NAMA : .....

TINGKATAN : .....

MODUL PINTAS SPM 2022
TINGKATAN 5

FIZIK
PHYSICS

KERTAS 2
PAPER 2

Dua jam tiga puluh minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Tuliskan nama, dan angka giliran pada ruang yang disediakan.*
2. *Kertas peperiksaan ini mengandungi tiga bahagian: Bahagian A, Bahagian B dan Bahagian C.*
3. *Jawapan hendaklah ditulis pada ruang jawapan yang disediakan di dalam kertas peperiksaan ini.*
4. *Kertas soalan ini adalah dalam dwibahasa.*
5. *Jawapan boleh ditulis dalam Bahasa Melayu atau Bahasa Inggeris.*
6. *Rajah yang mengiingi soalan tidak dilukis mengikut skala kecuali dinyatakan.*

Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperolehi
A	1	4	
	2	5	
	3	6	
	4	9	
	5	9	
	6	9	
	7	9	
	8	9	
B	9	20	
	10	20	
C	11	20	
Jumlah		**100**	

Kertas soalan ini mengandungi 36 halaman bercetak.

Rumus-rumus berikut boleh membantu anda menjawab soalan. Simbol-simbol yang diberikan adalah biasa digunakan.

DAYA DAN GERAKAN I
FORCE AND MOTION I

1 $v = u + at$

2 $s = \frac{1}{2}(u + v)t$

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

4 $v^2 = u^2 + 2as$

5 Momentum = mv

6 F = ma

HABA
HEAT

1 $Q = mc\Delta\theta$

2 $Q = m\ell$

3 $Q = Pt$

4 $P_1V_1 = P_2V_2$

5 $\frac{V_1}{T_1} = \frac{V_2}{T_2}$

6 $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

KEGRAVITIAN
GRAVITATION

1 $F = \frac{Gm_1m_2}{r^2}$

2 $g = \frac{GM}{r^2}$

3 $F = \frac{mv^2}{r}$

4 $a = \frac{v^2}{r}$

5 $v = \frac{2\pi r}{T}$

6 $\frac{T_1^2}{r_1^3} = \frac{T_2^2}{r_2^3}$

7 $v = \sqrt{\frac{GM}{r}}$

8 $u = -\frac{GMm}{r}$

9 $v = \sqrt{\frac{2GM}{r}}$

10 $g = 9.81 \text{ m s}^{-2}$ @ 9.81 N kg^{-1}

11 $G = 6.67 \times 10^{-11} \text{ N m}^2 \text{ kg}^{-2}$

GELOMBANG
WAVES

1 $v = f\lambda$

2 $\lambda = \frac{ax}{D}$

CAHAYA DAN OPTIK
LIGHT AND OPTICS

1 $n = \frac{c}{v}$

2 $n = \frac{\sin i}{\sin r}$

3 $n = \frac{1}{\sin c}$

4 $n = \frac{H}{h}$

5 $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

6 $n_1 \sin\theta_1 = n_2 \sin\theta_2$

7 Pembesaran linear, $m = \frac{h_i}{h_o} = \frac{v}{u}$

Linear magnification, $m = \frac{h_i}{h_o} = \frac{v}{u}$

DAYA DAN GERAKAN II
FORCE AND MOTION II

1 $F = kx$

2 $E_p = \frac{1}{2}Fx = \frac{1}{2}kx^2$

TEKANAN
PRESSURE

1 $P = \frac{F}{A}$

2 $P = h\rho g$

3 $\rho = \frac{m}{v}$

ELEKTRIK
ELECTRICITY

1 $E = \frac{F}{Q}$

2 $I = \frac{Q}{t}$

3 $V = \frac{E}{Q}$

4 $V = IR$

5 $R = \frac{\rho \ell}{A}$

6 $\varepsilon = V + Ir$

7 $P = VI$

8 $P = \frac{E}{t}$

9 $E = \frac{V}{d}$

ELEKTROMAGNET
ELECTROMAGNETISM

1 $\frac{V_S}{V_P} = \frac{N_S}{N_P}$

2 $\eta = \frac{\text{Kuasa output}}{\text{Kuasa input}} \times 100\%$

$\eta = \frac{\textit{Output power}}{\textit{Input power}} \times 100\%$

ELEKTRONIK
ELECTRONICS

1 Tenaga keupayaan elektrik, $E = eV$
Electrical potential energy, $E = eV$

2 Tenaga kinetik maksimum, $E_k = \frac{1}{2}mv^2$
Maximum kinetik energy, $E_k = \frac{1}{2}mv^2$

3 $\beta = \frac{I_C}{I_B}$

FIZIK NUKLEAR
NUCLEAR PHYSICS

1 $N = \left(\frac{1}{2}\right)^n N_o$

2 $E = mc^2$

3 $c = 3.0 \times 10^8 \text{ m s}^{-1}$

4 1 u.j.a = 1.66×10^{-27} kg

FIZIK KUANTUM
QUANTUM PHYSICS

1 $E = hf$

2 $f = \frac{c}{\lambda}$

3 $\lambda = \frac{h}{p}$

4 $\lambda = \frac{h}{mv}$

5 $E = \frac{hc}{\lambda}$

6 $p = nhf$

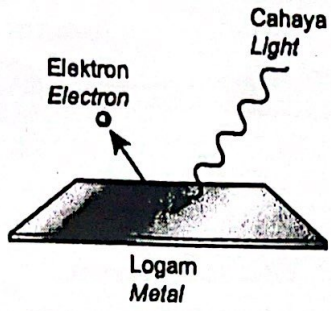
7 $hf = W + \frac{1}{2}mv^2$

8 $W = hf_o$

9 $h = 6.63 \times 10^{-34} \text{ J s}$

Bahagian A
[60 *markah*]
Jawab **semua** *soalan.*

1. Rajah 1 menunjukkan sinar cahaya pada frekuensi tertentu menyinari permukaan logam. Elektron terpancar daripada permukaan logam.
Diagram 1 shows light rays at a certain frequency illuminate on a metal surface. Electrons are emitted from the metal surface.



Rajah 1 / *Diagram* 1

(a) Tanda (√) bagi jawapan yang betul pada petak yang disediakan.
Mark with (√) for the correct answer in the box provided.

Fenomena ini dikenali sebagai
This phenomenon is known as

☐ pancaran termion
thermionic emission

☐ kesan fotoelektrik
photoelectric effect

[1 markah / 1 *mark*]

(b) Namakan frekuensi minimum yang dapat mengeluarkan elektron daripada permukaan logam apabila disinari cahaya.
Name the minimum frequency that allows electrons to be emitted from the metal surface when light is illuminated.

.....

[1 markah / 1 *mark*]

(c) (i) Apakah yang akan berlaku kepada tenaga kinetik elektron apabila keamatan cahaya bertambah?
What will happen to the kinetic energy of electron when the intensity of light increases?

.....

[1 markah / 1 *mark*]

(ii) Jelaskan jawapan anda dalam (c)(i).
Explain your answer in (c)(i).

