

SULIT

NAMA: _____

KELAS: _____



JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA 2010

4531/1

EXCEL 2

PHYSICS Kertas 1

Ogos 2010

1 Jam 15 minit

Satu jam lima belas minit

-
1. Kertas soalan ini adalah dalam dwibahasa.
 2. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Malaysia.
 3. Calon dikehendaki membaca dengan teliti arahan di dalam kertas soalan ini.

**DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED
(JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU)**

1. This question paper consists of **50** questions. (*Kertas soalan ini mengandungi 50 soalan*).
2. Answer **all** questions. (*Jawab semua soalan*).
3. Answer each question by **blackening** the correct space on the OMR. (*Jawab setiap soalan dengan **menghitamkan** ruangan yang betul pada kertas jawapan OMR*).
4. **Blacken** only one space for each question. (***Hitamkan** satu ruangan sahaja bagi setiap soalan*).
5. Should you wish to change your answer, erase the answer you have marked completely. Then blacken the space for new answer. (*Sekiranya anda hendak menukar jawapan, padamkan jawapan yang telah ditanda. Kemudian hitamkan ruangan untuk jawapan yang baru*).
6. The figures in the questions provided are not drawn to scale unless otherwise stated. (*Rajah-raja yang mengiringi soalan-soalan tidak dilukis mengikut skala kecuali dinyatakan*).
7. The use of non-programmable calculator is allowed. (*Penggunaan kalkulator saintifik yang tidak boleh diprogram adalah dibenarkan*).

Kertas soalan ini mengandungi 25 halaman bercetak.

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SULIT

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

$$1. \quad v^2 = u^2 + 2as$$

$$2. \quad a = \frac{v-u}{t}$$

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

$$4. \quad \text{Momentum} = mv$$

$$5. \quad F = ma$$

$$6. \quad \text{Kinetic Energy} = \frac{1}{2}mv^2$$

$$7. \quad \text{Gravitational Potential Energy} = mgh$$

$$8. \quad \text{Elastic Potential Energy} = \frac{1}{2}Fx$$

$$9. \quad \rho = \frac{m}{V}$$

$$10. \quad \text{Pressure in liquid, } P = h\rho g$$

$$11. \quad \text{Pressure, } P = \frac{F}{A}$$

$$12. \quad \text{Heat, } Q = mc\theta$$

$$13. \quad \text{Heat, } Q = m\ell$$

$$14. \quad \frac{PV}{T} = \text{constant}$$

$$15. \quad E = mc^2$$

$$16. \quad v = \lambda f$$

$$17. \quad \text{Power, } P = \frac{\text{Energy}}{\text{Time}}$$

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

$$19. \quad \lambda = \frac{ax}{D}$$

$$20. \quad n = \frac{\sin i}{\sin r}$$

$$21. \quad n = \frac{\text{real depth}}{\text{apparent depth}}$$

$$22. \quad n = \frac{1}{\sin c}$$

$$23. \quad Q = It$$

$$24. \quad V = IR$$

$$25. \quad \text{Power, } P = IV$$

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

$$27. \quad \frac{V_s}{V_p} = \frac{N_s}{N_p}$$

$$28. \quad \frac{I_s}{I_p} = \frac{V_p}{V_s}$$

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

Tiap-tiap soalan diikuti oleh sama ada **tiga, empat** atau **lima** pilihan jawapan. Pilih satu jawapan yang terbaik bagi setiap soalan dan hitamkan ruangan yang betul pada kertas jawapan anda.

1. 108 km h^{-1} is equivalent to
 108 km h^{-1} adalah bersamaan dengan
 - A. 20 m s^{-1}
 - B. 30 m s^{-1}
 - C. 50 m s^{-1}
 - D. 60 m s^{-1}

2. A runner runs 4 km towards south in 0.5 hours and 5 km towards east in 1.5 hours. What is his average velocity?
Seorang pelari belari 4 km menuju Selatan selama 0.5 jam dan 5 km menuju Timur dalam 1.5 jam. Apakah purata halajunya?
 - A. 6.50 km h^{-1}
 - B. 5.67 km h^{-1}
 - C. 4.50 km h^{-1}
 - D. 3.20 km h^{-1}

3. The purpose of taking average values in a measurement is to
Tujuan untuk mengambil nilai purata dalam suatu pengukuran ialah untuk
 - A. Increase its consistency
Meningkatkan kepersisan
 - B. Reduce its deviation
Mengurangkan sisihan relative
 - C. Avoid error
Mengelakkan ralat
 - D. Increase its accuracy
Meningkatkan kejituan

4. 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 mm Q = 18.9 cm R = 4.21 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 <i>Angkup vernier</i>	Micrometer screw gauge <i>Tolak skru mikrometer</i>	Metre rule <i>Pembaris meter</i>
B.	Micrometer screw gauge <i>Tolak skru mikrometer</i>	Vernier caliper <i>Angkup vernier</i>	Metre rule <i>Pembaris meter</i>
C.	Micrometer screw gauge <i>Tolak skru mikrometer</i>	Metre rule <i>Pembaris meter</i>	Vernier caliper <i>Angkup vernier</i>
D.	Vernier caliper <i>Angkup vernier</i>	Metre rule <i>Pembaris meter</i>	Metre rule <i>Pembaris meter</i>

5.

Energy = force x distance. <i>Tenaga = daya x jarak</i>

The unit for force is kg ms^{-2} and the unit for distance is m, what is the derived unit for energy?

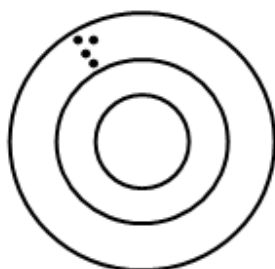
Tenaga adalah bersamaan dengan daya x sesaran. unit bagi daya ialah kg ms^{-2} dan unit bagi sesaran ialah m, apakah unit terbitan bagi tenaga?

- | | | | |
|-----------|-------------------------------|-----------|----------------------------------|
| A. | kg ms^{-2} | C. | $\text{kg m}^2 \text{s}^2$ |
| B. | $\text{kg m}^2 \text{s}^{-2}$ | D. | $\text{kg m}^{-1} \text{s}^{-2}$ |

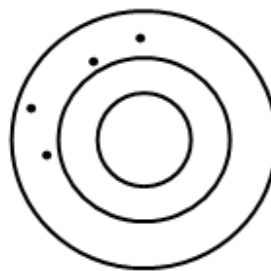
6. In a rifle shooting competition, Suresh was eliminated from the competition because his shots were not accurate even though they were consistent. Which target board below shows the shots made by Suresh?

Dalam sebuah pertandingan menembak, Suresh disingkirkan daripada pertandingan kerana tembakannya tidak jitu walaupun ianya persis. Papan sasaran yang manakah menunjukkan tembakan yang dilakukan oleh Suresh?

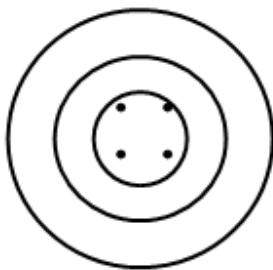
A.



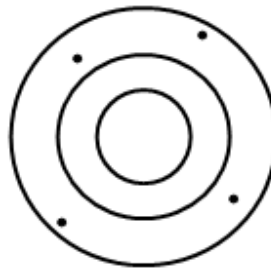
B.



C.



D.



7. Diagram 1 shows the velocity- time graph of a moving object .
Rajah 1 menunjukkan graf halaju-masa bagi objek yang sedang bergerak.

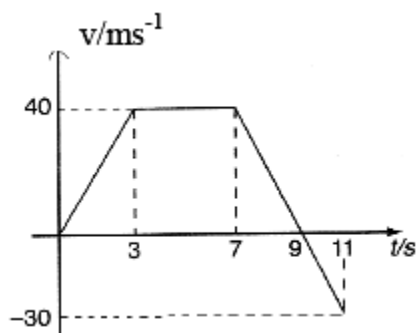
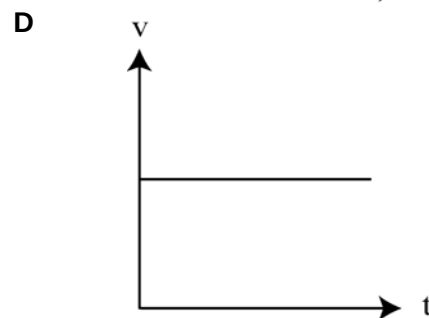
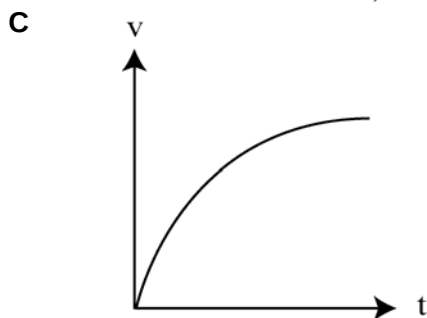
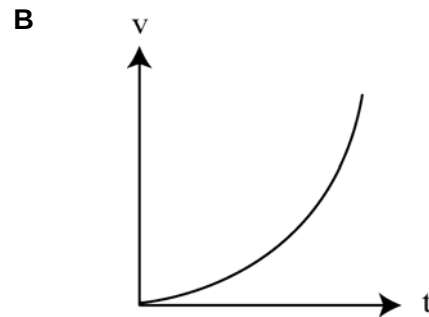
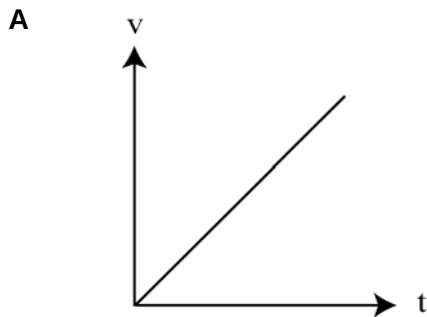


DIAGRAM 1
 RAJAH 1

Calculate the average velocity of its motion.
Kirakan halaju purata bagi gerakan tersebut.

- | | |
|--------------------------|--------------------------|
| A. 20.0 ms ⁻¹ | C. 23.6 ms ⁻¹ |
| B. 20.9 ms ⁻¹ | D. 25.5 ms ⁻¹ |

8. Force can do the following **except**
*Suatu daya boleh melakukan yang berikut **kecuali***
- A. Move a stationary object
Menggerakkan objek yang pegun
 - B. Stop a moving object
Memberhentikan objek yang sedang bergerak
 - C. Decelerate a moving object
Menyahpecut objek yang sedang bergerak
 - D. Alters the quantity of matters of the object
Mengubah kuantiti jirim sesuatu objek
9. Which graph shows an increasing acceleration?
Graf yang manakah menunjukkan pecutan semakin meningkat?



10. In diagram 2, three horizontal forces act on a car that is moving along a straight level road.

Dalam rajah 2, tiga daya mendatar bertindak ke atas sebuah kereta yang bergerak di sepanjang jalan yang rata.

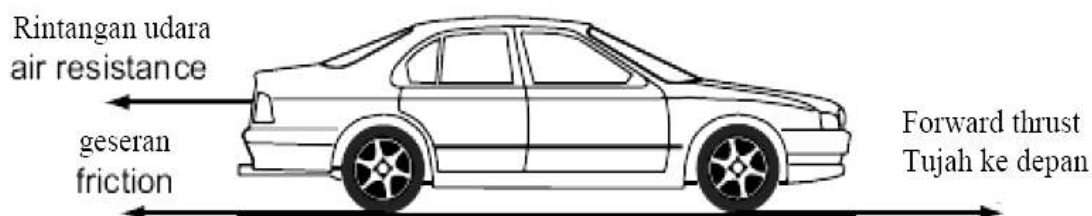


DIAGRAM 2
RAJAH 2

Which combination of forces would result in the car moving at constant velocity?

Kombinasi daya yang manakah akan menghasilkan halaju yang malar pada kereta tersebut?

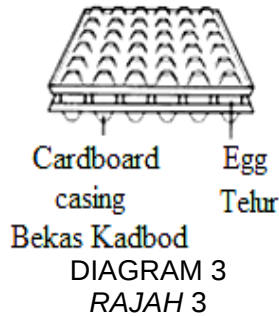
	Air resistance <i>Rintangan udara</i>	Friction <i>Daya geseran</i>	Forward thrust <i>Tujah ke depan</i>
A.	200 N	1000 N	800 N
B.	800 N	1000 N	200 N
C.	800 N	200 N	1000 N
D.	1000 N	200 N	800 N

11. An object of mass 2 kg is pulled by a force of 4 N. The object moves at a constant speed. What is the acceleration of the object when the force is increased to 10 N?

Sebuah objek berjisim 2 kg ditarik oleh daya 4 N. Objek tersebut bergerak dengan laju seragam. Apakah pecutan objek tersebut apabila daya ditingkatkan kepada 10 N?

- A. 2 ms^{-1}
B. 3 ms^{-1}
C. 5 ms^{-1}
D. 7 ms^{-1}

12. In diagram 3, a cardboard casing is usually used in packing eggs.
Dalam rajah 3, sebuah bekas kadbod yang biasa digunakan untuk mengisi telur.



The soft surface of the cardboard casing is to
Permukaan yang lembut pada bekas kadbod itu bertujuan untuk

- A. Hold the eggs in their places
Memegang telur pada kedudukannya
 - B. Increase the time of impact if accidentally drop to the floor
Meninggikan masa perlanggaran jika terjatuh ke lantai
 - C. Increase the impulsive force
Meninggikan daya impuls
13. Oil drips at a constant rate from a moving car. The diagram 4 shows the pattern of the drips on the road.
Minyak menitis pada kadar seragam dari kereta yang sedang bergerak. Rajah 4 menunjukkan corak titisan di atas jalan raya.



DIAGRAM 4
 RAJAH 4

Which statement describes the motion of the car?

Manakah pernyataan yang menerangkan gerakan kereta tersebut?

- A. It accelerated and then moved at a steady speed.
la memecut dan kemudiannya bergerak dengan laju seragam.
- B. It accelerated and then decelerated.
la memecut dan kemudiannya menyahpecut.
- C. It moved at a steady speed and then decelerated.
la bergerak dengan laju seragam dan kemudiannya menyahpecut.
- D. It moved at a steady speed and then accelerated.
la bergerak dengan laju seragam dan kemudiannya memecut.

14. Diagram 5 shows a spring of length 20 cm is compressed to a length of 10 cm when a load of 12 kg is put on top of it. When the load M is put on top of it, the spring compressed to a length of 15 cm .

Rajah 5 menunjukkan suatu spring dengan panjang 20 cm termampat kepada 10 cm apabila beban seberat 12 kg diletakkan ke atasnya. Apabila beban M diletakkan ke atasnya, spring itu termampat kepada 15 cm.

