



PHYSICS ***Workshop*** ***2022***

SMK YU HUA,
KAJANG

6 Oktober 2022

Physics workshop

SPM KSSM 2022

- Paper 1 – 40 objectives – 1 hour 15 min
- Paper 2- 8 structures (60 marks) Format 456 99999
and 3 Essay (part B – 2 choose 1) 20 marks
(part C -1 compulsory) 20 marks
2 hours 30 mins
- Paper Practical 1 questions (Random)– combination with chemistry and biology
15 marks - 45 minutes (Solo)

Paper 1 (KSSM SPM)

Form 4

- 1- measurement
- 2-Force and motion 1
- 3- Gravitation
- 4-Heat
- 5- Waves
- 6- Light

Form 5

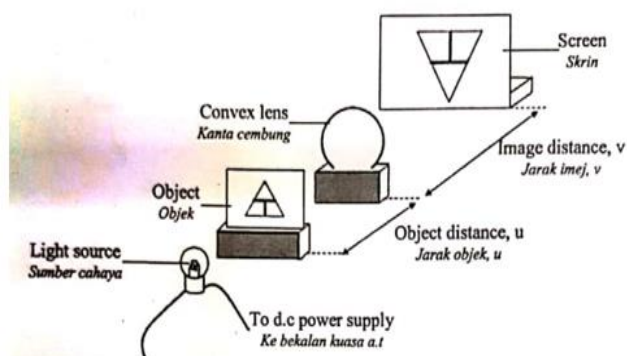
- 1- Force and motion 2
- 2-Pressure
- 3- Electricity
- 4-Electromagnetism
- 5- Electronics
- 6- Nuclear Physics
- 7- Quantum Physics

KSSM Objective

CONTOH Item Menganalisis

1.

4 Rajah menunjukkan satu susunan eksperimen untuk menyiasat hubungan antara jarak objek, u dan jarak imej, v .



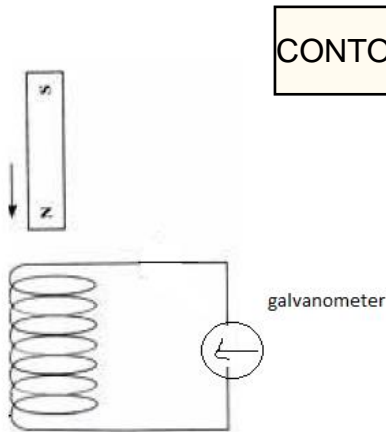
Graf manakah yang menunjukkan hubungan antara v dan u yang betul?

Diagram show an arrangement of an experiment to investigate the relationship between object distance, u and image distance, v .

Which of the following statement true about the above experiment?

	Manipulated variable	Constant variable	Responding variable
A	Image distance	Power of lense	Object distance
B	Power of lense	Object distance	Image distance
C	Object distance	Power of lense	Image distance
D	Type of lense	Power of lense	Image distance

2.



CONTOH Item Menganalisis

Diagram show an arrangement of an experiment to investigate the Faraday's Law.

Which of the following statement true about the above experiment?

	Manipulated variable	Constant variable	Responding variable
A	Height of magnet drop into solenoid	Induced current	Number of turns
B	Height of magnet drop into solenoid	Number of turns	Induced current
C	Number of turns	Height of magnet drop into solenoid	Induced current
D	Induced current	Number of turns	Height of magnet drop into solenoid

3. Based on the importance of knowing the values of gravitational acceleration of the planets in the Solar System, which of statement is correct about the effects of gravity on human growth?

- A. difference in age
- B. numbers of bones
- C. mass of lungs
- D. blood circulation system and blood pressure

CONTOH Item Mengingat

4. Johannes Kepler, a German astronomer whom had formulated laws that describe the movement of planets around the Sun which explains

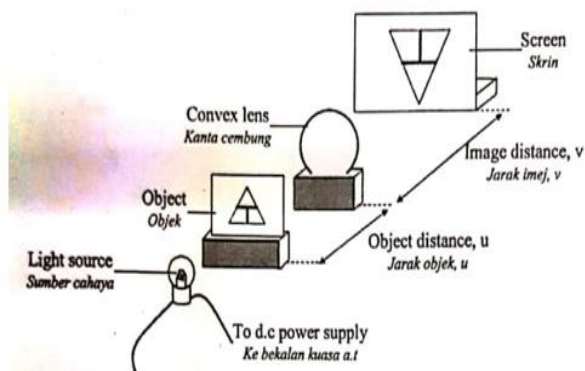
- I. all planets move in elliptical orbits, with the sun at one focus (Law of Orbits).
- II. a line that connects a planet to the sun sweeps out equal areas in equal times (Law of Areas).
- III. the square of the period of any planet is directly proportional to the square of the radius of its orbit (Law of Periods).