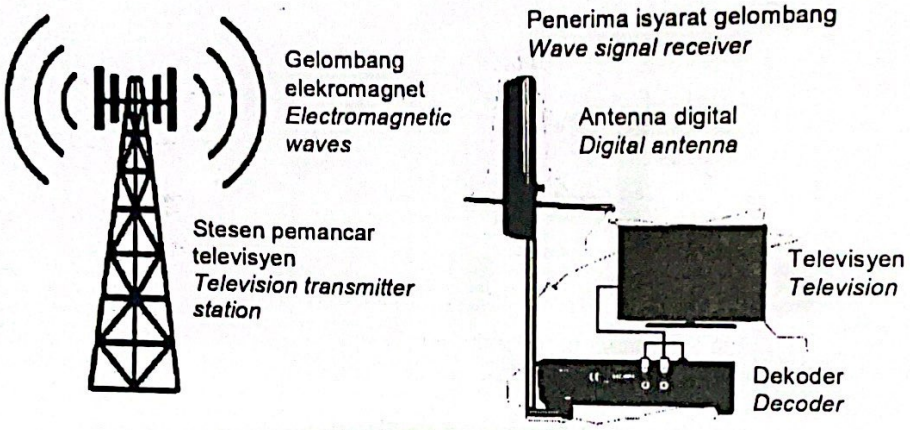
.....

[1 markah / 1 *mark*]

Total
A1

4

2. Rajah 2 menunjukkan suatu gelombang radio digunakan oleh stesen pemancar televisyen untuk siaran tempatan. Gelombang yang dipancarkan dapat dikesan oleh penerima isyarat gelombang.
Figure 2 shows a radio wave used by a television broadcasting station for local broadcasting. The emitted wave can be detected by the receiver of the wave signal.



Rajah 2 / *Diagram 2*

(a) Nyatakan satu ciri gelombang radio.
State one characteristic of radiowave

.....

[1 markah / 1 *mark*]

(b) Frekuensi gelombang radio yang dipancarkan ialah 2.5 x 108 Hz. Hitung panjang gelombang gelombang radio tersebut.
The frequency of the radio waves emitted is 2.5 x 108 Hz. *Calculate the wavelength of the radio wave.*

[2 markah / 2 *marks*]

(c) Penghantaran gelombang radio dari stesen pemancar televisyen dalam Rajah 2 dihalang oleh bukit atau bangunan yang tinggi. Gelombang tersebut masih boleh diterima oleh penerima isyarat gelombang.
Radiowave transmission from the television broadcasting station in Diagram 2 is blocked by hills or tall buildings. The wave can still be received by the receiver of the wave signal.

Namakan fenomena gelombang yang terlibat dan terangkan mengapa ia boleh berlaku?
Name the wave phenomenon involved and explain why it can happen.

.....

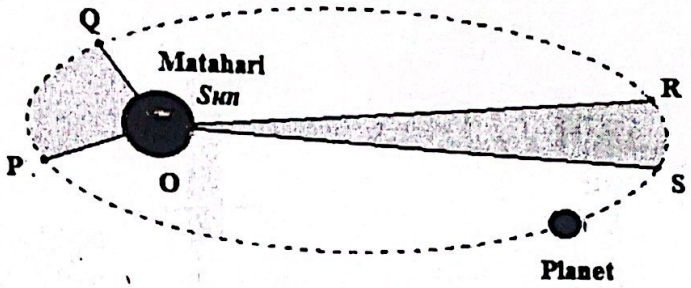
.....

[2 markah / 2 *marks*]

Total
A2

5

3. Rajah 3 menunjukkan sebuah planet mengelilingi Matahari dalam satu orbit. Tempoh yang dilalui oleh planet dari P ke Q adalah sama dengan tempoh dari R ke S. Luas OPQ sama dengan luas ORS.
Diagram 3 shows a planet revolves around the Sun in an orbit. The time taken from P to Q is equal to the time taken from R to S. The area of OPQ is equal to the area of ORS.



Rajah 3 / *Diagram 3*

(a) Nyatakan hukum yang terlibat dalam Rajah 3.
State the law involved in Diagram 3.

.....

[1 markah / 1 *mark*]

(b) (i) Tanda (√) pada pernyataan yang betul.
Mark with (√) for the correct statement.

☐ Laju linear dari P ke Q lebih daripada R ke S.
Linear speed from P to Q more than R to S.

☐ Laju linear dari P ke Q kurang daripada R ke S.
Linear speed from P to Q less than R to S.

[1 markah / 1 *mark*]

(ii) Berikan sebab bagi jawapan anda di (b)(i).
Give reasons for your answer in (b)(i).

.....

[1 markah / 1 *mark*]

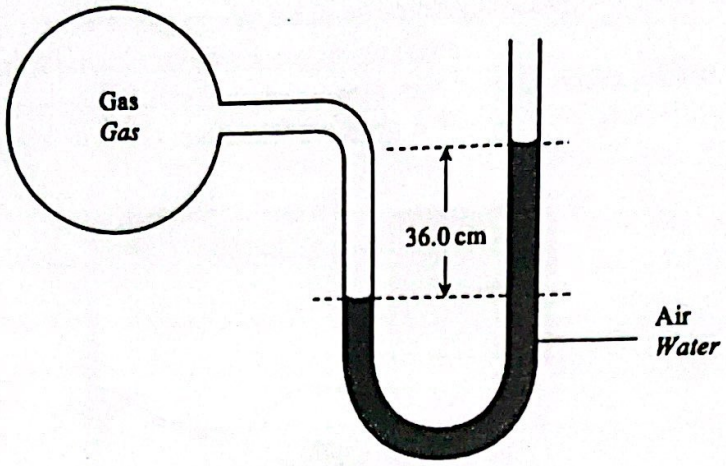
(c) Hitung tempoh orbit bagi planet dalam unit jam jika jarak purata dari pusat matahari ke orbit adalah $1.5\times10^{11} m$. Jisim matahari = $1.99\times10^{30} kg$.
Calculate the orbital period of the planet in hour if the average distance from the center of the Sun to the orbit is $1.5\times10^{11} m$. *Mass of Sun* = $1.99\times10^{30} kg$.

[3 markah / 3 *marks*]

Total
A3

6

4 Rajah 4 menunjukkan satu alat digunakan untuk mengukur tekanan gas.
Diagram 4 shows an instrument which is used to measure the gas pressure.



Rajah 4 / *Diagram* 4

(a) Namakan alat dalam Rajah 4.
Name the instrument in Diagram 4.

.....

[1 markah / 1 *mark*]

(b) Bandingkan tekanan gas di dalam kelalang dengan tekanan atmosfera.
Compare the gas pressure in the flask with the atmosperic pressure.

.....

[1 markah / 1 *mark*]

(c) (i) Nyatakan perbezaan antara tekanan gas dan tekanan atmosfera dalam unit m H_2O.
State the difference between the gas pressure and atmosperic pressure in m H_2O.

.....