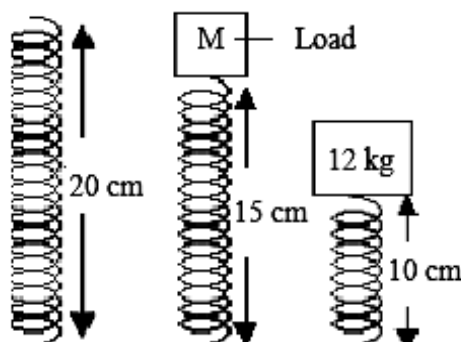


DIAGRAM 5
RAJAH 5

What is the value of M ?

Apakah nilai bagi M?

- | | |
|---------|---------|
| A. 4 kg | C. 8 kg |
| B. 6 kg | D. 9 kg |

15. Diagram 6 shows a car of mass 1000 kg moving at velocity 20 ms^{-1} hits the back of the lorry of mass 5000 kg which is parked by the road side.
Rajah 6 menunjukkan sebuah kereta yang berjisim 1000 kg sedang bergerak dengan halaju 20 ms^{-1} berlanggar dengan bahagian belakang sebuah lori yang berjisim 5000 kg dalam keadaan pegun.

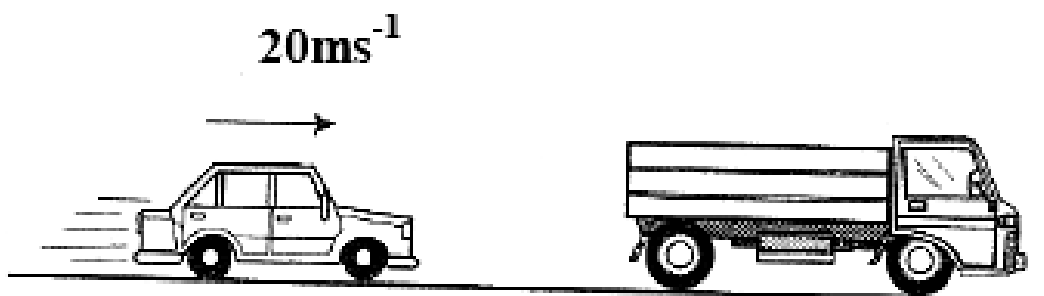


DIAGRAM 6
RAJAH 6

- If the car sticks to the lorry after the collision, what are their common velocities?
Jika kereta dengan lori bercantum selepas perlanggaran, apakah halaju sepunya?
- A. 0 ms^{-1} C. 4.0 ms^{-1}
B. 3.3 ms^{-1} D. 20.0 ms^{-1}
16. Where the heat energy does goes when a cup of hot tea cools?
Ke manakah tenaga haba dibebaskan apabila secawan teh panas menyejuk?
- A. It warms the surroundings
la menghangatkan persekitaran
B. It warms the water of the tea
la menghangatkan air the
C. It turns into heat energy and disappears
la bertukar menjadi tenaga haba kemudiannya lenyap

17. Which of the following characteristics does a liquid-in-glass thermometer work?
Manakah antara ciri-ciri berikut menerangkan fungsi termometer cecair dalam kaca?
- A. Volume of a fixed mass of liquid
Isipadu cecair pada jisim yang malar
 - B. Length of the liquid
Panjang cecair
 - C. Resistance of the liquid
Rintangan cecair
 - D. Pressure of the liquid
Tekanan cecair
18. When a Celsius scale is defined to a liquid-in-glass thermometer, what do the number 0 and 100 assign to?
Apabila sebuah skala Celcius ditentukan dalam termometer cecair dalam kaca, bagaimanakah nilai 0 dan 100 ditentukan?
- A. 0 is assigned to the freezing point and 100 is assigned to the boiling point
0 ditentukan kepada takat beku dan 100 ditentukan kepada takat didih
 - B. 0 is assigned at starting temperature and 100 as ending temperature
0 ditentukan sewaktu bermula suhu diukur dan 100 sebagai suhu akhir
 - C. 0 and 100 are assigned to minimum change of volume of the liquid in the thermometer
0 dan 100 ditentukan kepada perubahan isipadu minimum cecair dalam termometer

19. Which of the following is an application of high pressure?
Manakah antara berikut merupakan aplikasi untuk keadaan tekanan yang tinggi?
- A. Military tanks having special wheels called caterpillar tracks.
Kereta kebal mempunyai tayar khas yang dinamakan "caterpillar track".
 - B. Hammering a nail with a sharp end into a wall.
Menukul paku yang tajam pada dinding.
 - C. A skier moves faster over snow on skis.
Peluncur salji bergerak dengan pantas di atas salji menggunakan kasut ski.
 - D. A tractor has big and broad tires.
Sebuah traktor mempunyai tayar yang besar dan lebar.
20. Aiman lifts a heavy object underwater. He finds it is much easier to lift the object while it is underwater. This is because the object experiences
Aiman mengangkat objek yang berat di dalam air. Dia mendapati adalah lebih mudah mengangkat objek itu semasa di dalam air. Ini adalah kerana objek itu mengalami
- A. Buoyant force
Daya julangan
 - B. Force of gravity
Daya graviti
 - C. Surface tension
Tegangan permukaan
 - D. Water friction
Rintangan air
21. The acceleration due to gravity is 9.8 ms^{-2} . This means that for an object falling freely have
Pecutan disebabkan oleh graviti 9.8 ms^{-2} . Ini bermaksud bahawa objek yang jatuh secara bebas mempunyai
- A. the speed of the object is always 9.8 ms^{-1} .
laju objek sentiasa bernilai 9.8 ms^{-1} .
 - B. the speed of the object increases by 9.8 ms^{-1} in every second.
laju objek meningkat sebanyak 9.8 ms^{-1} setiap saat.
 - C. the distance traveled by the object is 9.8 m every second.
jarak yang dilalui objek bernilai 9.8 m setiap saat..
 - D. the distance traveled by the object increases by 9.8 m every second.
jarak yang dilalui objek meningkat setiap 9.8 m setiap saat.

22.

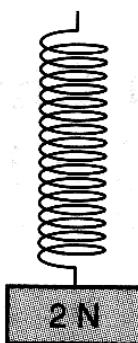


DIAGRAM 7

RAJAH 7

Diagram 7 shows a weight of 2 N being hung at the end of a spring. If the extension of the spring is 0.02 m, the work done in stretching the spring is

Rajah 7 menunjukkan pemberat 2 N digantungkan pada hujung spring. Sekiranya pemanjangan spring adalah 0.02 m, kerja yang dilakukan untuk meregangkan spring tersebut adalah

- | | |
|-----------|-----------|
| A. 2.00 J | B. 1.00 J |
| C. 0.04 J | D. 0.02 J |

23. Water has the specific heat capacity of $4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$. 21 kJ of heat is supplied to the water of mass 1 kg. What is the rise in temperature of the water?

Muatan haba tentu bagi air adalah $4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$. 21 kJ haba dibekalkan ke atas air yang berjisim 1 kg. Berapakah nilai kenaikan suhu air tersebut?

- | | |
|--------------------------|--------------------------|
| A. 200°C | B. 20°C |
| C. 5°C | D. 0.5°C |

24. Which of the following temperatures corresponds to absolute zero on the Kelvin scale?
Manakah antara pernyataan berikut berhubung kait dengan sifar mutlak dalam skala Kelvin?

- | | |
|---------------------------|--------------------------|
| A. 273°C | B. 0°C |
| C. -273°C | D. 100°C |

25.

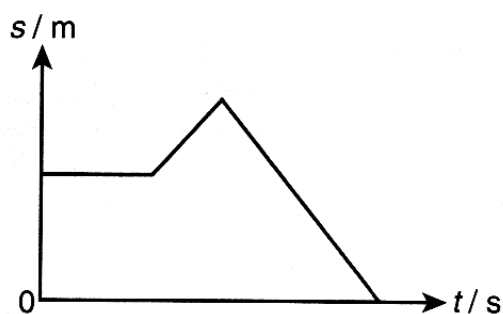


DIAGRAM 8

RAJAH 8

Diagram 8 shows the displacement-time graph of an object. Which of the following describes the sequence of motion of the object?

Rajah 8 menunjukkan graf sesaran melawan masa suatu objek. Manakah antara berikut menerangkan urutan pergerakan objek tersebut?

- A. Uniform velocity, acceleration, deceleration.
Halaju sekata, pecutan, nyahpecutan.
- B. Uniform velocity, deceleration, acceleration.
Halaju sekata, nyahpecutan, pecutan.
- C. Stationary, uniform velocity, uniform velocity in the opposite direction.
Pegun, halaju sekata, halaju sekata dengan arah berlawanan.
- D. Deceleration, acceleration, uniform velocity.
Nyahpecutan, pecutan, halaju sekata.

26. Which of the following factors **does not** influence the rise in temperature of the substance?

Manakah antara perkara berikut **tidak** mempengaruhi kenaikan suhu suatu bahan?

- A. Amount of heat supplied to the substance.
Jumlah haba dibekalkan ke atas bahan.
- B. Mass of the substance.
Jisim bahan.
- C. Specific heat capacity.
Muatan haba tentu.
- D. The initial temperature of the substance.
Suhu awal bahan.

27. A kettle made of aluminium has a mass of 1.8 kg. What is the heat capacity of the kettle? The specific heat capacity of aluminium is $880 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$.
Sebuah cerek buatan aluminium mengandungi jisim 1.8 kg. Berapakah nilai muatan haba cerek tersebut? Diberi mutan haba tentu aluminium $880 \text{ J g}^{-1} \text{ }^{\circ}\text{C}^{-1}$
- A. $704 \text{ J }^{\circ}\text{C}^{-1}$ B. $880 \text{ J }^{\circ}\text{C}^{-1}$
- C. $1584 \text{ J }^{\circ}\text{C}^{-1}$

28.

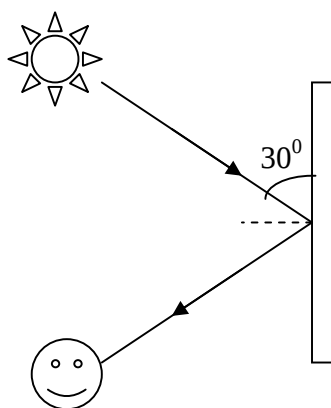


DIAGRAM 9
RAJAH 9

The diagram 9 shows a ray of light from a bulb striking a plane mirror at an angle of 30° as shown. What is the angle of reflection?

Rajah 9 menunjukkan sinaran cahaya dari lampu dipantulkan ke cermin satah pada sudut 30° . Berapakah sudut pantulannya?

- A. 30° B. 60°
 30° 60°
- C. 90° 120°
 90° 120°

29. A dentist uses a mirror to view his patient's decayed tooth. What type of mirror and the distance from the tooth should the mirror place?

Seorang doktor gigi menggunakan cermin untuk melihat kerosakan gigi pesakitnya. Apakah jenis cermin dan jaraknya sepatutnya cermin tersebut di letakkan dari gigi?

	Type of mirror Jenis cermin	Distance of mirror from the tooth Jarak cermin dari gigi
A.	Concave Cekung	Less than the focal length. <i>Kurang daripada jarak fokus.</i>
B.	Convex Cembung	Less than the focal length. <i>Kurang daripada jarak fokus.</i>
C.	Plane Satah	Same distance as the image behind it. <i>Sama jarak dengan imej di belakangnya.</i>
D.	Convex Cembung	Greater than the focal length. <i>Lebih besar daripada jarak fokus.</i>
E.	Concave Cekung	Greater than the focal length. <i>Lebih besar daripada jarak fokus.</i>

30.

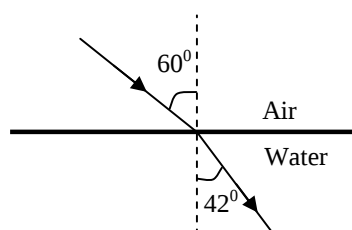


DIAGRAM 10
RAJAH 10

The diagram 10 shows a ray of light travels from air into water. The speed of light in a vacuum is $3.0 \times 10^8 \text{ ms}^{-1}$. What is the speed of light in the water?

Rajah 10 menunjukkan sinar cahaya merambat dari udara ke dalam air. Laju cahaya di vakum adalah $3.0 \times 10^8 \text{ ms}^{-1}$. Berapakah laju cahaya dalam air?

- | | | | |
|----|-----------------------------------|----|-----------------------------------|
| A. | $3.9 \times 10^7 \text{ ms}^{-1}$ | B. | $2.2 \times 10^8 \text{ ms}^{-1}$ |
| C. | $2.3 \times 10^8 \text{ ms}^{-1}$ | D. | $2.6 \times 10^8 \text{ ms}^{-1}$ |

31. The critical angle for certain liquid-air surface is determined when the incident angle is

Sudut kritikal untuk sesetengah permukaan cecair-udara ditentukan apabila sudut tuju

- A.** maximum as light travels from air to liquid.
maksimum sewaktu cahaya merambat dari udara ke cecair.
- B.** minimum as light travels from air to liquid.
minimum sewaktu cahaya merambat dari udara ke cecair.
- C.** maximum as light travels from liquid to air.
maksimum sewaktu cahaya merambat dari udara ke cecair.
- D.** minimum as light travels from liquid to air.
minimum sewaktu cahaya merambat dari cecair ke udara.

32. Which of the following characteristics can be used to differentiate between a transverse wave and a longitudinal wave?
Manakah antara berikut boleh digunakan untuk membezakan antara gelombang melintang dan gelombang membujur?

- A.** The amplitude of the wave.
Amplitude gelombang.
- B.** The frequency of the wave.
Frekuensi gelombang.
- C.** The medium of transmission of the wave.
Medium rambatan gelombang.
- D.** The direction of motion of particles of the medium.
Arah pergerakan zarah medium.

33. Long curtains and soft carpets are used in an auditorium hall to prevent
Langsir yang panjang dan tikar lembut digunakan di dewan auditorium untuk mengelakkan

- | | |
|---|--|
| A. Reflection of sound.
<i>Pantulan bunyi.</i> | C. Refraction of sound.
<i>Biasan bunyi.</i> |
| B. Interference of sound.
<i>Interferens bunyi.</i> | D. Diffraction of sound.
<i>Belauan bunyi.</i> |

34. Diagram 11 below shows a loudspeaker consisting of a cone which vibrates to and fro.

Rajah 11 di bawah menunjukkan pembesar suara terdiri daripada sebuah kon yang bergetar ke hadapan dan ke belakang.