- A. I and II only
- B. I and III only
- C. II and III only

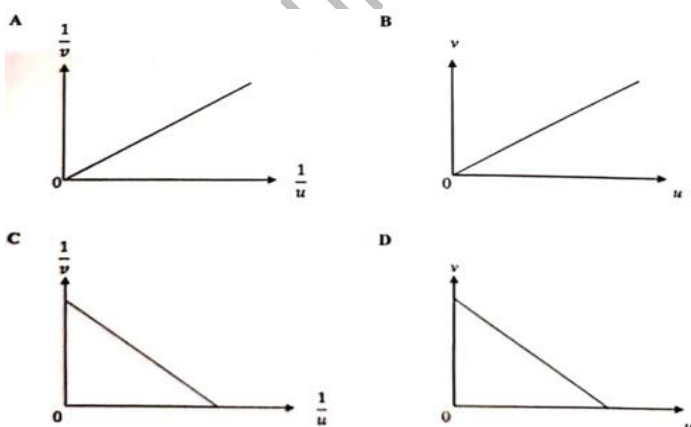
5. Diagram show an arrangement of an experiment to investigate the relationship between object distance, u and image distance, v .

Which of the following graph show the correct relationship between v and u true?

4 Rajah menunjukkan satu susunan eksperimen untuk menyiasat hubungan antara jarak objek, u dan jarak imej, v .



Graf manakah yang menunjukkan hubungan antara v dan u yang betul?



Paper 2 KSSM

Structures (60 marks)

1.

Kuantum tenaga bermaksud paket-paket tenaga diskrit yang bergantung kepada frekuensi gelombang. Einstein mengembangkan teori Planck dengan menyatakan bahawa cahaya wujud dalam bentuk kuantum yang dikenali sebagai foton menerusi Teori Fotelektrik Einstein.

Quantum of energy is a discrete packet of energy which is dependant on wave frequency. Einstein further expanded Planck's theory by stating that light exists in quanta known as photon through Einstein's Photoelectric Theory.

(a) Apakah yang dimaksudkan dengan fungsi kerja dalam Teori Fotelektrik Einstein?
What is the meaning of work function in Einstein's Photoelectric Theory?

[1 mark/ 1 markah]

(b) Lengkapkan ayat berikut dengan menandakan (/) jawapan yang betul.
Complete the following sentence by ticking (/) the correct answer.

Frekuensi ambang, f_0 ialah
Einstein's equation for photoelectric effect is

frekuensi untuk mengeluarkan elektron daripada jasad.
frequency to emit electron from the object

frekuensi minimum untuk menghasilkan kesan fotelektrik pada logam
minimum frequency to produce photoelectric effect on metal

[1 mark/ 1 markah]

(c) based on the equation of Einstein's equation for photoelectric effect, $E = W + K_{maks}$, state the equation for W and K_{maks} .

berdasarkan persamaan pada (b) di atas, nyatakan perwakilan untuk W dan f .

$W =$ _____

$K_{maks} =$ _____

[2 mark/ 2 markah]

2.

The label on electric kettle is marked 240 V , 3 kW. The kettle contains 1.7 kg of water at 20 °C. It takes 3.5 minutes to raise the temperature of the water to 100 °C.

[Specific heat capacity of water is $4.2 \times 10^3 \text{ J kg}^{-1} \text{ } ^\circ\text{C}^{-1}$,
specific latent heat of vaporization of water $2.3 \times 10^6 \text{ J kg}^{-1}$]



Diagram 5
Rajah 5

Sebuah cerek dilabelkan sebagai 240 V , 3 kW. Cerek mengandungi 1.7 kg air pada suhu 20 °C. Selama 3.5 minit masa diperlukan untuk meningkatkan suhu air sehingga 100 °C.

[Muatan haba tentu ialah $4.2 \times 10^3 \text{ J kg}^{-1} \text{ } ^\circ\text{C}^{-1}$, haba pendam tentu pengewapan air $2.3 \times 10^6 \text{ J kg}^{-1}$]

- (a) What is meant by specific heat capacity?
Apakah yang dimaksudkan dengan muatan haba tentu?



.....
.....

[2 marks]
[2 markah]

- (b) Calculate
Kira

- (i) the energy output of the electric kettle in 3.5 minutes,
tenaga yang dikeluarkan dari cerek dalam masa 3.5 minit



[2 marks]
[2 markah]

- (ii) the energy required to raise the temperature of 1.7 kg of water from 20^o C to 100^o C.
tenaga yang diperlukan untuk meningkatkan suhu bagi 1.7 kg air dari 20^o C ke 100^o C.