[1 markah / 1 *mark*]

(ii) Hitungkan tekanan gas itu dalam unit m H_2O.
[Tekanan atmosfera P_{atm} = 10.3 m H_2O]
Calculate the gas pressure in m H_2O.
[*Atmospheric pressure*, P_{atm}= 10.3 m H_2O]

[2 markah / 2 *marks*]

(iii) Berdasarkan jawapan anda dalam 4(c)(ii), hitung tekanan gas dalam unit Pa.
Based on your answer in 4(c)(ii), *calculate the atmospheric pressure in* Pa *unit.*
[Ketumpatan air, $\rho = 1\ 000\ kg\ m^{-3}$]
[*Density of water*, $\rho = 1\ 000\ kg\ m^{-3}$]

[2 markah / 2 *marks*]

(d) Air dalam alat pada Rajah 4 digantikan dengan merkuri.
Apakah yang berlaku kepada perbezaan aras cecair? Terangkan.
Water in the instrument in Diagram 4 *is replaced with mercury.*
What happens to the different in liquid levels? Explain.

.....

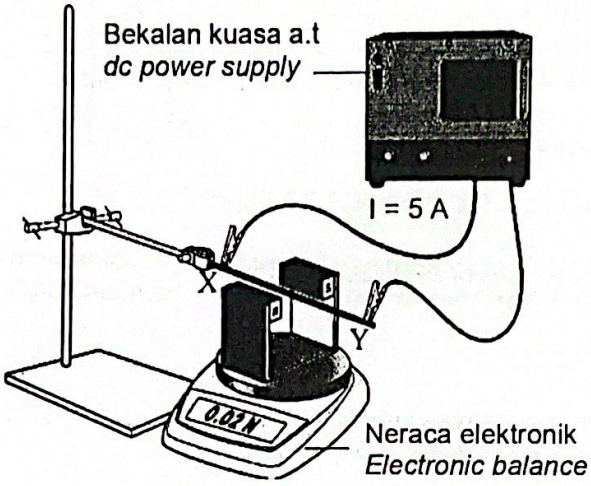
.....

[2 markah / 2 *marks*]

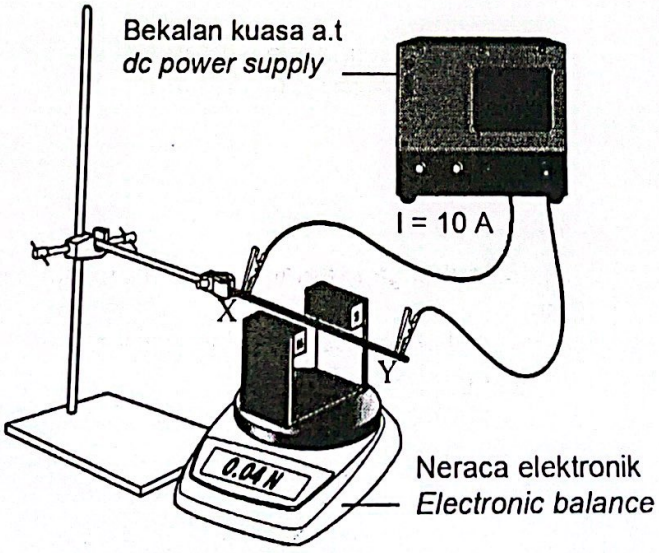
Total
A4

9

5 Rajah 5.1(a) menunjukkan sebuah magnet diletakkan di atas neraca elektronik. Suatu konduktor XY dengan arus 5 A diletakkan di antara kutub magnet tersebut.
Rajah 5.1(b) menunjukkan penggunaan radas dan susunan yang serupa dengan nilai arus yang melalui konduktor XY adalah 10 A.
Diagram 5.1(a) *shows a magnet placed in an electronic scale. An* XY *conductor with a current of* 5 A *is placed between the magnetic poles.*
Diagram 5.1(b) *shows a similar equipments and arrangement where the value of current passing through the conductor* XY *is* 10 A.



Rajah 5.1(a) / *Diagram* 5.1(a)



Rajah 5.1(b) / *Diagram* 5.1(b)

(a) Namakan hukum yang digunakan untuk menentukan arah daya yang bertindak ke atas konduktor pembawa arus dalam suatu medan magnet.
Name the rule that is used to determine the direction of force acting on a current-carrying conductor in a magnetic field.

.....

[1 markah / 1 *mark*]

(b) Berdasarkan Rajah 5.1(a) dan Rajah 5.1(b), bandingkan
Based on Diagram 5.1(a) *and Diagram* 5.1(b), *compare*

(i) nilai arus yang melalui konduktor XY.
the value of current passing through conductor XY.

.....

[1 markah / 1 *mark*]

(ii) bacaan neraca elektronik.
the reading of electronic balance.

.....

[1 markah / 1 *mark*]

(iii) magnitud daya yang dihasilkan.
the magnitude of force produced.

.....

[1 markah / 1 *mark*]

(c) Berdasarkan jawapan anda di 5(b)(i), 5(b)(ii) dan 5(b)(iii),
Based on your answer in 5(b)(i), 5(b)(ii) dan 5(b)(iii),

(i) nyatakan hubungan antara nilai arus dengan bacaan neraca elektronik.
state the relationship between the value of current and the reading of electronic balance.

.....

[1 markah / 1 *mark*]

(ii) deduksikan hubungan antara nilai arus dan magnitud daya yang dihasilkan.
deduce the relationship between the value of current and the magnitude of force produced.

.....

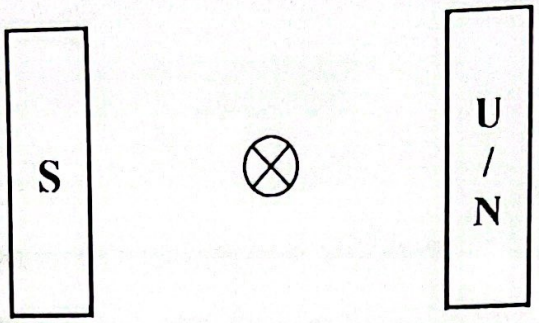
[1 markah / 1 *mark*]

(d) Ramalkan bacaan neraca elektronik dalam Rajah 5.1(a) apabila dawai yang lebih tebal digunakan.
Predict the reading of electronic balance in Diagram 5.1(a) *when a thicker wire is used.*

.....