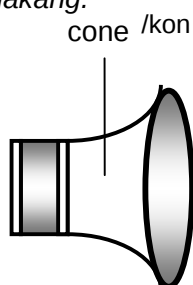


DIAGRAM 11
RAJAH 11

If the cone is made to vibrate with bigger amplitude, the sound will become

Sekiranya kon tersebut bergetar dengan amplitude yang besar, bunyi yang dikeluarkan akan menjadi

- | | |
|----------------------|------------------------------------|
| A. louder
lantang | C. higher pitched
lebih nyaring |
| B. quieter
senyap | D. lower pitch
kurang nyaring |

35. Which of the following does **not** affect the resistance of a copper wire?
Manakah antara berikut **tidak** mempengaruhi rintangan wayar kuprum?

- A. The temperature of the wire
Suhu wayar
- B. The length of the wire
Panjang wayar
- C. The type of material the wire is made of
Jenis bahan untuk wayar tersebut
- D. The elasticity of the wire
Kekenyalan wayar

39. In diagram 12 when a magnet is pushed towards a solenoid, the galvanometer connected to the solenoid deflects to the right.

Dalam rajah 12, apabila sebuah magnet ditolak menuju solenoid, galvanometer yang disambungkan pada solenoid tersebut memesong ke kanan.

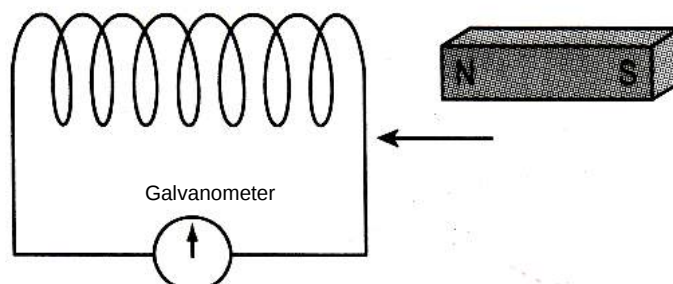


DIAGRAM 12
RAJAH 12

When the same magnet is pulled away from the solenoid at the same speed, what will be the deflection on the galvanometer?

Apabila magnet yang sama ditarik menjauhi solenoid tersebut pada laju yang sama, bagaimanakah pesongan galvanometer tersebut?

- | | |
|--|--|
| A. Zero
<i>Sifar</i> | C. The same and to the left
<i>Sama dan ke kiri</i> |
| B. The same and to the right
<i>Sama dan ke kanan</i> | D. Greater and to the left
<i>Lebih besar dan ke kiri</i> |
40. Diagram 13 shows the value of the current flowing through a transistor.
Rajah 13 menunjukkan nilai arus yang mengalir melalui sebuah transistor.

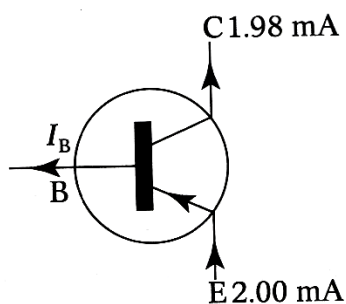


DIAGRAM 13
RAJAH 13

What is the value of current I_B ?

Berapakah nilai untuk arus I_B

- | | |
|------------|------------|
| A. 0.02 mA | B. 1.98 mA |
| C. 2.00 mA | D. 2.02 mA |

41. Diagram 14 shows an electric circuit for studying a logic gate.
Rajah 14 menunjukkan litar elektrik untuk mengkaji get logic.

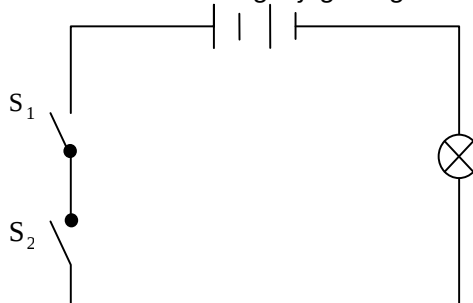


DIAGRAM 14
 RAJAH 14

The bulb only lights up when the two switches S_1 and S_2 are closed. What type of logic gate is being studied?

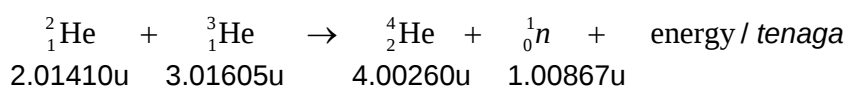
Mentol hanya menyala apabila dua suis S_1 dan S_2 ditutup. Apakah jenis get logic yang dikaji?

- | | |
|---|---|
| <p>A. NOT gate
Get TAK</p> <p>C. OR gate
Get ATAU</p> | <p>B. AND gate
Get DAN</p> <p>D. NAND gate
Get NAND</p> |
|---|---|
42. Isotopes of an element have
Isotopes suatu elemen mempunyai
- A.** the same chemical properties
kandungan bahan kimia yang sama
 - B.** the same physical properties
ciri fizikal yang sama
 - C.** the same number of neutrons
nombor neutrons yang sama
 - D.** the same number of electrons
nombor elektron yang sama

43. Why are gamma rays not deflected by an electric field and a magnetic field?
Kenapa sinar gamma tidak terpesong apabila melalui medan elektrik dan medan magnet?

- A. They have no mass
la tidak mempunyai jisim
- B. They have no charge
la tidak bercas
- C. They are weakly ionizing
Lemah kuasa pengionan
- D. They have strong penetration power
la mempunyai kuasa penembusan yang kuat

44. The following equation shows a nuclear fusion reaction.
Persamaan berikut menunjukkan tindakbalas pelakuran nuklear



$$[1\text{u} = 1.66 \times 10^{-27} \text{ kg}, c = 3.00 \times 10^8 \text{ m s}^{-1}]$$

What is the amount of energy released?
Berapakah jumlah tenaga yang dibebaskan?

- A. $3.13 \times 10^{-29} \text{ J}$
- B. $9.39 \times 10^{-21} \text{ J}$
- C. $2.82 \times 10^{-12} \text{ J}$
- D. $8.45 \times 10^{-4} \text{ J}$

45. Which statement regarding thermionic emission is **correct**?
 Manakah antara pernyataan berikut adalah **betul** mengenai pembebasan termionik?

- A. Electrons are emitted from the surface of the cathode which has high potential
Elektron dibebaskan daripada permukaan katod yang berkeupayaan tinggi
- B. Electrons are emitted from the surface of the cathode which is heated
Elektron dibebaskan daripada permukaan katod yang telah dipanaskan
- C. Electrons are emitted from the surface of the anode which has positive potential
Elektron dibebaskan daripada permukaan anod berkeupayaan positif
- D. Electrons are emitted from the surface of the grid with negative potential
Elektron dibebaskan daripada permukaan grid berkeupayaan negatif

46. Diagram 15 is a circuit designed to switch on the bulb when the correct combination of switches is closed.
 Rajah 15 adalah litar yang direka untuk menyalakan mentol apabila kombinasi suis yang betul ditutup

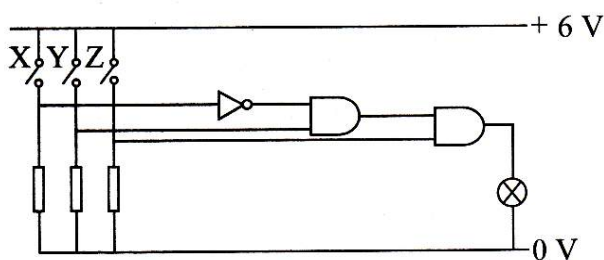


DIAGRAM 15
 RAJAH 15

Which combination of switches will light up the bulb when closed?
 Yang manakah kombinasi suis yang akan menyalakan mentol tersebut apabila suis tersebut ditutup.

- A. X and Y
X dan Y
- B. X and Z
X dan Z
- C. Y and Z
Y dan Z

47. Diagram 16 shows a neutron bombards an uranium nucleus which leads to a rapid series

of nuclear fissions.

Rajah 16 menunjukkan satu neutron membedil satu nukleus uranium yang mengakibatkan satu siri pembelahan nuklear dalam suatu masa yang singkat.

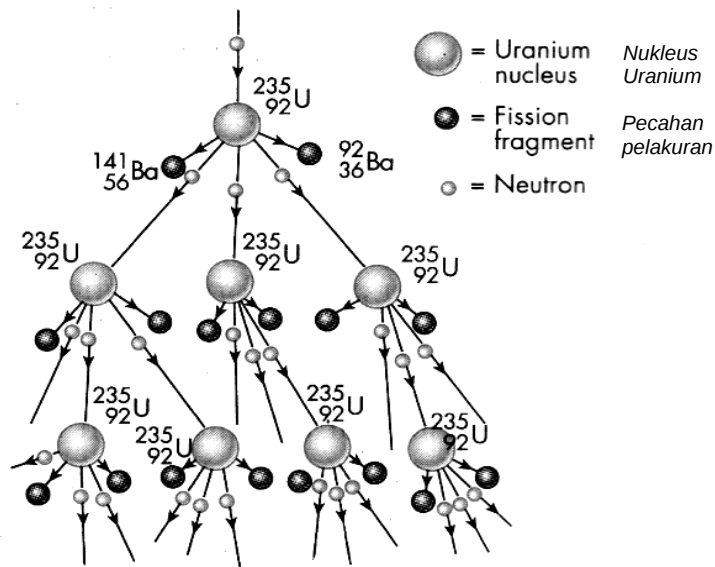


DIAGRAM 16
RAJAH 16

What is the result of this chain reaction?

Apakah kesudahan bagi tindak balas berantai ini?

- A. Huge amount of protons is produced.
Jumlah proton yang sangat besar dihasilkan
- B. Huge amount of electrons are produced.
Jumlah electron yang sangat besar dihasilkan
- C. Huge amount of electromagnetic waves is produced.
Jumlah gelombang electromagnet yang sangat besar dihasilkan
- D. Huge amount of energy is produced.
Jumlah tenaga yang sangat besar dihasilkan

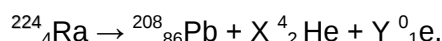
48. In a nuclear reaction, 2.70×10^{-13} J of energy is released. What is the mass lost? [Given

the speed of light is $3 \times 10^8 \text{ ms}^{-1}$

Dalam satu tindakbalas nuclear, $2.70 \times 10^{-13} \text{ J}$ tenaga telah dibebaskan. Berapakah jisim yang hilang? [Diberi laju cahaya adalah $3 \times 10^8 \text{ ms}^{-1}$]

- A. $9.0 \times 10^{-12} \text{ kg}$ B. $9.0 \times 10^{-18} \text{ kg}$
C. $3.0 \times 10^{-11} \text{ kg}$ D. $3.0 \times 10^{-29} \text{ kg}$

49. The following equation represents the decay of a radium nucleus.
Persamaan berikut menunjukkan proses pereputan nukleus radium.



What are the values of X and Y?
Berapakah nilai untuk X dan Y?

- | | X | Y |
|----|---|---|
| A. | 4 | 6 |
| B. | 4 | 4 |
| C. | 6 | 4 |
| D. | 6 | 6 |

50. The method of carbon dating cannot measure the objects of extremely old age accurately. Which of the following is the most likely reason?
Aplikasi menentukan tarikh menggunakan sebatian karbon tidak dapat mengukur suatu objek yang mempunyai usia yang sangat lama secara tepat. Manakah antara pernyataan berikut merupakan antara sebab puncanya?
- A. Activity of the sample with more than ten half-lives is too weak to be measured accurately.
Aktiviti sample yang lebih daripada sepuluh setengah hayatnya adalah sangat lemah untuk dikesan secara tepat
- B. After a long period of time, the level of C-14 is going to be raised again.
Setelah tempoh masa yang lama, paras C-14 akan dinaikkan lagi
- C. After a long period of time, the half-life of C-14 is going to change
Selepas tempoh yang lama, setengah hayat C-14 akan berubah
- D. The half-life of C-14 fluctuates with time
Setengah hayat C-14 berkurangan berkadar dengan masa.

END OF QUESTIONS
SOALAN TAMAT

ANSWER SCHEME PAPER 1
SKEMA JAWAPAN KERTAS 1

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

SULIT

NAMA: _____

KELAS: _____



JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA 2010

4531/2

EXCEL 2
PHYSICS
Kertas 2
Ogos 2010

1 Jam 15 minit

Satu jam lima belas minit

-
1. Kertas soalan ini adalah dalam dwibahasa.
 2. Soalan dalam Bahasa Inggeris mendahului soalan yang sepadan dalam Bahasa Malaysia.
 3. Calon dikehendaki membaca dengan teliti arahan di dalam kertas soalan ini.

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED
(JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU)

1. This question paper consists of **50** questions. (*Kertas soalan ini mengandungi 50 soalan*).
2. Answer **all** questions. (*Jawab semua soalan*).
3. Answer each question by **blackening** the correct space on the OMR. (*Jawab setiap soalan dengan **menghitamkan** ruangan yang betul pada kertas jawapan OMR*).
4. **Blacken** only one space for each question. (***Hitamkan** satu ruangan sahaja bagi setiap soalan*).
5. Should you wish to change your answer, erase the answer you have marked completely. Then blacken the space for new answer. (*Sekiranya anda hendak menukar jawapan, padamkan jawapan yang telah ditanda. Kemudian hitamkan ruangan untuk jawapan yang baru*).
6. The figures in the questions provided are not drawn to scale unless otherwise stated. (*Rajah-raja yang mengiringi soalan-soalan tidak dilukis mengikut skala kecuali dinyatakan*).
7. The use of non-programmable calculator is allowed. (*Penggunaan kalkulator saintifik yang tidak boleh diprogram adalah dibenarkan*).

Kertas soalan ini mengandungi 25 halaman bercetak.

SULIT

NAMA: _____

KELAS: _____



JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA
EXCEL 2
PHYSICS
Kertas 2
OGOS 2010

4531/2

2 Jam 30 minit

Dua jam tiga puluh minit

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED

(JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU)

1. Tulis nama dan kelas anda pada ruangan yang disediakan.
2. Calon dibenarkan menjawab keseluruhan Atau sebahagian soalan sama ada dalam bahasa Inggeris atau dalam bahasa Melayu

Untuk Kegunaan Pejabat			
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 18 halaman bercetak.