[2 marks]
 [2 markah]

- (iii) the energy required to boil away 0.23 kg of water at 100^o C.
tenaga yang diperlukan untuk mendidihkan 0.23 kg air pada 100^o C



[2 marks]
 [2 markah]

- (c) what is the meant by an electric kettle label 240V, 3 kW?



Apakah yang dimaksudkan dengan cerek elektrik dilabel 240V, 3 kW? [1marks/ 1markah]

3

Alia uses a convex lens to help her to see clearly while removing a wood splinter from her thumb.

Alia menggunakan sebuah kanta cembung untuk membantunya melihat dengan lebih jelas semasa mengeluarkan serpihan kayu kecil daripada ibu jarinya.

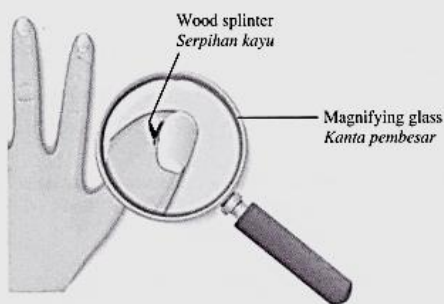


Diagram 4.1
 Rajah 4.1

- (a) Tick ✓ for the correct answer.
Tandakan ✓ bagi jawapan yang betul.

Convex lens can
Kanta cembung boleh

- converge the light
menumpukan cahaya
- diverge the light
mencapah cahaya

[1 mark]



- (b) The focal length of the lens used is 5.0 cm.
On Diagram 4.2, draw a ray diagram to show how the image in Diagram 4.1 is formed.

Panjang fokus kanta yang digunakan ialah 5.0 cm.

Pada Rajah 4.2, lukis satu rajah sinar untuk menunjukkan bagaimana imej dalam Rajah 4.1 terbentuk.

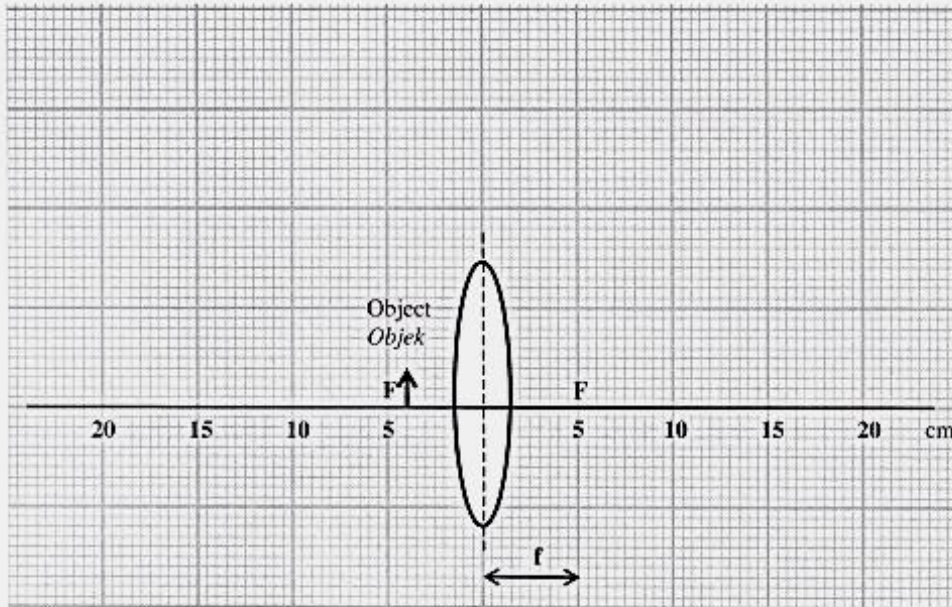


Diagram 4.2
Rajah 4.2

[3 marks]
[3 markah]

- (c) Determine the linear magnification of the lens.
Tentukan pembesaran linear kanta tersebut.



[2 marks]
[2 markah]

4.

Diagram 5.1 shows a boy rocking an elastic spring rocker.
Diagram 5.2 shows the same boy rocking on another spring rocker.
Both spring rockers used identical springs.

Rajah 5.1 menunjukkan seorang budak lelaki bermain rocker spring yang kenyal.
Rajah 5.2 menunjukkan budak lelaki yang sama bermain rocker spring yang lain.
Kedua-dua rocker spring tersebut menggunakan spring yang sama.



Diagram 5.1
Rajah 5.1



Diagram 5.2
Rajah 5.2



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

.....

[1 mark]
[1 markah]



- (b) Observe Diagram 5.1 and 5.2, compare;
Berdasarkan Rajah 5.1 dan 5.2, bandingkan;

- (i) the number of springs.
bilangan spring.

.....

[1 mark]
[1 markah]



- (ii) the compression of the springs.
pemampatan spring.

.....