[1 markah / 1 *mark*]

(e) Rajah 5.2 menunjukkan keratan rentas bagi konduktor dan dua magnet yang berlainan kutub.
Diagram 5.2 *shows a cross-sectional view of the conductor and two magnet of difference poles.*



Rajah 5.2 / *Diagram* 5.2

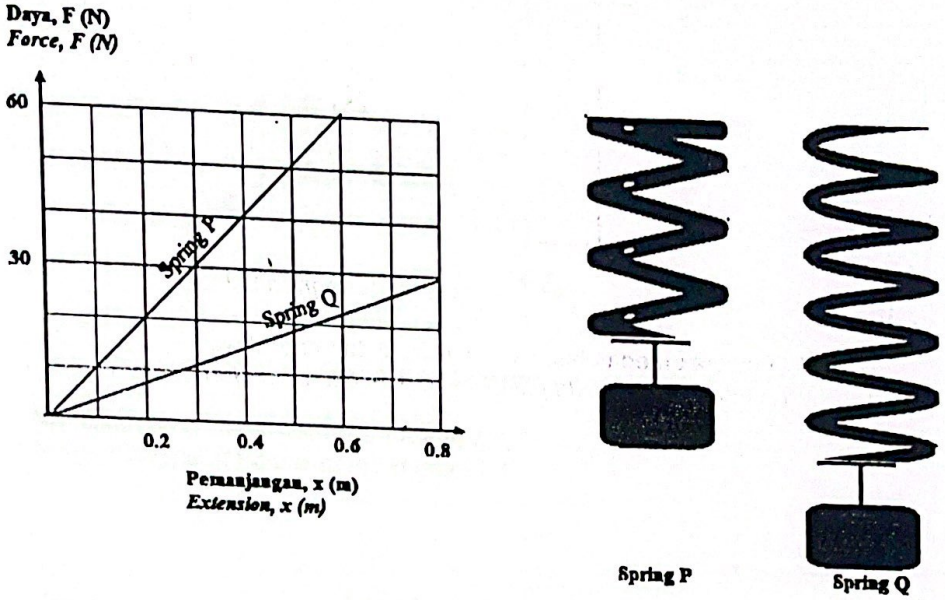
Lukis corak medan lastik yang terhasil dan arah daya, F pada Rajah 5.2.
Draw the catapult field pattern and direction of the force, F *in Diagram* 5.2.

[2 markah / 2 *marks*]

Total
A5

9

6. Rajah 6.1 menunjukkan graf daya melawan pemanjangan bagi spring P dan spring Q. Spring P dan spring Q diperbuat dari bahan yang sama dan mempunyai panjang asal yang sama.
Diagram 6.1 shows the graph of force against extension for spring P and spring Q. Spring P and spring Q are made of the same material and have the same original length.



Rajah 6. 1 / *Diagram* 6.1

(a) Apakah yang dimaksudkan dengan kekenyalan?
What is the meaning of elasticity?

.....

.....

[1 markah / 1 *mark*]

(b) Kira nilai pemalar spring bagi spring P
Calculate the value of spring constant for spring P.

[2 markah / 2 *marks*]

(c) Berdasarkan Rajah 6.1, bandingkan
Based on Diagram 6.1 *and* 6.2, *compare*

(i) ketebalan wayar spring P dan spring Y
thickness of spring wire P *and spring* Y

.....

[1 markah / 1 *mark*]

(ii) Pemanjangan spring P dan spring Q
The extension of spring P and spring Q

.....

[1 markah / 1 *mark*]

(iii) Pemalar spring bagi spring P dan spring Q
Spring constant for spring P and spring Q

.....

[1 markah / 1 *mark*]

(d) Berdasarkan jawapan anda di **6**(b), nyatakan hubungan antara ketebalan wayar spring dengan
Based on your answer in **6**(b), *state the relationship between the thickness of the spring wire and*

(i) pemanjangan spring
the extension of spring

.....

[1 markah / 1 *mark*]

(ii) pemalar spring
spring constant

.....

[1 markah / 1 *mark*]

(e) Namakan hukum yang mengaitkan perkara di atas?
Name the law that relates to the above?

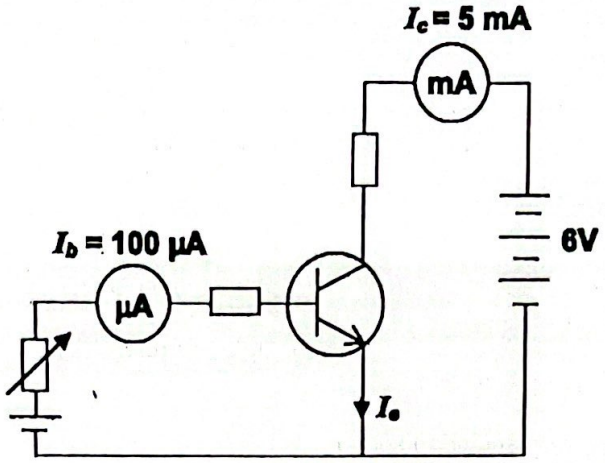
.....

[1 markah / 1 *mark*]

Total
A6

9

7. Rajah 7.1 menunjukkan satu litar bertransistor bertindak sebagai penguat arus.
Diagram 7.1 shows a transistor circuit acts as a current amplifier.



Rajah 7.1 / *Diagram* 7.1

(a) Namakan jenis transistor dalam Rajah 7.1.
Name the type of transistor in Diagram 7.1.

.....

[1 markah / 1 *mark*]

(b) Berdasarkan Rajah 7.1,
Based on Diagram 7.1,

(i) nyatakan arus tapak, I_b dalam unit mA.
state the base current I_b *in* mA.

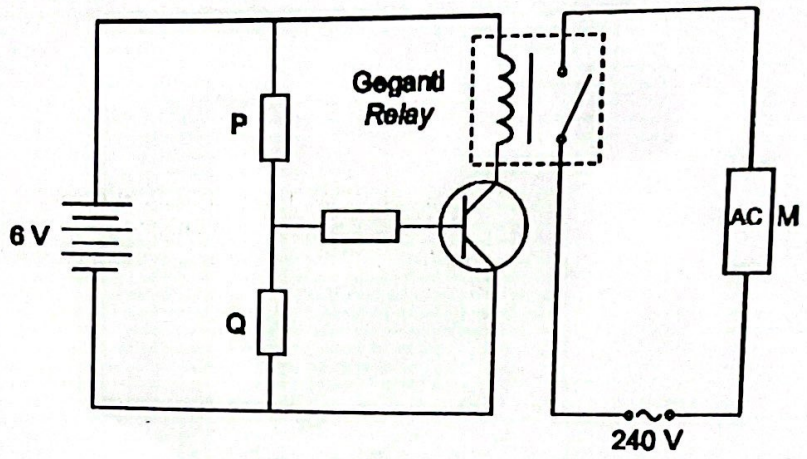
.....

[1 markah / 1 *mark*]

(ii) hitung faktor penggandaan amplifier.
calculate the amplifier multiplication factor.

[2 markah / 2 *marks*]

(c) Bilik guru di sebuah sekolah akan dilengkapi dengan penghawa dingin, M. Litar yang dicadangkan adalah seperti di dalam rajah 7.2
The teacher's room at a school will be equipped with air conditioning, M. The proposed circuit is as in diagram 7.2



Rajah 7.2 / *Diagram 7.2*

Di dapati pendingin hawa M yang dipasang itu tidak berfungsi dengan baik untuk menyejukkan bilik guru. Nyatakan pengubahsuaian yang perlu dilakukan untuk memastikan pendingin hawa boleh berfungsi dengan baik dan lebih cekap.
It was found that the air conditioner M *that was installed did not work well to cool the teacher's room.*
State the modifications that need to be done to ensure that the air conditioner can work properly and more efficiently.

