \frac{\ln 2}{3.82 \times 24 \times 60 \times 60}$$

$$= 2.10 \times 10^{-6} s^{-1}$$

2

(ii) Inside buildings, the average activity due to radon in $1 m^3$ of air is about 48 Bq. Estimate the average number of radon atoms in $1 m^3$ of air in 1 side buildings.

(2 marks)

$$A = \lambda N$$

$$N = \frac{48}{\lambda}$$

$$= 2.29 \times 10^7$$

2

(iii) Why is indoor radon considered harmful to human although α particles have limited penetrating power?

(1 marks)

As human inhale radon in indoor is difficult to be sense by normal feeling. As if human inhale it, α -particle has strong ionizing power. Thus harmful to body.

第 13(a)(i) 題 • 2/2

得分點 1 ✓ 以秒為單位代入半

得分點 2 ✓ 得到 $2.10 \times 10^{-6} s$

第 13(a)(ii) 題 • 1/2

1 ✗ 運用 $N = A/\lambda$ 的代入

得分點 2 ✓ 得到 2.29×10^7 個

第 13(a)(iii) 題 • 2/2

得分點 1 ✓ 指出氡氣可被吸入

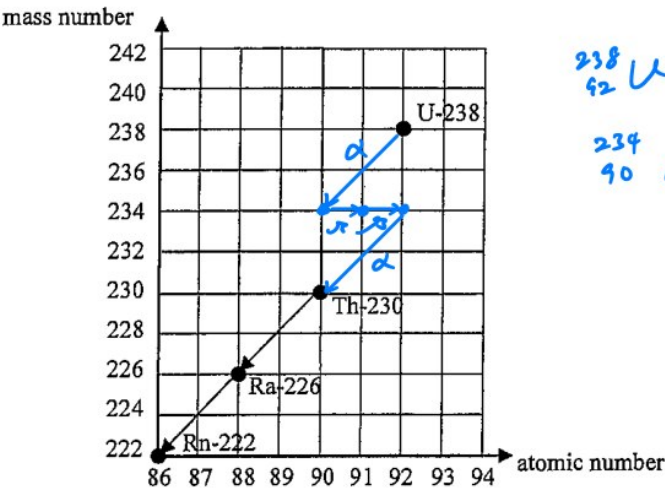
得分點 2 ✓ 指出 α 粒子電離能力

第 13(b) 題 • 2/2

得分點 1

✓ 四段 α 、 β^- 、 β^- 、 α 衰變箭

(b) Rn-222 belongs to a decay series starting from uranium-238 (U-238). It is known that U-238 undergoes decay in the sequence α - β - β - α to become thorium-230 (Th-230). Complete the decay series below from U-238 to Th-230 using arrows. (2 marks)



END OF PAPER

Sources of materials used in this paper will be acknowledged in the HKDSE Question Papers booklet published by the Hong Kong Examinations and Assessment Authority at a later stage.