[1 mark]
[1 markah]

W



- (iii) the stiffness of the springs.
kekerasan spring.

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



- (iv) Relate the number of spring and the compression of the spring.
Hubungkan bilangan spring dengan pemampatan spring.

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



- (v) Relate the stiffness and the compression of the spring.
Hubungkan antara kekerasan dengan pemampatan spring.

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



- (c) Which spring rocker can support children with greater mass?
Explain your answer.

*Rocker spring yang manakah mampu menampung kanak-kanak yang lebih berat?
Terangkan jawapan anda.*

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

www.gurutho.com

4.

1.

Diagram 7 shows a tyre of a car that is going to be used to travel from Kuala Lumpur to Kuala Terengganu.

Rajah 7 menunjukkan sebiji tayar kereta yang digunakan untuk perjalanan dari Kuala Lumpur ke Kuala Terengganu.

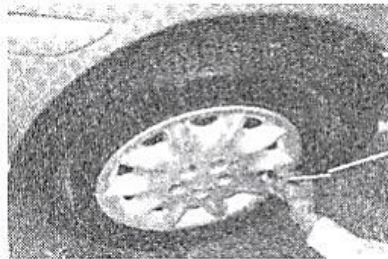


Diagram 7
Rajah 7

(a) After the long journey,
Selepas satu perjalanan yang jauh,



(i) what happen to the temperature of the air in the tyre
apakah yang berlaku kepada suhu udara di dalam tayar.

.....
[1 mark]



(ii) state **one** other physical quantity that will also change.
nyatakan **satu** kuantiti fizik lain yang turut berubah.

.....
[1 mark]

(b) Based on the answers in (a) (i) and (a) (ii), name the gas law involve.
Berdasarkan jawapan dalam (a) (i) dan (a) (ii), namakan hukum gas yang terlibat.



.....
[1 mark]

c) Before a long journey, the driver checked the air pressure of his car tyres. The air pressure of the tyres was 200 kPa at a temperature 27°C. After the journey, the air pressure of the tyres was found to have increased to 230 kPa. What is the temperature of the air in the tyre after the journey? [Assume the volume of the tyre is constant]



[2 marks]

- (d) The tyre in Diagram 7 is not suitable to be used on a muddy road. Suggest modifications to be done based on the characteristics given.
Tayar di dalam Rajah 7 tidak sesuai digunakan di atas jalan berlumpur. Cadangkan pengubahsuaian yang perlu dilakukan berdasarkan ciri-ciri yang diberi.



- (i) Surface area of the tyre
Luas permukaan tayar

.....
 [1 mark]

- (ii) Reason
Sebab

.....
 [1 mark]



- (iii) The track of the tyre
Alur pada tayar

.....
 [1 mark]

- (iv) Reason
Sebab

.....
 [1 mark]

- (v) The pressure of the tyre
Tekanan dalam tayar

_____ [1mark]



- (vi) Reason / *Sebab*

..... [1mark]

5.

Essay PART B

ESSAY Part B

1



- (a) Apakah yang dimaksudkan dengan kerintangan dawai?
 What is meant by resistivity of a conductor?

[1 mark]

- (b) i) Tentukan fuis yang sesuai bagi cerek bertanda 240V, 800W (Pilihan fuis adalah 1A, 3A, 5A, 8A atau 13A)



Determine an appropriate fuis for a kettle that is marked 240V, 800W.

(choice of fuis is 1A, 3A, 5A, 8A atau 13A)

[2 marks].

- ii) Tentukan tenaga yang digunakan untuk memanaskan air dalam cerek bertanda 240V, 800W selama 15 minit

Determine the energy uses to heat up the water in the kettle marked 240V, 800W for 15 minutes. [2 marks].

(c)

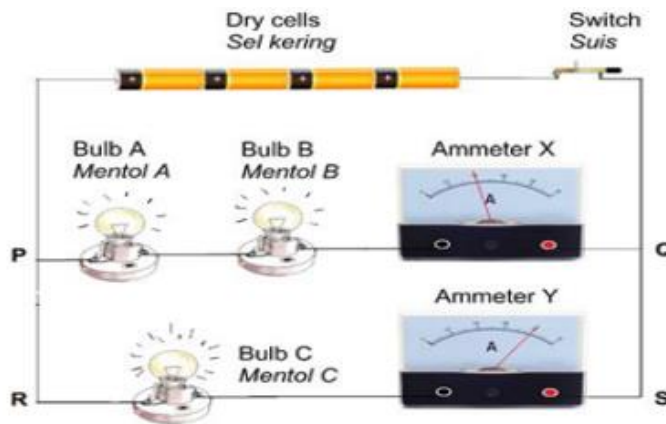


Diagram 10.1
Rajah 10.1

Diagram 10.1 shows an electrical circuit consist of three identical bulbs. Two bulbs and an ammeter are placed across PQ. A bulb and an ammeter are placed across RS. Assume the internal resistance of the dry cells is zero. *Rajah 10.1 menunjukkan litar elektrik mengandungi tiga mentol yang serupa. Dua mentol dan ammeter diletakkan merentasi PQ. Satu mentol dan ammeter diletakkan merentasi RS. Anggap rintangan dalam sel kering adalah sifar.*