Litar *Circuit*	Kedudukan perintang peka haba *Position of termistor*	Jenis transistor *Type of transistor*
K	Q	p-n-p
L	P	n-p-n
M	P	p-n-p

Jadual 1 / *Table* 1

Berdasarkan Jadual 1, nyatakan pengubahsuaian yang perlu dilakukan untuk memastikan pendingin hawa tersebut boleh berfungsi dengan baik dan lebih cekap.
Based on Table 1, *state the modifications that need to be done to ensure that the air conditioner can work well and more efficiently*

(i) Kedudukan perintang peka haba
Position of termistor

.....

Sebab
reason

.....

[2 markah / 2 *marks*]

(ii) Jenis transistor
Type of transistor

.....

Sebab
Reason

.....

[2 markah / 2 *marks*]

(d) Berdasarkan jawapan anda di 7(c), pilih litar yang paling sesuai untuk memastikan pendingin hawa boleh berfungsi dengan lebih cekap.
Based on your answer in 7(c), *choose the most suitable circuit to ensure that the air conditioner can work more efficiently.*

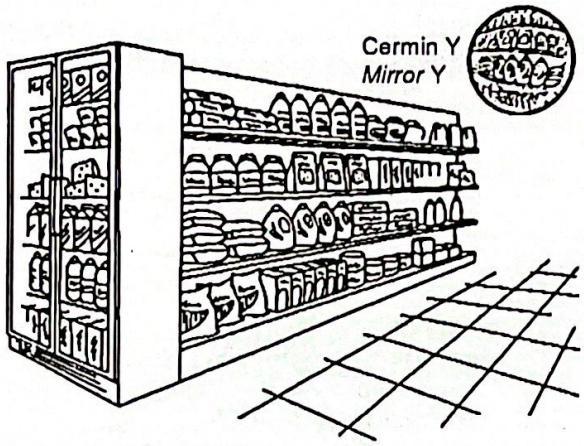
.....

[1 markah / 1 *mark*]

Total
A7

9

8 Rajah 8.1 menunjukkan imej bagi satu cermin Y yang diletakkan di suatu sudut bahagian atas sebuah kedai untuk membantu peniaga untuk memantau keselamatan di dalam kedai.
Diagram 8.1 shows an image of a Y mirror placed in a corner of the top of a shop for security to assist the shopkeeper to monitor the safety in his shop.



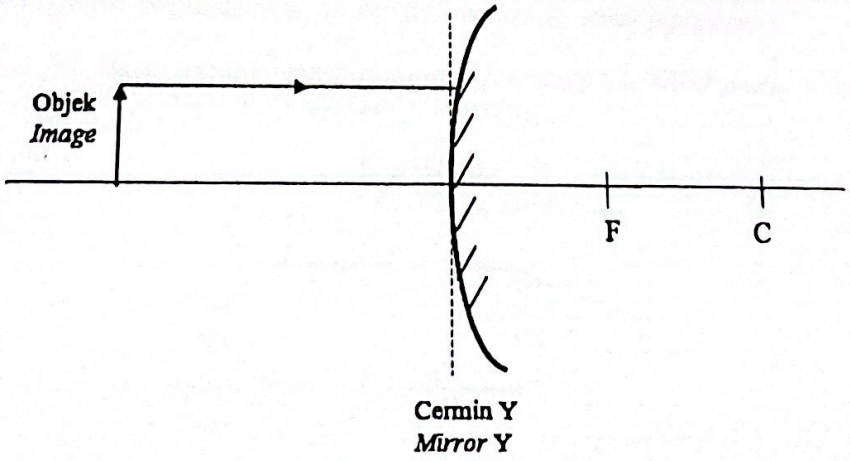
Rajah 8.1 / *Diagram* 8.1

(a) Apakah fenomena cahaya yang terlibat dalam cermin Y?
What light phenomenon involved in the mirror Y?

.....

[1 markah / 1 *mark*]

(b) Rajah 8.2 menunjukkan gambar rajah sinar yang tidak lengkap bagi cermin Y.
C ialah pusat kelengkungan dan F ialah titik fokus cermin Y.
Diagram 8.2 shows an incomplete ray diagram of mirror Y.
C is the centre of curvature and F *is the focal point of the mirror* Y.



Rajah 8.2 / *Diagram* 8.2

Pada Rajah 8.2, lengkapkan gambar rajah sinar untuk menunjukkan imej yang terbentuk.
In Diagram 8.2, complete the ray diagram to show the image formed.

[2 markah / 2 marks]

(c) Peniaga mendapati sukar untuk memantau aktiviti di kedainya. Cadangkan pengubahsuaian kepada cermin berdasarkan aspek-aspek berikut:
The shopkeeper found out that it is difficult to observe the activity in his shop. Suggest modifications to the mirror based on the following aspects:

(i) Jenis cermin
Type of mirror

.....

Sebab
Reason

.....

[2 markah / 2 *marks*]

(i) Jejari kelengkungan
Radius of curvature

.....

Sebab
Reason

.....

[2 markah / 2 *marks*]

(ii) Diameter
Diameter

.....

Sebab
Reason

.....

[2 markah / 2 *marks*]

Total
A8

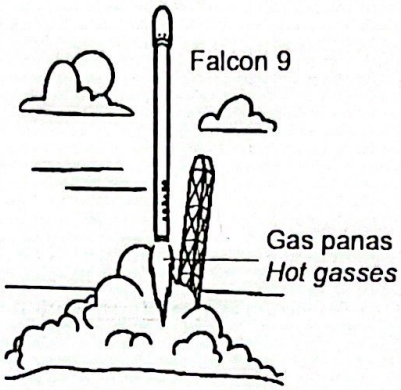
9

Bahagian B

[20 *markah*]

Bahagian ini mengandungi **dua** *soalan. Jawab* **satu** *soalan.*

9. Rajah 9.1 menunjukkan roket Falcon 9 dilancarkan dari sebuah tapak pelancaran.
Diagram 9.1 *shows Falcon 9 rocket is launched from a launch pad.*



Rajah 9.1 / *Diagram* 9.1

(a) Apakah maksud momentum?
What is meant by momentum?

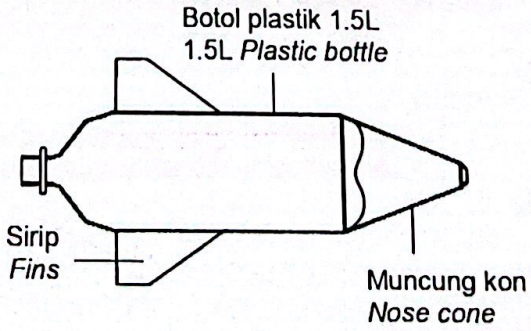
[1 markah / 1 *mark*]

(b) Terangkan bagaimana pelepasan gas panas melalui ekzos roket dapat memecutkan roket ke atas.
Explain how the release of hot gases through the rocket's exhaust enables the rocket to accelerate upwards.

[4 markah / 4 *marks*]

(c) Rajah 9.2 menunjukkan sebuah roket air diperbuat daripada botol plastik bersaiz 1.5 liter dengan menambahkan air dan tekanan udara untuk pelancaran.