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

- | | |
|---|--|
| 1. $a = \frac{v - u}{t}$ | 16. Power, $P = \frac{\text{energy}}{\text{time}}$ |
| 2. $v^2 = u^2 + 2as$ | 17. $V = IR$ |
| 3. $s = ut + \frac{1}{2}at^2$ | 18. Power, $P = IV$
<i>kuasa</i> |
| 4. Momentum = mv | 19. $\frac{N_s}{N_p} = \frac{V_s}{V_p}$ |
| 5. $F = ma$ | 20. Efficiency = $\frac{I_s V_s}{I_p V_p} \times 100\%$
<i>(kecekapan)</i> |
| 6. Kinetic energy
<i>(Tenaga kinetik)</i> $= \frac{1}{2}mv^2$ | 21. $I_{\text{rms}} = \frac{I_{\text{peak}}}{\sqrt{2}}$ |
| 7. Potential energy
<i>Tenaga keupayaan</i> $= mgh$ | 22. $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$ |
| 8. Elastic potential energy = $\frac{1}{2}Fx$
<i>(Tenaga keupayaan kenyal)</i> | 23. $n = \frac{\sin i}{\sin r}$ |
| 9. $\rho = \frac{m}{V}$ | 24. $n = \frac{\text{Real depth / dalam nyata}}{\text{Apparent depth / dalam ketara}}$ |
| 10. Pressure, $p = hpg$.
<i>Tekanan</i> | 25. $\lambda = \frac{ax}{D}$ |
| 11. Pressure, $p = \frac{F}{A}$
<i>Tekanan</i> | 26. $Q = I t$ |
| 12. Heat, $Q = mc\theta$
<i>Haba</i> | 27. $E = I(R + r)$ |
| 13. $\frac{PV}{T} = \text{Constant}$ (<i>pemalar</i>) | 28. $eV = \frac{1}{2}mv^2$ |
| 14. $E = mc^2$ | 29. $g = 10 \text{ ms}^{-2}$ |
| 15. $v = f \lambda$ | |

Section A [60 marks]
Bahagian A [60 markah]

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

1. A student used a pair of vernier calipers to measure the thickness of a block. **Diagram 1(a)** shows the reading on the vernier calipers when the jaws are fully closed while **Diagram 1(b)** shows the reading when the block is placed between the jaws.

Seorang pelajar menggunakan sepasang angkup vernier untuk mengukur ketebalan seketul kayu. **Rajah 1(a)** menunjukkan bacaan angkup vernier semasa angkup vernier bertutup. **Rajah 1(b)** menunjukkan bacaan angkup vernier semasa kayu itu diukur.

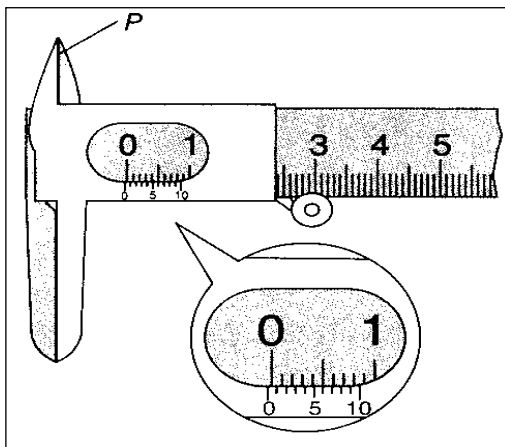


Diagram 1(a)
Rajah 1(a)

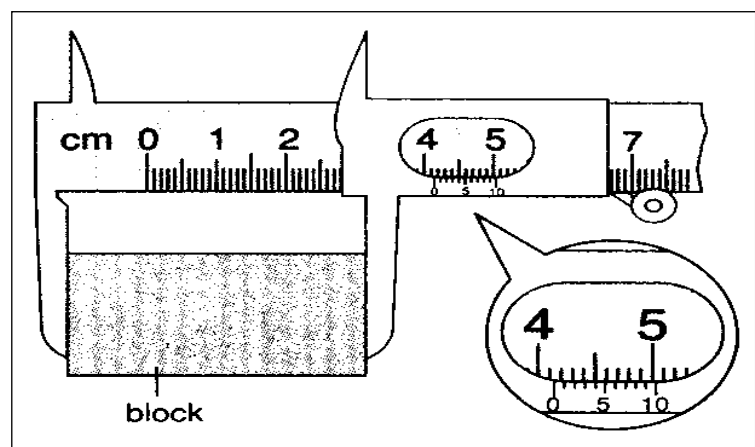


Diagram 1(b)
Rajah 1(b)

- | | | |
|-------|---|-------------------------|
| (a) | State the function of P .
<i>Nyatakan kegunaan P.</i> | [1 mark]
[1 markah] |
| <hr/> | | |
| (b) | State the zero error on the vernier calipers.
<i>Nyatakan ralat sifar bagi angkup vernier.</i> | [1 mark]
[1 markah] |
| <hr/> | | |
| (c) | Calculate the thickness of the block in <i>cm</i> .
<i>Kirakan ketebalan kayu.</i> | [2 marks]
[2 markah] |

2.

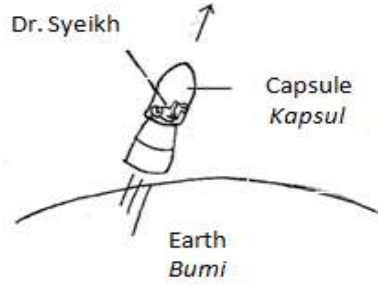


Diagram 2(a)
Rajah 2(a)

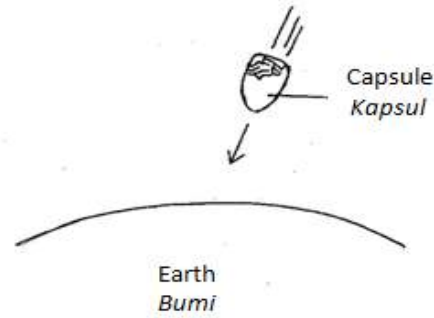


Diagram 2(b)
Rajah 2(a)

Diagram 2(a) shows the rocket used to send the capsule, Soyul into the outer space and **Diagram 2(b)** shows the capsule, Soyul is returning to the Earth.

Rajah 2(a) menunjukkan sebuah rocket digunakan untuk menghantar kapsul Soyul ke angkasa lepas. **Rajah 2(b)** menunjukkan kapsul Soyul bergerak menuju ke arah bumi.

- (a) What causes the apparent weight of Dr. Syeikh increases tremendously when the rocket takes off? [1 mark]
Apa yang mengakibatkan berat ketara Dr. Syeikh meningkat dengan ketara semasa roket bergerak ke atas? [1 markah]

- (b) Show the formula that can be used to calculate the apparent weight of Dr. Syeikh if the acceleration of the rocket is $a \text{ ms}^{-2}$ and the mass of Dr. Syeikh is $m \text{ kg}$. [1mark]
Tunjukkan formula yang boleh digunakan untuk mengira berat ketara Dr. Syeikh jika pecutan roket ialah $a \text{ ms}^{-2}$ dan jisim Dr. Syeikh ialah $m \text{ kg}$. [1 markah]

- (c) The rocket is constructed in multi-stages. Each stage consist a combustion chamber and fuel. State the purpose to have multi-stages. State the principle used to achieve higher acceleration. [2 marks]
Roket itu dibina dalam beberapa peringkat. Setiap peringkat mengandungi bahan api dan ruang perbakaran. Nyatakan tujuan roket dibina dalam beberapa peringkat. Nyatakan prinsip yang digunakan untuk meningkatkan pecutan roket. [2 markah]

- (d) From the aspect of direction, identify and state the difference between the apparent weight acted on Dr. Syeikh when the capsule returns to the Earth [1 mark]
Dari segi arah, nyatakan perbezaan berat ketara yang dialami oleh Dr. Syeikh semasa kapsul kembali ke bumi. [1 markah]

3. **Diagram 3** shows a model of Bourdon Gauge which is constructed by a student to measure the gas pressure.

Rajah 3 menunjukkan sebuah model Tolok Bourdon dibina oleh seorang pelajar untuk mengukur tekanan gas.

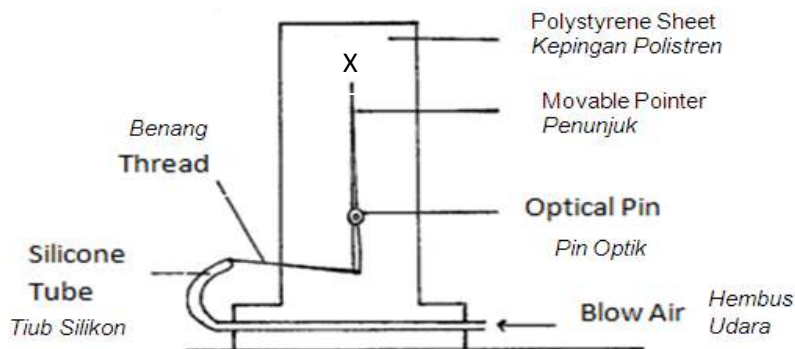


Diagram 3
Rajah 3

- (a) What is the initial reading X in terms of atmospheric pressure? [1 mark]
Apakah nilai bacaan X dalam sebutan tekanan udara? [1 markah]
-
- (b) State the direction of the motion of the silicone tube and the movable pointer when the air is blown into the silicone tube. [2 marks]
Nyatakan arah pergerakan yang ditunjukkan oleh tiub silikon dan penunjuk yang bebas bergerak apabila udara ditiup ke dalam tiub silikon? [2 markah]
-
- (c) The sensitivity of the model is low. Suggest 2 methods that can be used to improve the sensitivity of the model. [2 marks]
Kepekaan model ini adalah rendah. Cadangkan 2 kaedah yang boleh digunakan untuk meningkatkan kepekaannya. [2 markah]
-
- (d) If the model is used to measure the pressure of the cooking gas in a cylinder and the reading obtained is 1.6 atmospheric pressure, find the pressure of the cooking gas in the cylinder. [1 mark]
Jika model ini digunakan untuk mengukur tekanan gas memasak dalam silinder dan bacaan yang diperolehi ialah 1.6 tekanan udara, carikan tekanan gas memasak dalam silinder. [1 markah]
-

4.

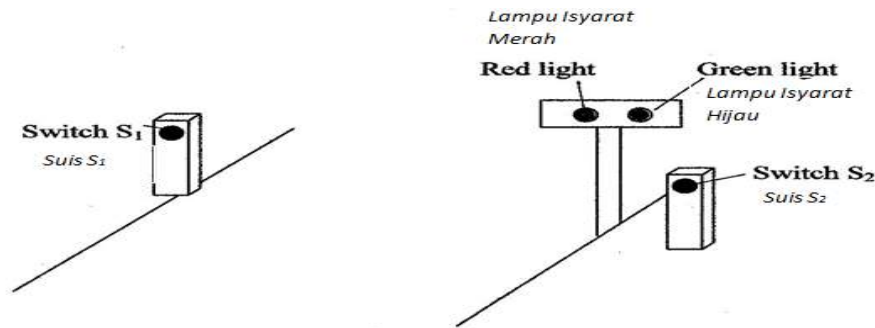


Diagram 4
Rajah 4

Diagram 4 shows the traffic light which is controlled by an electronic circuit that designed by an engineer to control a traffic light so that pedestrians can cross a busy road easily. The green light is always on unless one of the switches S_1 or S_2 is pressed or both the switches are pressed by the pedestrian. The red light only on when the green light is off.

Rajah 4 menunjukkan lampu isyarat yang dikawal oleh sebuah litar elektronik yang direka oleh seorang jurutera untuk memudahkan pejalan kaki untuk merentasi suatu jalan yang sibuk. Lampu isyarat hijau selalu menyala, kecuali salah satu suis ditekan atau kedua-dua suis S_1 dan S_2 ditekan bersama. Lampu isyarat merah hanya menyala jika lampu isyarat hijau terpadam.

- (a) Complete the table below to show the output of green light and red light. [2 marks]
Lengkapkan jadual di bawah untuk menunjukkan output lampu isyarat hijau dan lampu isyarat merah. [2 markah]

Switch S_1 Suis S_1	Switch S_2 Suis S_2	Green Light Lampu isyarat hijau	Red Light Lampu isyarat merah
0	0		
1	0		
0	1		
1	1		

- (b) Name the logic gate(s) needed in the circuit to control [2 marks]
Namakan get logic yang diperlukan dalam litar untuk mengawal [2 markah]

- (i) the green light: _____
lampu isyarat hijau: _____
- (ii) the red light: _____
lampu isyarat merah: _____

- (c) Design and draw the electronic circuit to control the traffic light. [3 marks]
Reka dan lukiskan litar elektronik yang mengawal lampu isyarat. [3 markah]

5. **Diagram 5(a)** shows the sparks generated from the fireworks which are falling on Ali's hand. **Diagram 5(b)** shows that Ali is using his hand to stir the dodol in a wok with a stirrer.

Rajah 5(a) menunjukkan percikan api dihasilkan oleh bunga api yang terjatuh di atas tangan Ali.

Rajah 5(b) menunjukkan Ali menggunakan pengacau untuk mengacau dodol di dalam sebuah periuk.



Diagram 5(a)
Rajah 5(a)

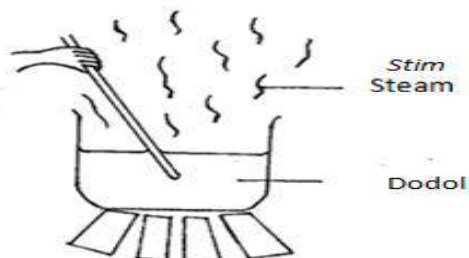


Diagram 5(b)
Rajah 5(b)

- (a) How does the temperature of sparks from the fireworks and the steam from the wok change when they are in contacted with Ali's hand? [1 mark]
Bagaimanakah suhu percikan api dan stim berubah semasa bersentuh dengan tangan Ali? [1 markah]
-
- (b) State another physical change which only shown by steam when it is in contacted with Ali's hand. [1 mark]
Namakan satu perubahan fizikal lagi yang hanya ditunjukkan oleh stim semasa ia bersentuh dengan tangan Ali. [1 markah]
-
- (c) What form of energy is lost as heat energy:
Apakah bentuk tenaga yang hilang sebagai tenaga haba:
- (i) from the spark? [1 mark]
oleh percikan api? [1 markah]
-
- (ii) from the steam? [1 mark]
oleh stim? [1 markah]
-
- (d) Give a general equation to show the total heat transferred to Ali's hand from
Berikan rumus untuk menunjukkan jumlah tenaga haba yang pindah ke tangan Ali
- (i) the spark [1 mark]
dari percikan api [1 markah]
-
- (ii) the steam [1 mark]
daripada stim [1 markah]
-

- (e) Ali does not suffer any pain from the sparks but is seriously burnt by the steam. Give 3 reasons to explain the phenomenon. [3 marks]

Ali tidak rasa sakit apabila terkena dengan percikan api tetapi melecur dengan serius oleh stim. Berikan 3 alasan untuk menerangkan kenyataan di atas. [3 markah]

6. **Diagram 6** shows a graph of the activity of nucleus X which varies with time. The activity of nucleus X is recorded with a Geiger Muller tube which is placed 10 cm in front of the radioactive source X.