A piece of copper wire is connected across Bulb B in Diagram 10.1. *Seutas dawai kuprum disambung merentasi Mentol B dalam Rajah 10.1.*

Explain what happens to the ammeter readings and brightness of the bulbs. *Terangkan apakah yang berlaku kepada bacaan ammeter dan kecerahan mentol.* [4 marks]

(d)

Table 11.2 shows design of four pressure cookers and their characteristics.

Jadual 11.2 menunjukkan rekabentuk bagi empat periuk tekanan dan cirri-cirinya.

You are required to determine the most suitable specifications for a design of a pressure cooker. Explain the suitability of each specification. Choose the most suitable pressure cooker and give reasons for your choice.

Anda dikehendaki menentukan spesifikasi yang paling sesuai untuk merekabentuk sebuah periuk tekanan. Terangkan kesesuaian setiap spesifikasi. Pilih periuk tekanan yang paling sesuai dan beri sebab untuk pilihan anda. [10 marks]

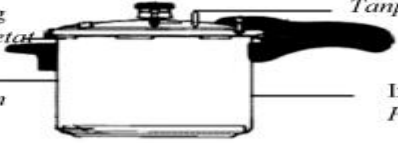


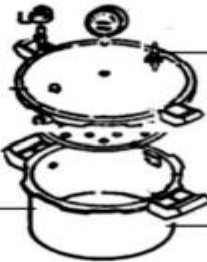
Model Model	Characteristics of the model <i>Ciri-ciri model</i>
P	<p>Without sealing ring <i>Tanpa gelung pengetat</i></p> <p>Without release valve <i>Tanpa injap pelepas</i></p> <p>1 layer <i>1 lapisan</i></p> <p>Iron pot <i>Periuk besi</i></p> 
Q	<p>Release valve <i>Injap pelepas</i></p> <p>Sealing ring <i>Gelung pengetat</i></p> <p>Steel pot <i>Periuk keluli</i></p> <p>Multilayer <i>Banyak lapisan</i></p> 
R	<p>Without release valve <i>Tanpa injap pelepas</i></p> <p>Sealing ring <i>Gelung pengetat</i></p> <p>one layer iron pot <i>satu lapisan periuk besi</i></p> 
S	<p>Release valve <i>Injap pelepas</i></p> <p>Steel pot <i>Periuk keluli</i></p> <p>Multilayer <i>Banyak lapisan</i></p> 

Table 11.2
Jadual 11.2

- (e) Selain daripada spesifikasi periuk tekanan yang diberikan dalam Jadual di atas, cadangkan satu faktor lain bagi periuk tekanan tersebut untuk membolehkan periuk tekanan tersebut digunakan dengan selamat. Beri satu sebab.

Apart of the specification of the pressure cooker given in Table above, suggest another one factor for the pressure cooker to enable it to be used safely. Give a reason. [2 marks]

Part c

Esei

1

Diagram 1 shows the formation of the image of an object by a lens X. In Diagram 2, another lens, Y, is used to form the image of the same object.
Rajah 1 menunjukkan pembentukan imej bagi suatu objek oleh kanta X. Dalam Rajah 2, satu lagi kanta, Y, digunakan bagi membentuk imej bagi objek yang sama.

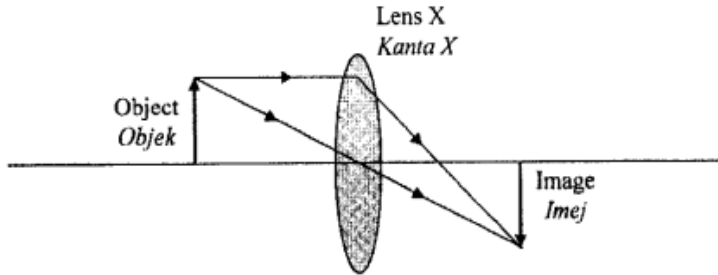


Diagram 1 / Rajah 1

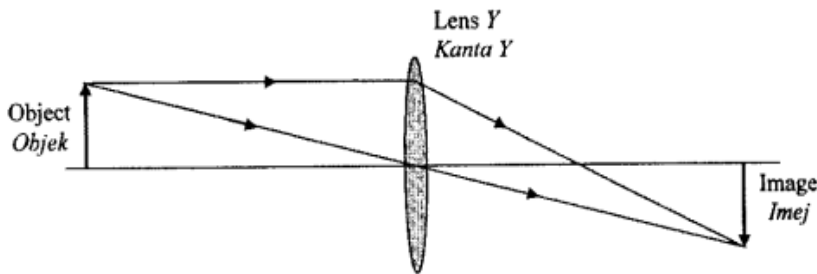


Diagram 2 / Rajah 2

1(a)