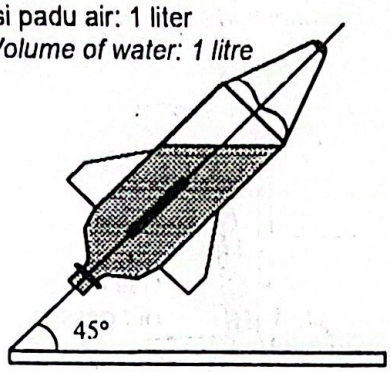
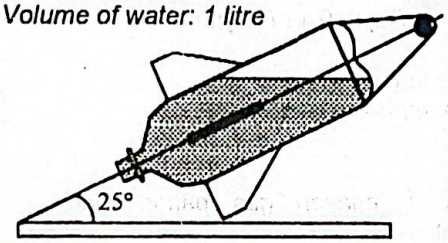
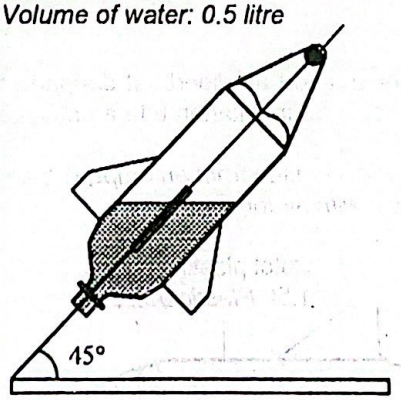
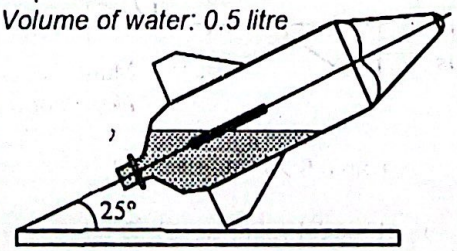
Diagram 9.2 *shows a water rocket made from an empty* 1.5 *litre of plastic bottle by adding water and pressuring it with air for launching.*



Rajah 9.2 / *Diagram* 9.2

Jadual 9 menunjukkan empat model roket air, P, Q, R dan S dengan spesifikasi yang berbeza.

Table 9 *shows four water rocket models,* P, Q, R *and* S *with different specifications.*

Model *Model*	Rajah kedudukan roket di atas tapak pelancar *Diagram of the position of the rocket on the launch pad*	Tekanan udara di dalam botol *Air pressure in the bottle*	Bahan tambahan pada muncung *Additional material in nose cone*
P	Isi padu air: 1 liter *Volume of water: 1 litre* 	Tinggi *High*	Tiada plastisin *Without plastisine*
Q	Isi padu air: 1 liter *Volume of water: 1 litre* 	Rendah *Low*	Ada plastisin *With plastisine*
R	Isi padu air: 0.5 liter *Volume of water: 0.5 litre* 	Tinggi *High*	Ada plastisin *With plastisine*
S	Isi padu air: 0.5 liter *Volume of water: 0.5 litre* 	Rendah *Low*	Tiada plastisin *Without plastisine*

Jadual 2 / *Table* 2

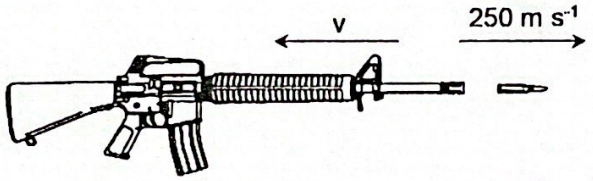
Anda dikehendaki memilih model roket air yang boleh dilancarkan ke hujung sebuah padang sekolah yang luas.
Kaji spesifikasi keempat-empat model roket air berdasarkan aspek-aspek yang diberikan.
Terangkan kesesuaian setiap spesifikasi dan seterusnya tentukan model roket air yang paling sesuai. Beri sebab untuk pilihan anda.

You are required to choose the model of the water rocket that can be launched to the end of a wide school field.
Study the specifications of the four water rocket models based on the given aspects. Explain the suitability of each specification and then determine the most suitable water rocket model. Give reasons for your choice.

[10 markah / 10 *marks*]

(d) Rajah 9.3 menunjukkan sebutir peluru berjisim 10 g dilepaskan daripada selaras senapang yang berjisim 1.5 kg. Selepas tembakan, peluru bergerak ke hadapan dengan halaju 250 m s^{-1} manakala senapang tersentak ke belakang dengan halaju, v.

Diagram 9.2 *shows a bullet of mass* 10 g *fired from a riffle of mass* 1.5 kg. *After firing, the bullet moves forward with a velocity of* 250 m s^{-1} *while the riffle recoils with a velocity,* v.



Rajah 9.3 / *Diagram* 9.3

(i) Tentukan jumlah momentum sistem sebelum tembakan.
Determine the total momentum of the system before the shot.

[1 markah / 1 *mark*]

(ii) Tukarkan unit bagi jisim peluru kepada unit Sistem Antarabangsa (S.I).
Convert the unit of bullet mass to the International System (S.I) *unit.*

[1 markah / 1 *mark*]

(iii) Hitung halaju senapang selepas tembakan, v.
Calculate the velocity of the gun after the shot, v.

[3 markah / 3 *marks*]

SOALAN 9

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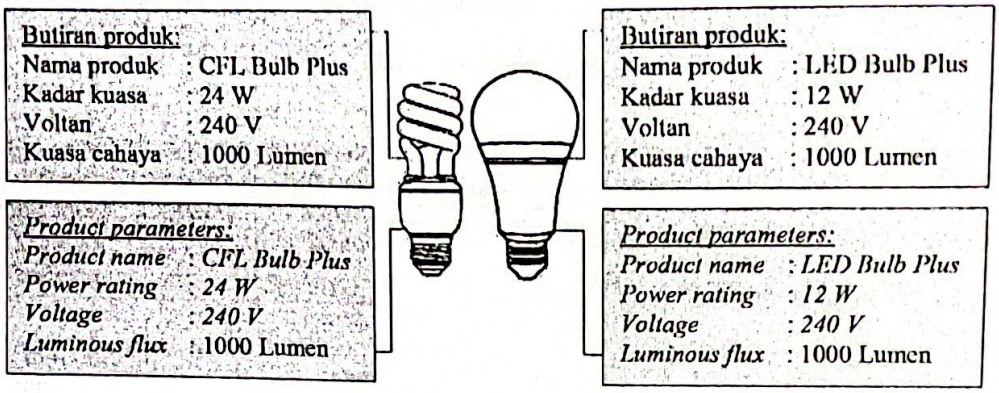
10. Rajah 10.1 menunjukkan sebuah model lampu *Compact Fluorescent Lamp* (CFL) dan sebuah model lampu *Light Emitting Diode* (LED) dan spesifikasi kedua-dua lampu.