Rajah 6 menunjukkan sebuah graf aktiviti nukleus X yang berubah dengan masa. Aktiviti nukleus X adalah diukur oleh sebuah Tiub Geiger Muller yang terletak 10 cm di depan sumber bahan radioaktif X.

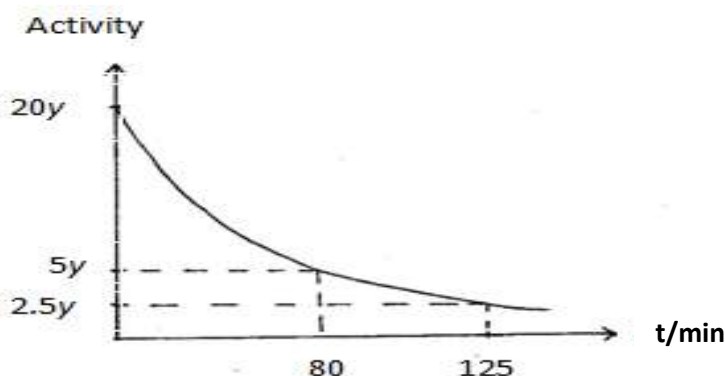


Diagram 6
Rajah 6

- (a) What is background reading? [1 mark]
Apa itu bacaan latar belakang? [1 markah]

- (b) State the 2 sources that produce the background reading in the Geiger Muller tube. [2 marks]
Namakan 2 sumber yang menghasilkan bacaan latar belakang oleh Tiub Geiger Muller. [2 markah]

- (c) Find the half life of nucleus X from the graph given, [1 mark]
Tentukan separuh hayat nukleus X daripada graf yang diberi, [1 markah]
(i) when activity X dropped from 20y to 5y
apabila aktiviti X menurun dari 20y ke 5y

- (ii) when activity X dropped from $5y$ to $2.5y$ [1 mark]
 apabila aktiviti X menurun dari $5y$ ke $2.5y$ [1 markah]
-

- (d) State the weakness of the half life determined from question (c). [1 mark]
 Nyatakan kelemahan separuh hayat yang ditentukan dari soalan (c). [1 markah]
-

- (e) State the error made and suggest a method to overcome the weakness. [2 marks]
 Nyatakan kesilapan yang dilakukan dan cadangkan satu kaedah untuk mengatasi kelemahan itu. [2 markah]
-
-
-

7. **Diagram 7** shows the shape of the waves generated by a leaking water pipe that lies at the base of the pond. Some stones are scattered around the leaking point of the water pipe.

Rajah 7 menunjukkan bentuk gelombang yang dihasilkan oleh sebatang paip yang kebocor. Paip itu berada di dasar sebuah kolam. Di sekeliling tempat air kebocor itu terdapat beberapa buah batu.

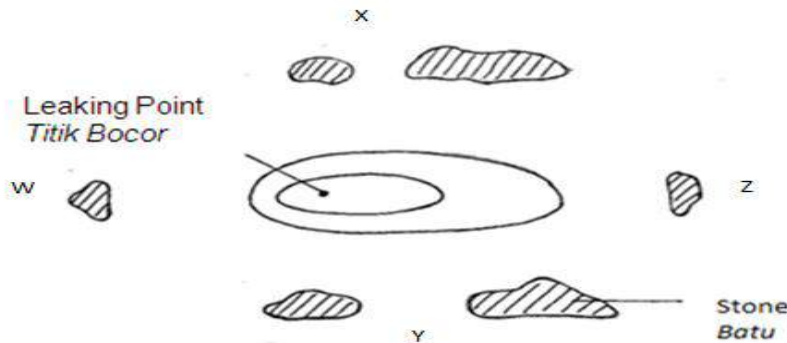


Diagram 7
Rajah 7

- (a) Based on the shape of the waves generated,
 Berdasarkan bentuk gelombang yang terhasil,
- (i) name the physical quantity that remains constant when the wave is propagating outwards. [1 mark]
 apakah kuantiti fizikal yang tidak berubah semasa gelombang merambat. [1 markah]
-
- (ii) state the relationship between velocity and wavelength of the wave. [1 mark]
 Nyatakan hubungan di antara halaju dan panjang gelombang. [1 markah]
-

- (b) Based on the wavelength generated around the leaking point,
Berdasarkan jarak gelombang air yang dihasilkan oleh paip terbocor,
- (i) label the 2 areas which are having the same depth with symbol A. [1 mark]
labelkan 2 kawasan yang mempunyai kedalaman yang sama dengan simbol A. [1 markah]
- (ii) label the deepest area with symbol B. [1 mark]
labelkan kawasan paling dalam dengan simbol B [1 markah]
- (c) Sketch the wave formed after propagating
Lakarkan bentuk gelombang selepas ia merambat
- (i) through slits X and Y. [2 marks]
melalui celahan X dan Y [2 markah]
- (ii) around stones W and Z. [2 marks]
mengelilingi batu W dan Z [2 markah]
- (d) Based on the answer from question (c), identify 2 factors that affect the diffraction. [2 marks]
Berdasarkan jawapan dari soalan (c), tentukan 2 faktor yang mempengaruhi kesan belauan. [2 markah]
-

8. **Diagram 8** shows a circuit consists of 3 identical light bulbs, and 2 switches.
Rajah 8 menunjukkan litar yang mengandungi 3 buah mentol yang serupa dan 2 buah suis.

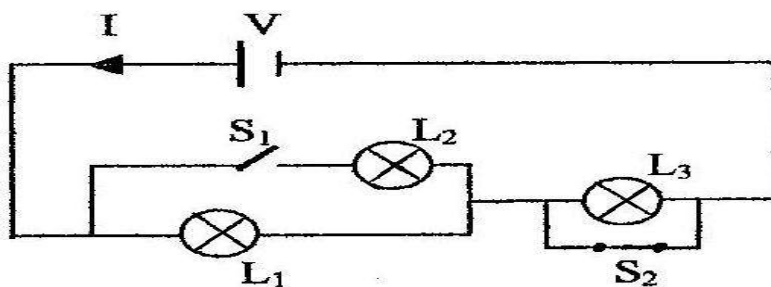


Diagram 8
Rajah 8

- (a) When switch S_1 is off and switch S_2 is on.
 Apabila suis S_1 terbuka dan suis S_2 tertutup.
- (i) Name the light bulb that light up in the circuit. [1 mark]
 Namakan mentol yang menyala di dalam litar. [1 markah]
-
- (ii) Find the product of current and voltage across the bulb L_1 in terms of I and V . [1 mark]
 Carikan hasil darab arus dan beza upaya bagi mentol L_1 dalam sebutan I dan V . [1 markah]
-
- (b) When both the switches are on.
 Apabila kedua-dua suis tertutup.
- (i) Name the bulb(s) that light up in the circuit. [1 mark]
 Namakan mentol yang menyala di dalam litar. [1 markah]
-
- (ii) Find the total current flows through the circuit in terms of I . [1 mark]
 Carikan jumlah arus yang mengalir melalui litar dalam sebutan I . [1 markah]
-
- (iii) Find the current and the voltage across bulb L_1 in terms of I and V . [1 mark]
 Carikan arus dan beza upaya merentasi mentol L_1 dalam sebutan I dan V . [1 markah]
-
- (iv) Find the product of current and voltage across the bulb L_1 in terms of I and V . [1 mark]
 Carikan hasil darab arus dan beza upaya merentasi mentol L_1 dalam sebutan I dan V . [1 markah]
-

- (v) How many times the brightness of bulb L_1 has dropped compare to case (a)?
[1 mark]
Berapa kali gandakah kecerahan mentol L_1 menurun berbanding dengan kes (a)?
[1 markah]
-
- (c) When both swithes are off.
Apabila kedua-dua suis terbuka.
- (i) Find the total current flow in the circuit in terms of I [1 mark]
Carikan jumlah arus yang mengalir dalam litar dalam sebutan I . [1 markah]
-
- (ii) Find the current that flows through bulb L_1 in terms of I [1 mark]
Carikan arus yang mengalir melalui mental L_1 dalam sebutan I . [1 markah]
-
- (iii) Find the product of current and voltage across the bulb L_1 in terms of I and V [1 mark]
Carikan hasil darab arus dan beza upaya merentasi mentol L_1 dalam sebutan I dan V . [1 markah]
-
- (iv) How many times the brightness of L_1 has dropped compare to case (a)?
[1 mark]
Berapa kali gandakah kecerahan mentol L_1 menurun berbanding dengan kes (a)?
[1 markah]
-
- (d) Between cases (b) and (c), which is a better way to connect electrical appliances at home? [1 mark]
Antara kes (b) dan (c), yang manakah lebih sesuai digunakan untuk memasang alat-alat elektrik di rumah? [1 markah]
-

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

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

9. (a) What is acceleration? [1 mark]
 Apa itu pecutan? [1 markah]
- (b) To accelerate 2 objects with the same acceleration, the heavier object needs a bigger force. Explain the statement. [4 marks]
 Untuk memecut 2 objek dengan pecutan yang sama, objek berjisim lebih besar memerlukan daya yang lebih tinggi. Terangkan pernyataan di atas. [4 markah]
- (c)

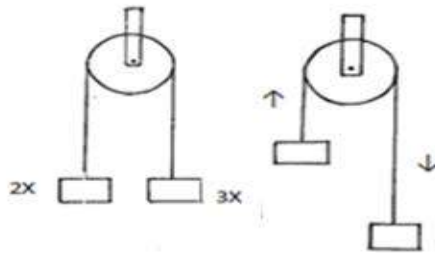


Diagram 9(a)
Rajah 9(a)

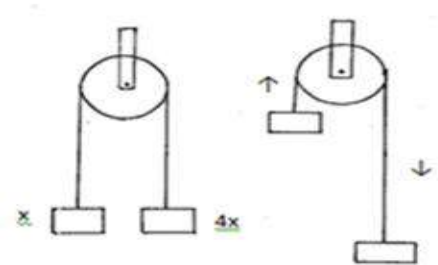


Diagram 9(b)
Rajah 9(b)

Based on **Diagram 9(a) and 9(b)**, compare the total mass, the mass difference and the magnitude of the acceleration of the 2 systems.
 Relate and explain the mass difference, total mass and the acceleration of the motion of the 2 systems.
 Name the physics law that explains the above situation. [5 marks]

Berdasarkan **rajah 9(a) dan rajah 9(b)**, bandingkan jumlah jisim dan pecutan pergerakan bagi kedua-dua sistem yang diberi.
 Kaitkan dan terangkan perbezaan jisim dan pecutan pergerakan bagi kedua-dua sistem.
 Namakan hukum fizik yang dapat menerangkan situasi di atas. [5 markah]

- (d) An engineer is converting a passenger airplane into a cargo airplane. The cargo airplane has to carry more weight and needs to fly at higher altitude to cut down fuel consumption. State the modifications that need to be done based on the following aspects:
- (i) Load capacity
 - (ii) Efficiency
 - (iii) Safety
- [10 marks]

Seorang jurutera menukar sebuah kapal terbang penumpang kepada kapal terbang kargo. Kapal terbang kargo perlu membawa muatan yang lebih tinggi dan perlu terbang pada altitud yang lebih tinggi supaya dapat mengurangkan penggunaan petrol. Cadangkan pengubahsuaian yang boleh dilakukan berdasarkan aspek-aspek yang berikut:

- (i) Muatan
- (ii) Kecekapan
- (iii) Keselamatan

[10 markah]

10. (a) What is electromagnetic induction?
Apa itu aruhan electromagnet?

[1 mark]

[1 markah]

- (b) The acceleration of a magnet that drops vertically into a solenoid is much smaller than the gravitational acceleration. Explain the statement. [4 marks]

Pecutan sebatang magnet yang jatuh secara tegak melalui sebuah solenoid adalah lebih rendah berbanding dengan pecutan gravity. Jelaskan penyataan tersebut.[4 markah]

- (c)

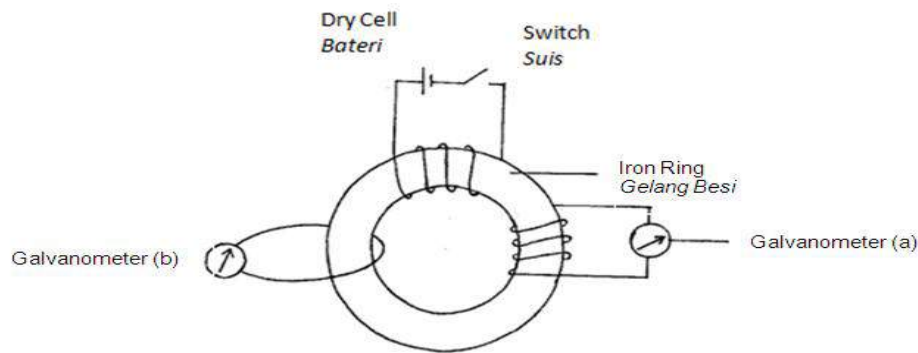


Diagram 10
Rajah 10

The galvanometers in **Diagram 10** shows the reading obtained at the moment the switch of the circuit X is switched off.

Compare the number of coil connected to the 2 galvanometers.

Compare the readings of the 2 galvanometers.

Relate and explain the number of coils used and the reading of the galvanometers.

Name the physics law related to the result of the activity.

[5 marks]

Galvanometer pada **Rajah 10** menunjukkan bacaan semasa suis litar ditutup.

Bandingkan bilangan lilitan gelung yang menyambung pada kedua-dua galvanometer.

Bandingkan bacaan kedua-dua galvanometer.

Kaitkan dan terangkan bilangan lilitan gelung dengan bacaan galvanometer.

Namakan hukum fizik yang terlibat.