For each case, compare;

Bagi setiap kes, bandingkan ;

- (i) the size of the object and the size of the image
saiz objek dan saiz imej
- (ii) the object distance and the image distance
jarak objek dan jarak imej

[2 marks]

(b)

- (i) Compare the focal length of lens X and lens Y.
Bandingkan panjang fokus kanta X dan kanta Y.
- (ii) Compare the thickness of lens X and lens Y.
Bandingkan ketebalan kanta X dan kanta Y.
- (iii) Relate the focal length with the thickness of the lens.
Hubungkan panjang fokus kanta dengan ketebalannya.

[3 marks]

1(c) what is the unit for the power of the lenses?

[1mark]

(d)



Diagram above show a technician using magnifying glass to assist him to fix the circuit board. The magnifying glass will magnified the board image.

Using the diagram to explain how the image forms. In your explanation, state the characteristics of the image.

Rajah atas menunjukkan seorang juru teknik menggunakan lampu pembesar untuk membantunya memperbaiki sebuah papan litur. Lampu pembesar itu menggunakan sebuah kanta untuk memperbesarkan imej litur itu.

Dengan menggunakan rajah, terangkan bagaimana imej terbentuk. Dalam penerangan anda, nyatakan ciri-ciri imej itu. [4 marks]

(e) Diagram 9.3 shows a simple solar water-heating system. Energy from the Sun falls on the solar panel. Water is pumped around the system so that a store of hot water is made available in the tank.

Rajah 9.3 menunjukkan satu sistem pemanasan air yang ringkas. Tenaga dari matahari memancar ke atas panel solar. Air dipam mengelilingi sistem itu supaya simpanan air panas tersedia di dalam tangki.

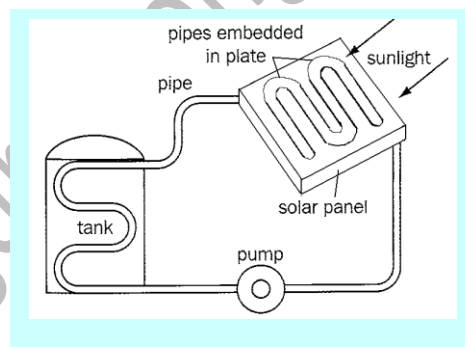


DIAGRAM 9.3



Using suitable physics concepts, explain the required **modification** needed in designing an efficient solar water-heating system. The modification should include the following aspects:

Dengan menggunakan konsep fizik yang sesuai, terangkan pengubahsuaian yang diperlukan dalam mereka bentuk sistem pemanasan air solar yang cekap. Pengubahsuaian hendaklah mengikuti aspek-aspek berikut:

(i) **pipes design**
rekabentuk paip

(ii) **material used**
bahan yang digunakan

(iii) **heat absorption**
penyerapan haba

[10 marks]

KBAT Questions

A (d)

Diagram 9.3 shows Hazim is driving a hydrofoil boat in a lake. As the boat moves, the hydrofoil lift the boat's hull out of the water surface due to its foil attached underneath the boat, hence increase the speed of the boat.

Explain how hydrofoil lifts the boat to increase its speed.

Rajah 9.3 menunjukkan Hazim memandu sebuah bot hidrofoil di sebuah tasik. Apabila bot bergerak, hidrofoil mengangkat badan bot keluar dari permukaan air disebabkan oleh penghadang yang dipasang dibawahnya, seterusnya meningkatkan kelajuan bot.

Terangkan bagaimana hidrofoil boleh mengangkat bot dan meningkatkan kelajuannya.