Diagram 10.1 *shows a model of a Compact Fluorescent Lamp* (CFL) *and a model of a Light Emitting Diode* (LED) *lamp and the specifications of both lamps.*



Rajah 10.1 / *Diagram* 10.1

(a) Apakah maksud 240 V, 12 W yang dinyatakan dalam butiran produk lampu LED tersebut.
What is the meaning of 240 V, 12 W *mentioned in the product details of the* LED *lamp.*

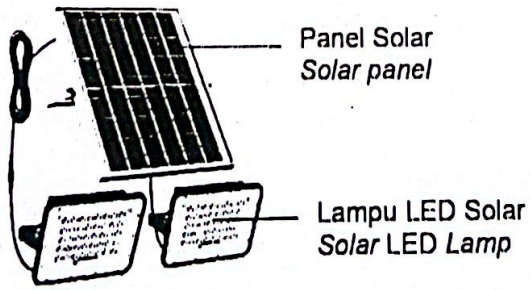
[1 markah / 1 *mark*]

(b) Lampu *Light Emitting Diode* (LED) semakin menjadi pilihan pengguna berbanding lampu *Compact Fluorescent Lamp* (CFL) oleh kerana lebih menjimatkan penggunaan tenaga dan kos.
Terangkan bagaimana lampu *Light Emitting Diod* (LED) boleh menjimatkan lebih banyak tenaga dan kos berbanding lampu *Compact Fluorescent Lamp* (CFL).

Light Emitting Diode (LED) *lamps have become the choice of consumers compared to Compact Fluorescent Lamp* (CFL) *because they are more energy efficient and cost effective.*
Explain how Light Emitting Diode (LED) *lamps can save more energy and cost compared to Compact Fluorescent Lamp* (CFL) *lamps.*

[4 markah / 4 *marks*]

(c) Rajah 10.2 menunjukkan satu set lampu *Light Emitting Diode* (LED) Solar.
Diagram 10.2 *shows a set of Solar Light Emitting Diode* (LED) *lamp.*



Rajah 10.2 / *Diagram* 10.2

Seorang penternak biri-biri bercadang memasang lampu *Light Emitting Diode* (LED) Solar bagi menerangi kawasan kandang biri-birinya di waktu malam.
A sheep farmer plans to install solar Light Emitting Diode (LED) *lamps to light up his sheep pen area at night.*

Jadual 3 menunjukkan empat model lampu LED Solar A, B, C dan D.
Table 3 *shows four model of* A, B, C *and* D *Solar* LED *lamps.*

Model Lampu LED Solar *Model of Solar LED Lamp*	Kapasiti bateri boleh dicas semula *Rechargeable battery capacity*	Orientasi solar panel *Solar panel orientation*	Kadar kuasa *Power rating*	Saiz lampu *Light Emitting Diode* (LED) *Light Emitting Diode (LED) lamp size*
A	8000 mAh	Mengadap Mahatari di waktu tengahari *Facing the Sun at noon*	500 W	350 mm x 350 mm
B	5000 mAh	Mengadap Matahari di waktu pagi *Facing the Sun in the morning*	150 W	260 mm x 174 mm
C	10 000 mAh	Mengadap Matahari di waktu petang *Facing the Sun in the afternoon*	500 W	290 mm x 350 mm
D	50 000 mAh	Mengadap Mahatari di waktu tengahari *Facing the Sun at noon*	1200 W	350 mm x 350 mm

Jadual 3 / *Table* 3

Anda dikehendaki menentukan model Lampu LED Solar yang dapat menerangi seluruh kawasan dalam tempoh masa yang lama pada waktu malam.
Kaji spesifikasi keempat-empat model Lampu LED Solar berdasar aspek-aspek yang diberi.
Terangkan kesesuaian setiap spesifikasi dan seterusnya tentukan model lampu LED Solar yang paling sesuai. Beri sebab untuk pilihan anda.

You are required to determine the model of Solar LED *Lights that can illuminate the entire area for a long period of time at night.*
Study the specifications of all four Solar LED *Lamp models based on the given aspects.*
Expiain the suitability of each specification and then determine the most suitable model of Solar LED *lights. Give reasons for your choice.*

[10 markah / 10 *marks*]

(d) Sebuah lampu pendarfluor dilabelkan dengan 240 V, 32 W. Hitung:
A fluorescent lamp is labelled 240 V, 32 W. *Calculate:*

(i) Arus yang mengalir melalui lampu apabila menyala dengan kecerahan normal.
The current flowing through the lamp when light up with normal brightness.

[2 markah / 2 *marks*]

(ii) Tenaga elektrik yang dibekalkan selama tiga jam dalam unit kilojoule (kJ).
The electrical energy that is supplied for three hours in kilojoule (kJ).

[3 markah / 3 *marks*]

SOALAN 10

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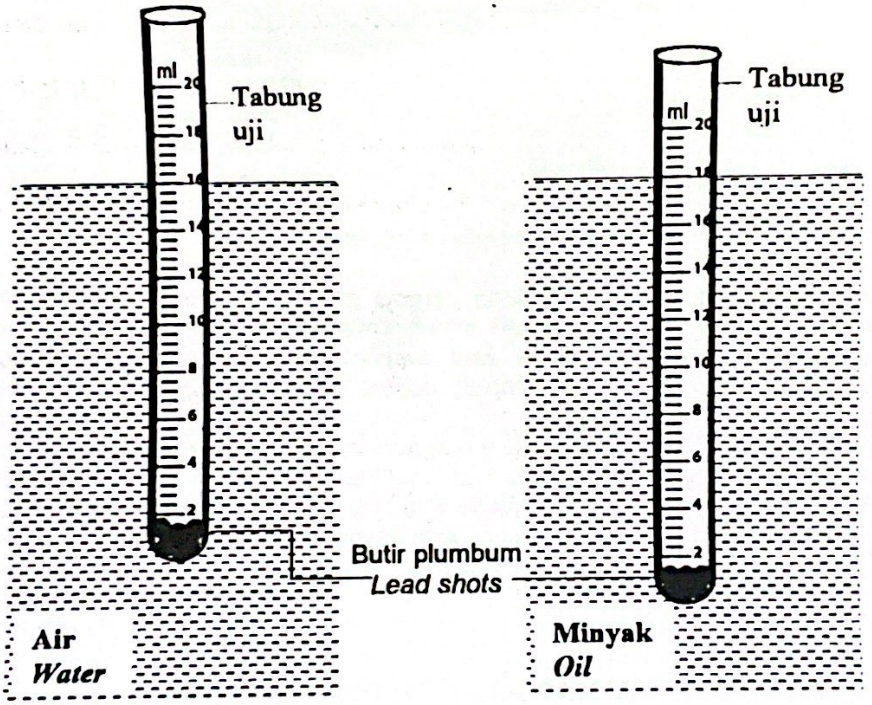
Bahagian C

[20 *markah*]

Soalan ini **mesti** *dijawab.*

11 Rajah 11.1 sebuah tabung uji berisi butir plumbum terapung tegak di dalam air berketumpatan 1 g cm^{-3}
Rajah 11.2 tabung uji berisi butir plumbum yang sama terapung tegak di dalam minyak berketumpatan 0.9 g cm^{-3}.
Diagram 11.1 *a test tube filled with lead shots floating upright in water of density* 1 g cm^{-3}.
Diagram 11.2 *the same test tube filled with lead shots floating upright in oil of density* 0.9 g cm^{-3}



Rajah 11.1
Diagram 11.1

Rajah 11.2
Diagram 11.2

(a) Namakan konsep fizik yang terlibat dalam Rajah 11.1?
Name the physics concept involved in Diagram 11.1?