[5 markah]

- (d) An old D.C dynamo used in a factory is functioning poorly. The owner decides to upgrade the efficiency of the dynamo and at the same time convert it into an A.C dynamo. State the modifications that need to be done by the owner based on the following aspects:
- (i) Magnet used
 - (ii) Type of material and the physical properties of the magnetic coil.
 - (iii) Commutator used
- [10 marks]

Sebuah dinamo arus terus yang digunakan dalam sebuah kilang berfungsi dengan kurang cekap. Tuan kilang cuba meningkatkan kecekapannya dan pada masa yang sama, menukarkannya kepada dinamo arus ulang-alik. Nyatakan pengubahsuaian yang boleh dilakukan berdasarkan aspek-aspek berikut:

- (i) Magnet yang digunakan*
 - (ii) Jenis bahan dan ciri-ciri fizikal*
 - (iii) Komutator*
- [10 markah]

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

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

11. (a) What is meant by waves? [1 mark]
Apakah yang dimaksudkan dengan gelombang? [1 markah]
- (b) During high tide, a boat which parks behind a retaining wall rocking up and down more vigorously. Explain the statement. [4 marks]
Semasa air pasang, sebuah sampan yang diletakkan di belakang sebuah tembok beranjak dengan kuat. Terangkan pernyataan di atas. [4 markah]
- (c) A medical technician is using echo imaging to take a photograph of a patient who is suffering from liver problem. The quality of the photograph is depending on the properties of the waves used. The table below shows 5 types of waves that can be used.

Seorang pembantu perubatan menggunakan pengimejan gema untuk mengambil gambar seorang pesakit yang menghadapi sakit hati. Kualiti gambar adalah bergantung kepada ciri-ciri gelombang yang digunakan. Jadual di bawah menunjukkan 5 jenis gelombang yang boleh digunakan.

Choice <i>Pilihan</i>	Types of waves <i>Jenis gelombang</i>	Wavelength <i>Panjang gelombang</i>	Amplitude <i>Amplitud</i>	Principle used <i>Prinsip yang digunakan</i>
A	X-ray <i>Sinar X</i>	Short <i>Pendek</i>	High <i>Tinggi</i>	Interference <i>Interferens</i>
B	Intrasonic <i>Intrasonik</i>	Long <i>Panjang</i>	Low <i>Rendah</i>	Reflection <i>Pantulan</i>
C	Ultrasonic <i>Ultrasonik</i>	Short <i>Pendek</i>	High <i>Tinggi</i>	Reflection <i>Pantulan</i>
D	X-ray <i>Sinar X</i>	Short <i>Pendek</i>	Low <i>Rendah</i>	Refraction <i>Pembiasan</i>
E	Ultrasonic <i>Ultrasonik</i>	Long <i>Panjang</i>	High <i>Tinggi</i>	Diffraction <i>Pembelauan</i>

Explain the properties of the waves needed to produce a photograph with high quality. Determine the most suitable waves to be used and give reasons for your choice.

[10 marks]

Terangkan ciri-ciri gelombang yang diperlukan untuk menghasilkan sekeping gambar yang berkualiti. Tentukan gelombang yang paling sesuai dan berikan alasan bagi pilihan anda. [10 markah]

(d)

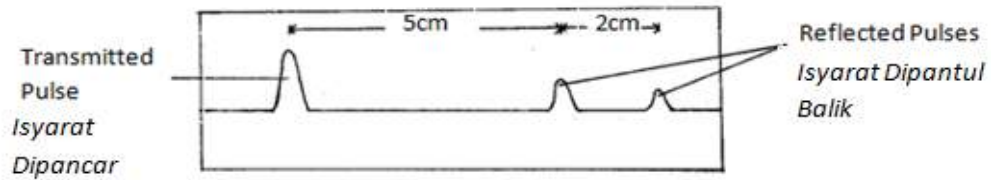


Diagram 11
Rajah 11

Diagram 11 shows the result obtained when microwave is used to detect the location of the 2 airplanes that are approaching the airport. The first airplane is 5 km away from the airport. The second airplane is a bit behind the first airplane.
(Velocity of microwave = $3.0 \times 10^8 \text{ ms}^{-1}$)

Rajah 11 menunjukkan keputusan yang diperolehi apabila gelombang mikro digunakan untuk mengesan kedudukan 2 buah kapal terbang yang menuju ke arah lapangan kapal terbang. Kapal terbang pertama berada 5km dari lapangan kapal terbang. Kapal terbang kedua berada sedikit belakang kapal terbang pertama.
(Halaju gelombang mikro = $3.0 \times 10^8 \text{ ms}^{-1}$)

- (i) Find the time represented by 1 cm in the C.R.O. [2 marks]
Tentukan masa yang diwakili oleh 1 cm dalam O.S.K. [2 markah]
- (ii) Calculate the time taken for the transmitted pulse to reach the second airplane. [2 marks]
Kirakan masa yang diambil untuk isyarat dipancar sampai ke kapal terbang kedua. [2 markah]
- (iii) Find the distance between the 2 airplanes. [1 mark]
Tentukan jarak di antara 2 kapal terbang. [1 markah]
12. (a) What is meant by focal length? [1 mark]
Apa yang dimaksudkan dengan jarak fokus? [1 markah]
- (b) A convex lens used as a magnifying glass is always thick but with small diameter. Explain the statement. [4 marks]
Kanta cekung yang digunakan sebagai kanta pembesar sentiasa tebal dan berdiameter kecil. Terangkan pernyataan di atas. [4 markah]
- (c) A photographer is taking part in the bird watching competition held in Sabah. The light condition of the jungle is dim and the birds are flying fast. The table below shows the type of lens and the conditions of the camera that can be used.

Seorang jurugambar mengambil bahagian dalam pertandingan 'bird watching' yang diadakan di Sabah. Keadaan hutan adalah malap dan burung terbang dengan laju. Jadual berikut menunjukkan jenis kanta dan keadaan kamera yang boleh digunakan.

Camera	Type of lens	Focal length	Diaphragm Opening	Shutter Speed $/s^{-1}$
A	Convex <i>Cembung</i>	Long <i>Panjang</i>	Large <i>Besar</i>	$\frac{1}{1000}$
B	Concave <i>Cekung</i>	Long <i>Panjang</i>	Large <i>Besar</i>	$\frac{1}{500}$
C	Plano-convex <i>Plano-cembung</i>	Short <i>Pendek</i>	Small <i>Kecil</i>	$\frac{1}{1000}$
D	Convex <i>Cembung</i>	Short <i>Pendek</i>	Small <i>Kecil</i>	$\frac{1}{20}$
E	Concave <i>Cekung</i>	Short <i>Pendek</i>	Large <i>Besar</i>	$\frac{1}{100}$

Explain the suitability of each conditions of the camera used by the photographer.
Determine the most suitable condition of camera used and give reasons for your choice.
[10 marks]

*Jelaskan kesesuaian setiap keadaan kamera yang digunakan oleh jurugambar itu.
Tentukan keadaan kamera yang paling sesuai dan jelaskan pilihan anda. [10 markah]*

(d)

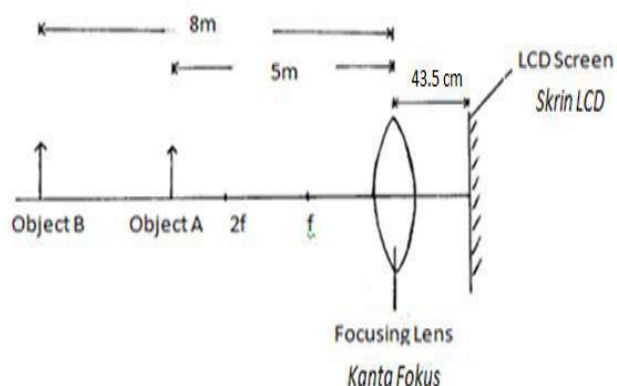


Diagram 12
Rajah 12

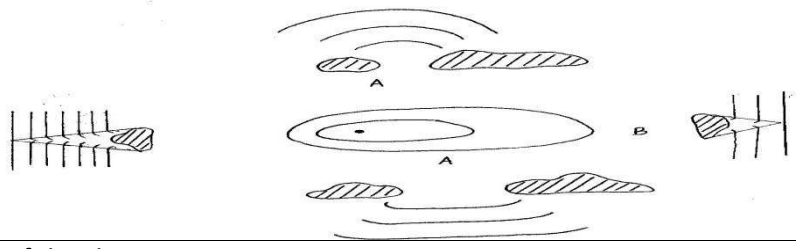
Diagram 12 shows the distance of the focusing lens from the LCD screen when it is used to focus object A.

Rajah 12 menunjukkan jarak di antara kanta fokus dengan skrin LCD apabila ia diguna untuk mengfokus objek A.

- (i) Find the focal length of the focusing lens. [2 marks]
Tentukan jarak fokus bagi kanta fokus. [2 markah]
- (iii) Find the distance of the focusing lens needs to be moved to focus object B again. [3 marks]
Tentukan jarak yang perlu digerak oleh kanta fokus supaya objek B dapat difokus. [3 markah]

ANSWER

1.	(a)	Measure internal diameter	(1)										
	(b)	-0.04 cm	(1)										
	(c)	4.14 cm	(1)										
		4.14 – (-0.04) = 4.18 cm	(1)										
2.	(a)	The high acceleration of the rocket	(1)										
	(b)	Apparent weight = m (g + a)	(1)										
	(c)	$a \propto \frac{1}{m}$	(1)										
		Reduce mass by dropping the stage when fuel is used up.	(1)										
	(d)	The apparent weight acts in opposite direction compare to before.	(1)										
3.	(a)	1 atmosphere	(1)										
	(b)	Silicone tube move to the left	(1)										
		Pointer move to the right.	(1)										
	(c)	Using longer pointer	(1)										
		Using softer silicone tube or with low elastic constant.	(1)										
	(d)	0.6 atmosphere	(1)										
4.	(a)	<table border="1"><thead><tr><th>Green Light</th><th>Red Light</th></tr></thead><tbody><tr><td>1</td><td>0</td></tr><tr><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td></tr><tr><td>0</td><td>1</td></tr></tbody></table> If 1 wrong, 1 mark is given	Green Light	Red Light	1	0	0	1	0	1	0	1	(1)
Green Light	Red Light												
1	0												
0	1												
0	1												
0	1												
	(b) (i)	NAND gate	(1)										
	(ii)	OR gate	(1)										
	(c)	If 1 wrong, 1 mark is given	(3)										
5.	(a)	Both the temperature drops	(1)										
	(b)	Change from steam into liquid	(1)										
	(c) (i)	Kinetic energy	(1)										
	(ii)	Kinetic energy and potential energy	(1)										
	(d) (i)	$H = mc\theta$	(1)										

		(ii)	$H = mL + mc\theta$	(1)
	(e)		Steam releases latent heat.	(1)
			Steam has higher specific capacity	(1)
			Steam has higher mass	(1)
6.	(a)		Reading obtained without radioactive source	(1)
	(b)		Cosmic ray	(1)
			Gamma ray	(1)
	(c)	(i)	40 min	(1)
		(ii)	45 min	(1)
	(d)		The value of the two half life is different	(1)
	(e)		The activity recorded is affected by the background reading	(1)
			Activity recorded has to minus the background reading before plotting the graph	(1)
7.	(a)	(i)	Frequency	(1)
		(ii)	Velocity directly proportional to wavelength OR when velocity increase, wavelength increase.	(1)
	(b)	(i)		(6)
	(c)	(i)		
		(ii)		
	(d)		Size of the slit	(1)
			Wavelength	(1)
8.	(a)	(i)	L_1	(1)
		(ii)	IV	(1)
	(b)	(i)	L_1, L_2	(1)
		(ii)	$2I$	(1)
		(iii)	I, V	(1)
		(iv)	IV	(1)
		(v)	None	(1)
	(c)	(i)	$\frac{I}{2}$	(1)
		(ii)	$\frac{I}{2}$	(1)
		(iii)	$\frac{2V}{4}$	(1)
		(iv)	4 times	(1)
	(d)		Case (b) or parallel	(1)
9.	(a)		Rate of change of velocity	(1)
	(b)		Higher mass, higher inertia	(1)
			To accelerate an object, need to overcome the inertia first.	(2)
			Therefore, more force is needed for heavier object.	(1)

	(c)	Both system has the same total mass	(1)														
		System (b) accelerate faster than system (a)	(1)														
		Bigger mass different, net force is bigger	(1)														
		m = constant, F directly proportional to a	(1)														
		Newton's second law	(1)														
	(d)	<table><tr><th>Modification</th><th>Reason</th></tr><tr><td>Increase the size of the body</td><td>To increase the space</td></tr><tr><td>Increase the length of the wing</td><td>To increase the up thrust</td></tr><tr><td>Increase the thickness of the body</td><td>To stand higher pressure difference</td></tr><tr><td>Use a more powerful engine</td><td>To overcome bigger inertia and do more work per unit time</td></tr><tr><td>Increase the number of tyres</td><td>To support higher mass / pressure while landing</td></tr><tr><td>Protective bar between the cabin and the pilot</td><td>To prevent moving object to knock at the pilot while landing</td></tr></table>	Modification	Reason	Increase the size of the body	To increase the space	Increase the length of the wing	To increase the up thrust	Increase the thickness of the body	To stand higher pressure difference	Use a more powerful engine	To overcome bigger inertia and do more work per unit time	Increase the number of tyres	To support higher mass / pressure while landing	Protective bar between the cabin and the pilot	To prevent moving object to knock at the pilot while landing	(10)
Modification	Reason																
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Increase the number of tyres	To support higher mass / pressure while landing																
Protective bar between the cabin and the pilot	To prevent moving object to knock at the pilot while landing																
10	(a)	Induced e.m.f produced by magnetic flux change	(1)														
	(b)	Magnetic flux change in the solenoid	(1)														
		Induced current generates in the solenoid	(1)														
		Direction of induced current always flows in the direction to generate magnetic pole to oppose the pole of the falling magnet.	(2)														
		Therefore, acceleration is lower	(1)														
	(c)	The number of coil for galvanometer (a) > (b)	(1)														
		The galvanometer with higher number of coil shows bigger reading	(1)														
		Higher number of coil, higher magnetic flux change and generate higher e.m.f	(2)														
		Faraday's law	(1)														
	(d)	<table><tr><th>Modification</th><th>Reason</th></tr><tr><td>Stronger magnet is used</td><td>Produce higher magnetic flux</td></tr><tr><td>Use material with low resistivity</td><td>Reduce resistance of the coil</td></tr><tr><td>Use coil with bigger diameter</td><td>Reduce resistance to reduce power loss</td></tr><tr><td>Increase the number of coil</td><td>Increase e.m.f generated</td></tr><tr><td>Replace the split ring commutator with a slip ring commutator</td><td>To convert D.C to A.C</td></tr><tr><td>Increase diameter of the coil</td><td>Increase speed and increase the rate of magnetic flux charge</td></tr></table>	Modification	Reason	Stronger magnet is used	Produce higher magnetic flux	Use material with low resistivity	Reduce resistance of the coil	Use coil with bigger diameter	Reduce resistance to reduce power loss	Increase the number of coil	Increase e.m.f generated	Replace the split ring commutator with a slip ring commutator	To convert D.C to A.C	Increase diameter of the coil	Increase speed and increase the rate of magnetic flux charge	(10)
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Increase diameter of the coil	Increase speed and increase the rate of magnetic flux charge																
11.	(a)	Wave is a periodic motion to transfer energy from the centre of vibration	(1)														
	(b)	When depth increase, velocity will increase, wavelength increase and higher diffraction happen.	(4)														
	(c)	<table><tr><th>Properties</th><th>Reason</th></tr><tr><td>Ultrasonic</td><td>Suitable to detect soft organ</td></tr><tr><td>Longer wavelength is used</td><td>Cut down diffraction and increase</td></tr></table>	Properties	Reason	Ultrasonic	Suitable to detect soft organ	Longer wavelength is used	Cut down diffraction and increase	(8)								
Properties	Reason																
Ultrasonic	Suitable to detect soft organ																
Longer wavelength is used	Cut down diffraction and increase																