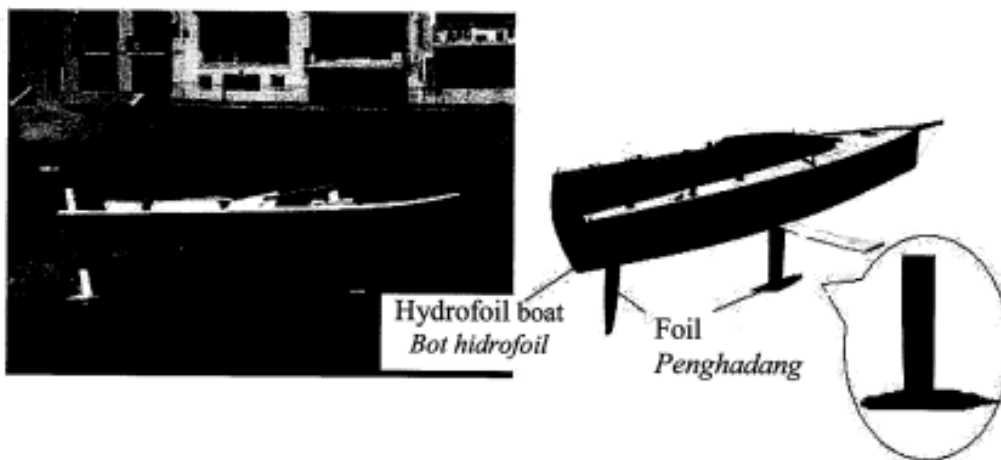


Diagram 9.3
Rajah 9.3

[4 marks]
[4 markah]

(e) Diagram 9.4 shows a snorkelling suit and equipment set.

Rajah 9.4 menunjukkan pakaian dan peralatan snorkel.

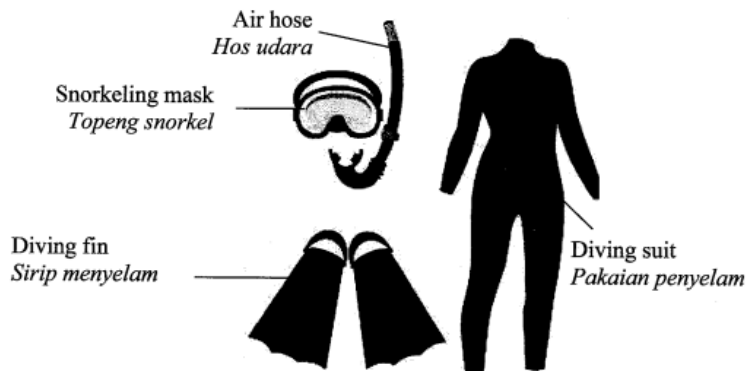


Diagram 9.4
Rajah 9.4

The diving suit and equipment in Diagram 9.4 are not suitable to be used for deep sea diving.

Based on your knowledge in pressure, buoyant force and properties of material, you are required to suggest some modifications so that the diver can dive safely in deep sea. State and explain your suggestions based on the characteristics of the diving suit, the diving equipment and other safety features.

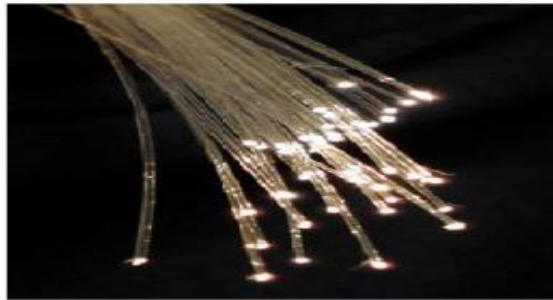
Pakaian dan peralatan menyelam dalam Rajah 9.4 tidak sesuai digunakan untuk menyelam di laut dalam.

Menggunakan pengetahuan anda tentang tekanan, daya apungan dan sifat-sifat bahan, anda diminta untuk mencadangkan beberapa pengubahsuaian supaya penyelam boleh menyelam di laut dalam dengan selamat.

Nyatakan dan terangkan cadangan anda berdasarkan ciri bagi pakaian menyelam, peralatan menyelam dan ciri keselamatan. [10 marks/ markah]

(B)

- (c) Diagram 9.4 shows a fibre optic.
Rajah 9.4 menunjukkan gentian optik.



You are required to give suggestions to design a fibre optics which can work efficiently. Using your knowledge on light, and the properties of material, explain the suggestion based on the following aspects;

Anda diminta untuk memberikan cadangan untuk mereka bentuk satu gentian optik yang dapat berfungsi dengan cekap. Menggunakan pengetahuan anda tentang cahaya dan sifat bahan, terangkan cadangan anda berdasarkan aspek berikut;

- (i) the refractive index of outer and inner layer
indeks biasan lapisan luar dan dalam
- (ii) flexibility
kelenturan
- (iii) strength
kekuatan
- (iv) thickness
ketebalan
- (v) density of the glass
ketumpatan kaca

- (C).** Diagram 10.6 shows a water heater used to boil water.

Rajah 10.6 menunjukkan satu pemanas rendam digunakan untuk mendidihkan air.