[1 markah / 1 *mark*]

(b) Perhatikan Rajah 11.1 dan Rajah 11.2,
Observe Diagram 11.1 *and Diagram* 11.2,

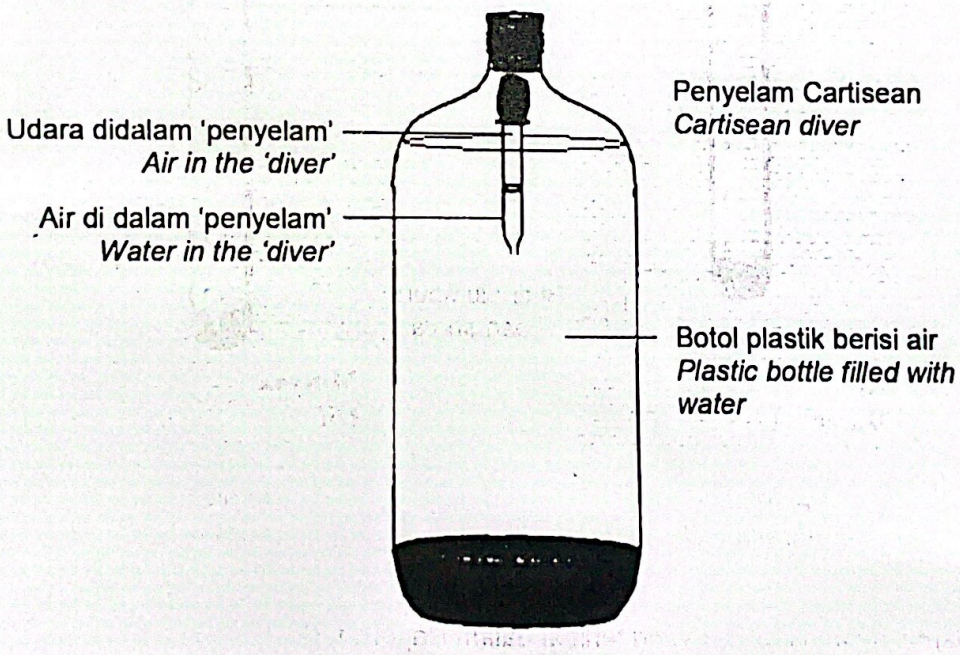
(i) bandingkan ketumpatan cecair, kedalaman tabung uji tenggelam di dalam cecair dan isipadu cecair tersesar.
compare the density of liquid, depth of test tube immersed in liquid and volume of liquid displaced.

[3 markah / 3 *marks*]

(ii) nyatakan hubungkait antara ketumpatan cecair dengan kedalaman tabung uji tenggelam didalam cecair. Buat satu deduksi berkaitan hubungkait antara ketumpatan cecair dengan isipadu cecair tersesar bagi mengkaji satu konsep fizik di dalam (a).
state the relationship between the density of liquid and depth of test tube immersed in liquid. Make a deduction regarding the relationship between the density of liquid and volume of liquid displaced to study the physics concept in (a).

[2 markah / 2 *marks*]

(c) Rajah 11.3 menunjukkan penitis dijadikan penyelam Cartesian dan sedang terapung di dalam botol plastik berisi air.
Diagram 11.3 shows a dropper made into a Cartesian diver and is floating in a plastic bottle filled with water.

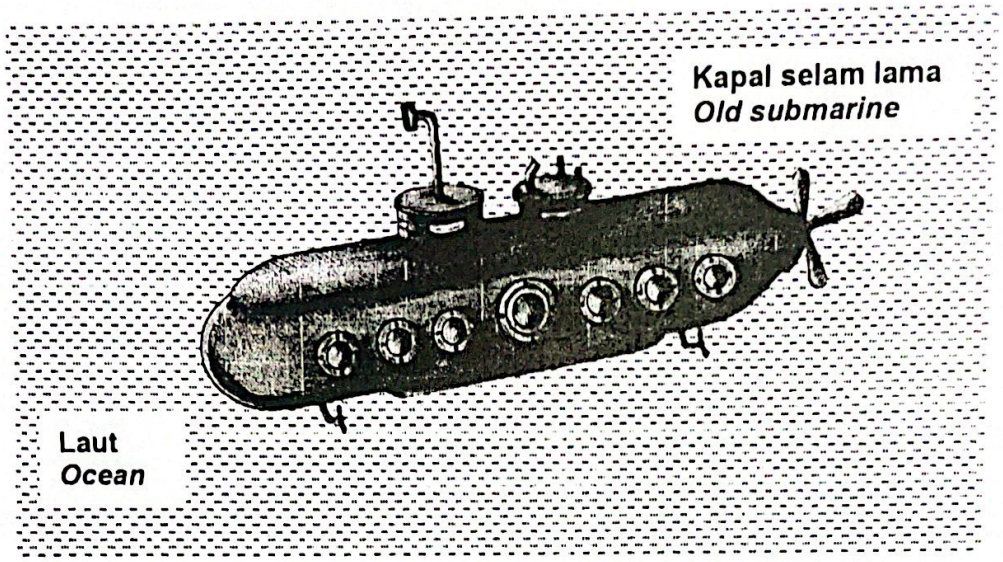


Rajah 11.3 / *Diagram* 11.3

Huraikan apakah yang berlaku kepada penyelam Cartesian apabila botol plastik itu dipicit.
Describe what happens to the Cartisean diver when the plastic bottle is squeezed.

[4 markah / 4 *marks*]

(d) Penyelam Cartesian dalam Rajah 11.3 boleh digunakan untuk memahami prinsip kerja sebuah kapal selam lama seperti ditunjukkan dalam Rajah 11.4.
Cartisean diver in Diagram 11.3 *can be used to understand the working principle of an old submarine as shown in Diagram* 11.4.



Rajah 11.4 / *Diagram* 11.4

Menggunakan konsep fizik yang sesuai, cadangkan pengubahsuaian yang perlu dilakukan kepada kapal selam lama dalam Rajah 11.4 supaya ia boleh menyelam beribu-ribu meter di bawah permukaan laut, boleh timbul dan tenggelam dengan mudah, boleh dikemudi dalam air dengan selamat dan kekal berada di dalam air bagi tempoh beberapa bulan.
Using appropriate physics concept, suggest modifications that need to be done to the old submarine in Diagram 11.4 *so that it can dive to thousands of metres below the surface of the ocean, able to rise and sink easily, can navigate under the water safely and remain underwater for several months.*

[10 markah / 10 *marks*]

KERTAS PEPERIKSAAN TAMAT

SOALAN 11

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