				reflection		
			Higher amplitude	More energy can be reflected		
			Reflection	Use different intensity of reflection to map out the shape of the organ		
			C is chosen because ultrasonic with higher wavelength and amplitude can give reflection			(2)
	(d)	(i)	Time taken = $\frac{1}{3} \times 10^{-4} \text{ s}$ $1 \text{ cm} = \frac{1}{15} \times 10^{-4} \text{ s}$			(2)
		(ii)	$2.33 \times 10^{-5} \text{ s}$			(2)
		(iii)	2 km			(1)
12.	(a)		Focal length is the distance measured from the centre of the lens to the focal point			(1)
	(b)		Thick , short focal length and therefore higher magnification			(2)
			Image formed is virtual, brightness not affected by diameter			(2)
	(c)					(8)
			Properties	Reasons		
			Convex lens is used	Produce real image		
			Longer focal length is preferred	Higher magnification for distant object		
			Larger opening of diaphragm is preferred	Allow more light to enter or produce brighter image		
			Higher shutter speed is preferred	Avoid multiple image formed to increase sharpness of the photo		
			A is chosen because convex lens with longer focal length is used with bigger opening of the diaphragm and higher shutter speed.			(2)
	(d)	(i)	$\frac{1}{5} + \frac{1}{0.435} = \frac{1}{f}$ $f = 40 \text{ cm}$			(1) (1)
		(ii)	$\frac{1}{8} + \frac{1}{v} = \frac{1}{0.4}$ $V = 42.1 \text{ cm}$ Distance moved = 1.4 cm			(1) (1) (1)

SULIT

NAMA : _____

KELAS : _____



JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA 2010

4531/3

EXCEL 2

PHYSICS

Kertas 3

Ogos 2010

1 Jam 30 minit

Satu jam tiga puluh minit

DO NOT OPEN THE QUESTION PAPER UNTIL INSTRUCTED
(JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU)

1. Tulis nama dan kelas anda pada ruangan yang disediakan. .
2. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam bahasa Inggeris atau dalam bahasa Melayu.

Untuk Kegunaan Pejabat			
Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	16	
	2	12	
B	3	12	
	4	12	
Jumlah			

Kertas soalan ini mengandungi 11 halaman bercetak.

SULIT

NAMA : _____

KELAS : _____



JABATAN PELAJARAN NEGERI SABAH

SIJIL PELAJARAN MALAYSIA 2010

4531/3

EXCEL 2

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Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	16	
	2	12	
B	3	12	
	4	12	
Jumlah			

Kertas soalan ini mengandungi 11 halaman bercetak.

Section A / Bahagian A
[28 marks / 28 markah]

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

- 1** A student carries out an experiment to investigate the relationship between the distance of an object and the linear magnification of the object. The size of the object is fixed throughout the experiment. The arrangement of apparatus is shown in Diagram 3.1.

Seorang murid menjalankan sebuah eksperimen untuk mengkaji hubungan di antara jarak objek dan pembesaran linear objek tersebut. Saiz objek dimalarkan sepanjang eksperimen. Susunan alat radas ditunjukkan seperti dalam Rajah 3.1

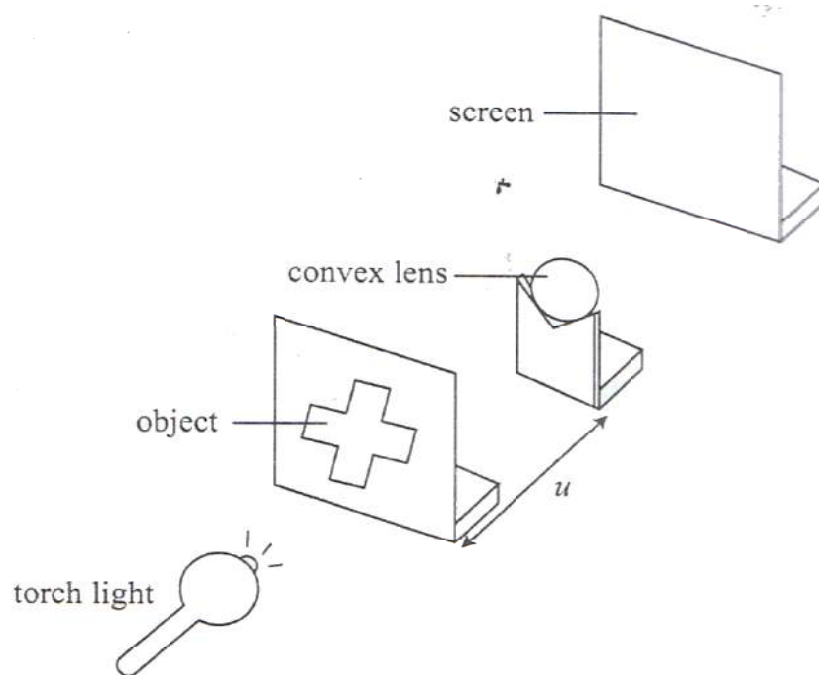


Diagram 3.1 / Rajah 3.1

The actual height of the object is as shown in Diagram 3.2. The object and the convex lens are adjusted at object distance, u , is equal to 40 cm. Then the torch light is switched on.

The actual corresponding image of the object is displayed on the screen. The height of image, h_i , as shown in Diagram 3.3, is measured.

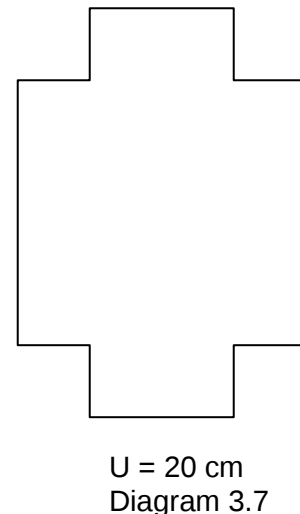
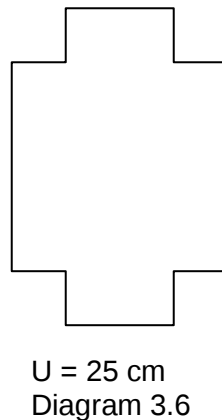
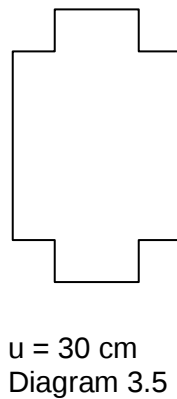
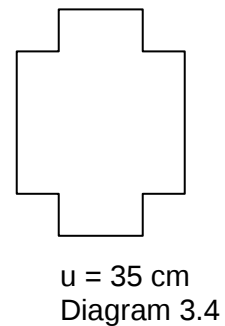
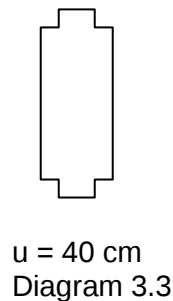
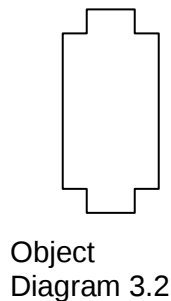
The above steps of experiment are repeated for object distance, $u = 35$ cm, 30 cm,

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25 cm and 20 cm. The corresponding images of the height of the images, h_i are shown in diagrams 3.4, 3.5, 3.6 and 3.7 respectively.

Kemudiannya dilaraskan pada suatu jarak, u , sama dengan 40 cm. Lampu picit itu dinyalakan. Imej yang sepadan yang sebenar bagi objek dipaparkan di atas layer. Tinggi imej itu, h_i , seperti yang ditunjukkan dalam Rajah 3.3, diukur.

Langkah-langkah eksperimen di atas diulang untuk jarak objek, $u = 35$ cm, 30 cm, 25 cm dan 20 cm. Imej-imej yang sepadan bagi tinggi imej, h_i , ditunjukkan dalam Rajah 3.4, 3.5, 3.6 dan 3.7 masing-masing.



(a) Based on the experiment, determine:

Berdasarkan eksperimen tersebut, tentukan:

- (i) Manipulated variable / *pemboleh ubah dimanipulasi*
- (ii) Responding variable / *pemboleh ubah bergerak balas*
- (iii) Constant variable / *pemboleh ubah dimalarkan*

[3 marks / 3 markah]

In Diagram 3.2, measure the height of object, h_o .

(b) Dalam Rajah 3.2, ukur tinggi objek h_o .

$h_o =$ _____

[1 mark / 1 markah]

Based on the diagram 3.3, 3.4, 3.5, 3.6 and 3.7, measure the height of images,

(c) h_i . In each case, calculate the linear magnification:

Berdasarkan rajah-rajah 3.3, 3.4, 3.5, 3.6 dan 3.7, ukur tinggi bagi imej-imej, h_i .

Dalam setiap kes, hitungkan pembesaran linear:

$$M = \frac{\text{height of image / tinggi imej}}{\text{height of object / tinggi objek}} = \frac{h_i}{h_o}$$

Tabulate your results for u , h_i and M and $\frac{1}{M}$.

[6 marks / 6 markah]

Jadualkan keputusan anda untuk u , h_i , M dan $\frac{1}{M}$

- (d) On the graph paper, draw a graph of $\frac{1}{M}$ against u . [5 marks / 5 markah]

Di atas kertas graf, lukiskan sebuah graf $\frac{1}{M}$ melawan u .

- (e) Based on your graph, state the relationship between M and u . [1 mark / 1 markah]

Berdasarkan graf anda, nyatakan hubungan di antara M dan u .

- 2 A student carries out an experiment to investigate the relationship between the potential difference across, V , a dry cell and the current, I , flowing through it.

Seorang murid menjalankan sebuah eksperimen untuk mengkaji hubungan di antara beza upaya, V , yang merentasi sebuah sel kering dan arus, I , yang melaluinya.

Graph of V against I / Graf V melawan I

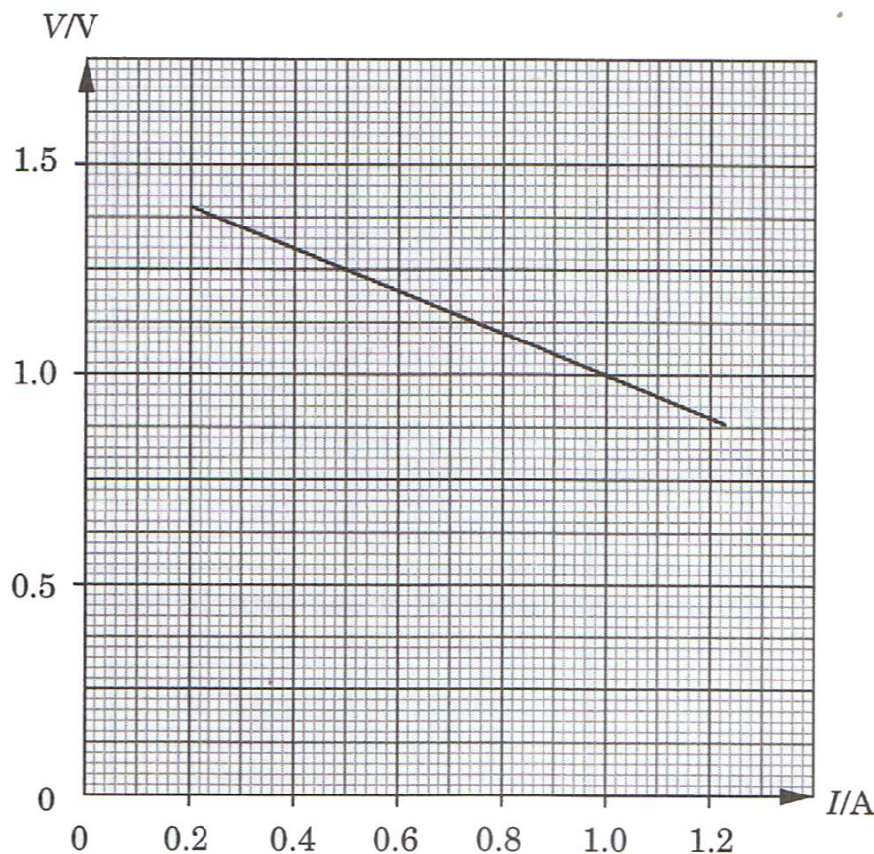


Diagram 2 /
Rajah 2

The results of the experiment are shown in Diagram 2.

Keputusan bagi eksperimen tersebut ditunjukkan dalam Rajah 2.

(a) Based on the graph in Diagram 2,

(i) State the relationship between V and I . [1 mark / 1 markah]

Nyatakan hubungan di antara V dan I .

(ii) Determine the value of V when $I = 0.00 \text{ A}$. [2 marks / 2 marks]

Tentukan nilai bagi V apabila $I = 0.00 \text{ A}$.

(iii) Name the physical quantity represented by the value of V in (a)(ii).

Namakan kuantiti fizikal yang diwakili oleh nilai V dalam (a)(ii).

[1 mark / 1 markah]

(b) The gradient of the graph represents the internal resistance of the dry cell. Based on the graph in Diagram 2, determine the value of the internal resistance of the dry cell.

Kecerunan bagi graf tersebut mewakili rintangan dalaman bagi sel kering itu. Berdasarkan graf di dalam Rajah 2, tentukan nilai bagi rintangan dalaman bagi sel kering berkenaan.

[3 marks / 3 markah]

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- (c) The electromotive force of the dry cell, E , of the dry cell is given by the formula

$$E = I (R + r)$$

Where r is the internal resistance, R is the resistance and I is the current flow.

Calculate the value of R when $I = 0.80 \text{ A}$.

[3 marks / 3 markah]

- (d) State one precaution that should be taken to improve the results of the experiment.

Nyatakan satu langkah berjaga-jaga yang perlu diambil untuk memperbaiki kepurusan eksperimen.

[1 mark / 1 markah]

Section B / Bahagian B

[12 marks / 12 markah]

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

- 3 Diagram 3.1 shows a student moving himself near a vibrating tuning fork. He notices that he can hear alternating soft and loud sounds. When he uses another tuning fork, he notices that the positions of loud sounds are further apart as shown in Diagram 3.2.

Rajah 3.1 menunjukkan seorang pelajar bergerak mendekati sebuah tala bunyi yang bergetar. Pelajar itu dapat mendengar bunyi lemah dan kuat yang berselang-seli. Apabila pelajar itu menggunakan tala bunyi yang berbeza, didapati kedudukan-kedudukan bunyi kuat adalah lebih jauh antara satu sama lain seperti yang ditunjukkan dalam Rajah 3.2.

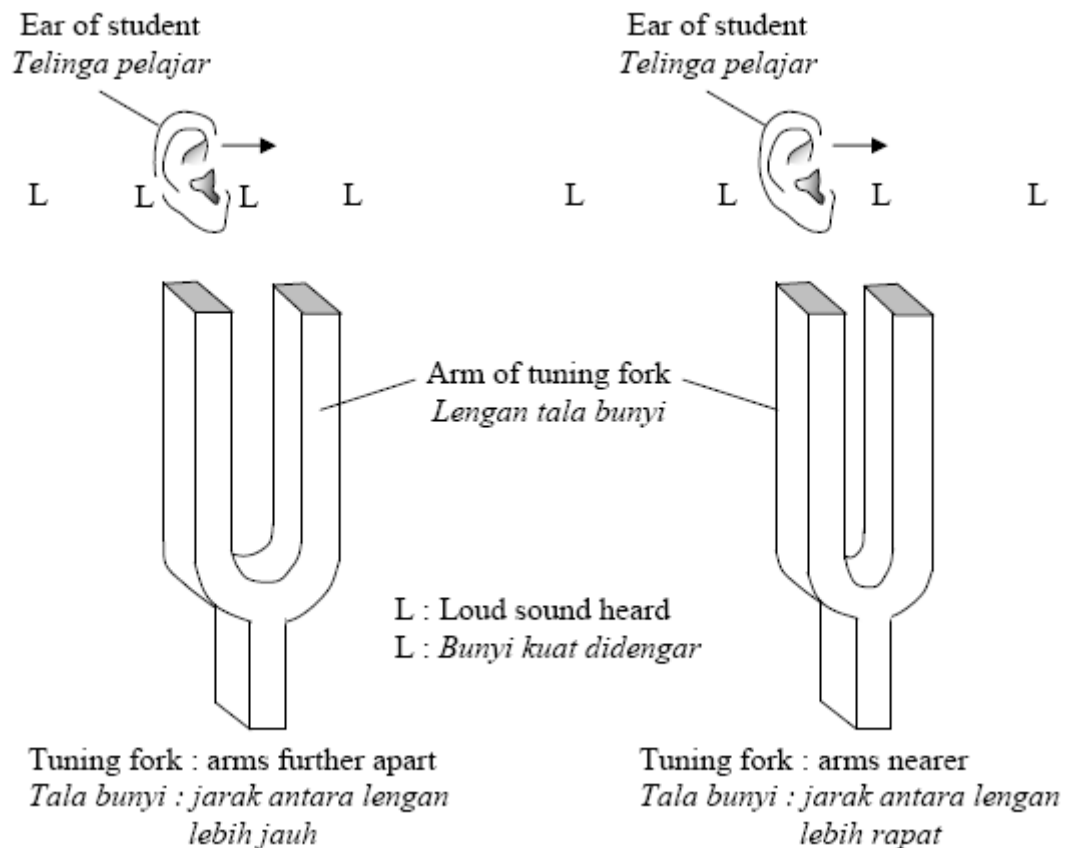


Diagram 3.1 / Rajah 3.1

Diagram 3.2 / Rajah 3.2

Using this information,

Dengan menggunakan maklumat ini,

(a) make **one** suitable inference/ *tuliskan satu inferens yang sesuai.*

[1 mark / 1 markah]

(b) State **one** appropriate hypothesis that could be investigated.

[1 mark]

Nyatakan satu hipotesis yang sesuai yang boleh dikaji.

[1 markah]

(c) With the use of apparatus such as a signal generator, two loudspeakers and other apparatus, describe an experiment framework to investigate the hypothesis stated in 3(b).

Dengan menggunakan alat radas seperti penjana isyarat, dua buah pembesar suara dan alat radas yang lain, huraikan rangka kerja sebuah eksperimen untuk mengkaji hipotesis yang dinyatakan dalam 3(b).

In your description, state clearly the following:

Dalam huraian anda, nyatakan dengan jelas

(i) aim of the experiment / *tujuan eksperimen*

(ii) variables in the experiment / *pemboleh ubah dalam eksperimen*

(iii) list of apparatus and materials / *senarai alat radas dan bahan*

(iv) arrangement of the apparatus / *susunan alat radas*

(v) the procedure of the experiment which include the method of controlling the manipulated variable and the method of measuring the responding variable.

Prosedur eksperimen yang merangkumi kaedah mengawal pemboleh ubah dimanipulasi dan kaedah mengukur pemboleh ubah bergerak balas.

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(vi) the way you would tabulate the data / *cara anda menjadualkan data*

(vii) the way you would analyse the data / *cara anda menganalisis data*

[10marks/10markah]

- 4 Diagram 4 shows two pails, R and S, with R containing more water than S. Both the pails are exposed to sunlight. After a few hours it was observed that the water in pail S is hotter than the water in pail R.

Rajah 4 menunjukkan dua buah baldi, R dan S, dengan R mengandungi lebih banyak air daripada baldi S. Kedua-dua baldi didedahkan kepada cahaya matahari. Selepas beberapa jam diperhatikan air dalam baldi S lebih panas daripada air dalam baldi R.

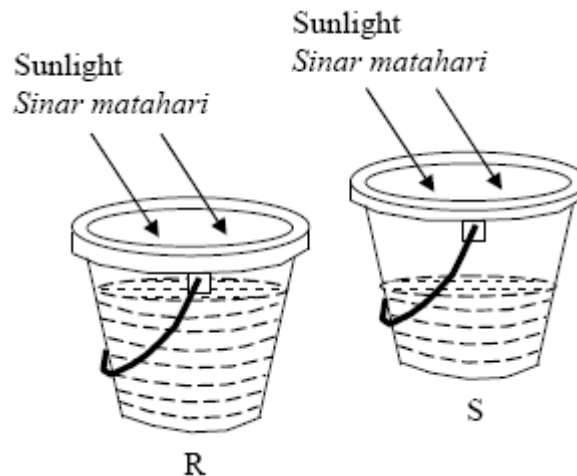


Diagram 4 / Rajah 4

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

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

[1 mark / 1 markah]

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

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

[1 mark / 1 markah]

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- (c) With the use of apparatus such as beaker, thermometer, immersion heater and other apparatus, describe **one** experiment to investigate the hypothesis stated in 4(b).

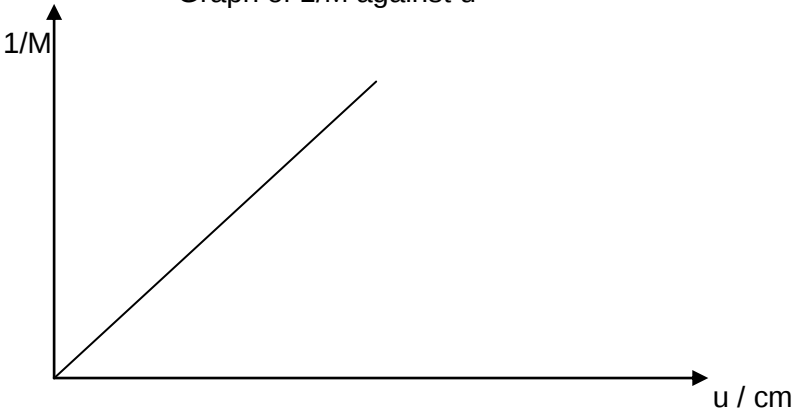
*Dengan menggunakan radas seperti bikar, termometer, pemanas rendam dan radas lain, terangkan **satu** eksperimen untuk menyiasat hipotesis yang dinyatakan di 4(b).*

In your description, state clearly the following:

Dalam penerangan anda, nyatakan dengan jelas perkara berikut:

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

[10 marks / 10 markah]

No.	Section A																										
1	(a)	(i) u, object distance (ii) h, height of image (iii) size of object / focal length																									
	(b)	$h_0 = 2.7 \text{ cm}$																									
	(c)	$h_5 = 5.4 \text{ cm} \quad M_5 = \frac{5.4}{2.7} = 2.00$ $h_4 = 4.2 \text{ cm} \quad M_4 = \frac{4.2}{2.7} = 1.56$ $h_3 = 3.6 \text{ cm} \quad M_3 = \frac{3.6}{2.7} = 1.33$ $h_2 = 3.0 \text{ cm} \quad M_2 = \frac{3.0}{2.7} = 1.11$ $h_1 = 2.5 \text{ cm} \quad M_1 = \frac{2.5}{2.7} = 0.91$																									
		<table border="1"> <thead> <tr> <th>u / cm</th><th>h_i / cm</th><th>M</th><th>$\frac{1}{M}$</th></tr> </thead> <tbody> <tr> <td>20</td><td>5.4</td><td>2.00</td><td>0.50</td></tr> <tr> <td>25</td><td>4.2</td><td>1.56</td><td>0.64</td></tr> <tr> <td>30</td><td>3.6</td><td>1.33</td><td>0.75</td></tr> <tr> <td>35</td><td>3.0</td><td>1.11</td><td>0.90</td></tr> <tr> <td>40</td><td>2.5</td><td>0.91</td><td>1.10</td></tr> </tbody> </table>		u / cm	h_i / cm	M	$\frac{1}{M}$	20	5.4	2.00	0.50	25	4.2	1.56	0.64	30	3.6	1.33	0.75	35	3.0	1.11	0.90	40	2.5	0.91	1.10
u / cm	h_i / cm	M	$\frac{1}{M}$																								
20	5.4	2.00	0.50																								
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30	3.6	1.33	0.75																								
35	3.0	1.11	0.90																								
40	2.5	0.91	1.10																								
	(d)	Graph of $1/M$ against u 																									

	(e)	M is inversely proportional to u
2	(a)	(i) V is linearly decreasing with I (ii) $V = 1.5 \text{ V}$ (iii) Electromagnetic force (e.m.f)
	(b)	Gradient, $r = \frac{1.25 - 1.00}{0.5 - 1.0} = -0.5 \text{ V I}^{-1}$
	(c)	$E = I(R + r)$ When $I = 0.08 \text{ A}$, $1.5 = 0.08(R - 0.05)$ $R = \frac{1.5}{0.08} + 0.5 = 2.38 \Omega$
	(d)	The position of eyes must be perpendicular to the scale of ammeter / voltmeter to avoid parallax error // switch off the circuit when not taking any reading
Section B		
3	(a)	The positions of two consecutive loud sounds depend on the separation of the two loudspeakers.
	(b)	The further the separation between the two sources of sound, the closer the distance between two consecutive loud sounds
	(c)	(i) To investigate the relationship between the separation between two loudspeakers and the distance between the position of the loud sounds (ii) Manipulated variable: separation of two sound sources Responding variable: the distance between the positions of two consecutive loud sounds Fixed variable: the frequency of sound wave // sound wavelength // distance between the wall and the loud speakers (iii) Signal generator, two loudspeakers, metre rule

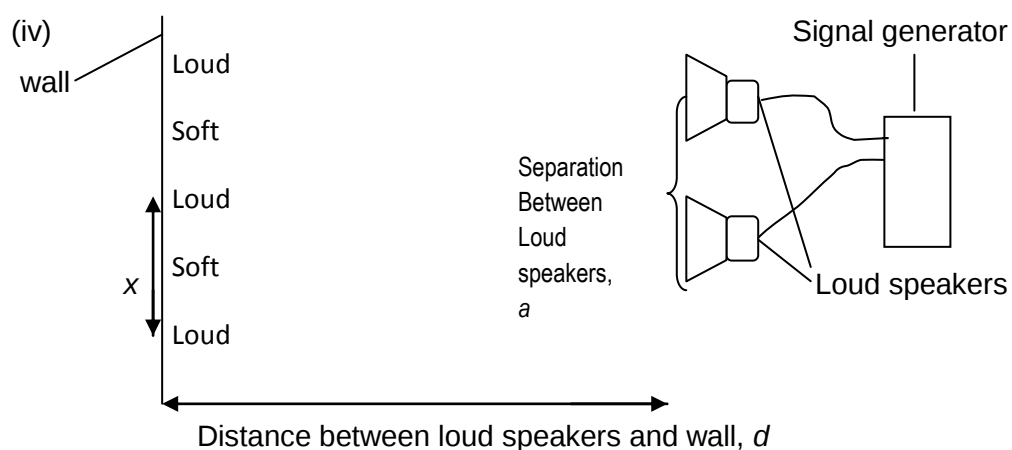


Diagram A

- (v) a. The apparatus is set up as shown in Diagram A.
 b. the separation of the two loud speaker, a , is set to 1.00 m.
 c. The positions of two successive loud sounds is determined and the distance, x , between them is measured with a metre rule.
 d. The experiment is repeated for values of $a = 1.50$ m, 2.00 m, 2.50 m, 3.00 m, and 3.50 m
- (vi) The results are tabulated as follows:
- (vii) The graph of the distance between two consecutive loud sounds, x , against the separation of loud speakers, a



4	(a) The mass of water affects the rate of temperature change (b) The bigger the mass, the slower the temperature change (c) (i) To investigate the relationship between the mass of water and its rise in temperature (ii) Manipulated variable: mass of water Responding variable: increase in temperature Fixed variable: heat supplied // heating period (iii) beaker, thermometer, immersion heater, water, triple beam balance, stopwatch, stirrer (iv) Diagram B (v) a. The apparatus is set up as shown in Diagram B. b. A beaker is filled with water of mass 1200 g. Its initial temperature is recorded. c. An immersion heater is immersed in the beaker and is switched on for 2 minutes. d. The water temperature is measured by using a thermometer and recorded. e. The experiment is repeated with mass of water, $m = 1000\text{ g}$, 800 g, 600 g, and 400 g
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(vi) The results are tabulated as follows:

Mass of water, m / g	Rise in temperature, Θ / $^{\circ}\text{C}$
400	
600	
800	
1000	
1200	

(vii) Graph of mass, m , against temperature rise, Θ , is plotted