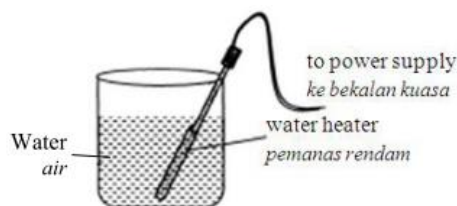


Diagram 10.6
Rajah 10.6

Using appropriate physics concepts, suggest and explain how to build a water heater which can boil a larger quantity of water faster, more efficient, and more safety based on the following aspects;

Dengan menggunakan konsep-konsep Fizik yang sesuai, cadang dan terangkan bagaimana untuk membina satu pemanas rendam yang boleh mendidihkan kuantiti air yang lebih besar dengan lebih cepat, lebih cekap dan lebih selamat, berdasarkan aspek-aspek berikut ;

(i) type of material used for the heating element of the water heater
 Jenis bahan yang digunakan untuk elemen pemanas bagi pemanas rendam

(ii) shape of the heating element of the water heater
 bentuk elemen pemanas bagi pemanas rendam

(iii) melting point of the heating element of the water heater
 takat lebur elemen pemanas bagi pemanas rendam

(iv) rate of rusting of the heating element of the water heater
 kadar pengurangan elemen pemanas bagi pemanas rendam

(v) additional component used for safety when the water boil
 Komponen tambahan yang digunakan untuk keselamatan bila air mendidih [10 marks]

(D)

Diagram 9.1(a) and Diagram 9.1(b) show two cups of coffee with same mass and same initial temperature. A metal spoon and a plastic spoon of same mass are placed in the cups of coffee respectively. The temperature of coffee decreases after several minutes.

Rajah 9.1(a) dan Rajah 9.1(b) menunjukkan dua cawan kopi yang sama jisim dan suhu awal yang sama. Sebatang sudu logam dan sebatang sudu plastik yang sama jisim diletakkan dalam cawan kopi masing-masing. Suhu kopi berkurang selepas beberapa minit.



Diagram 9.1(a) / Rajah 9.1(a)



Diagram 9.1(b) / Rajah 9.1(b)

Diagram 9.2 shows the graph of temperature against time for the spoons.

Rajah 9.2 menunjukkan graf suhu melawan masa bagi kedua-dua sudu itu.

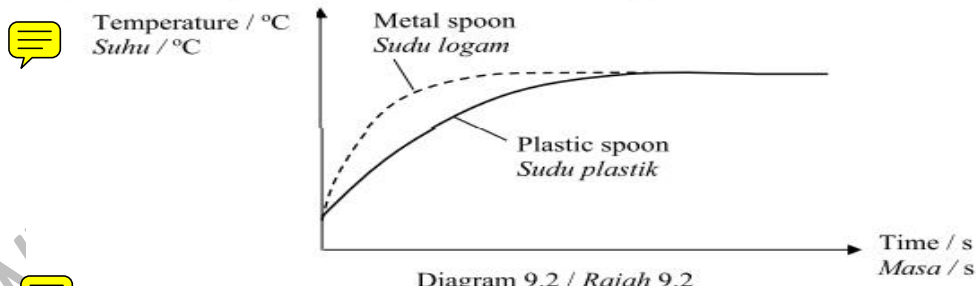


Diagram 9.2 / Rajah 9.2

(c) After an hour, the temperature of the coffee in Diagram 9.1 is equal to the temperature of the surrounding. Explain this situation.

Selepas sejam suhu kopi dalam Rajah 9.1 adalah sama dengan suhu persekitaran. Terangkan situasi ini.

[4 marks /markah]

Paper 3

1. Rajah 3.1 menunjukkan sebuah papan tanda sekolah diperhatikan melalui suatu kanta cembung. Rajah 3.2 menunjukkan papan tanda itu diperhatikan melalui kanta cembung yang sama apabila kanta itu dibawa lebih dekat kepada papan tanda itu.

Diagram 3.1 shows a school sign is viewed through a convex lens.

Diagram 3.2 shows the sign is viewed with the same convex lens when the lens is closer to the sign.



Diagram 3.1
Rajah 3.1



Diagram 3.2
Rajah 3.2

(a) Berdasarkan situasi di atas, rancangkan eksperimen ini dengan menggunakan radas dan bahan yang diberikan dalam Jadual 3.

Prosedur anda hendaklah mengandungi:

- Cara mengendalikan pemboleh ubah.
- Langkah berjaga-jaga.

Based on the situation above, plan your experiment by using the apparatus and materials provided in Table.

Your procedure should include:

- Method to handle variables.
- Step of precaution..

[4 marks/ markah]

(b) Jalankan eksperimen tersebut, dan buat penjadualan data.

Carry out the experiment and tabulate the data.

[5 marks/ markah]

(c) Pada kertas graf yang disediakan, plotkan graf berdasarkan penjadualan data dalam 3(b).

[5 marks/ markah]

(d) Berdasarkan graf anda di 3 (c), nyatakan hubungan antara pemboleh ubah manipulasi dan pemboleh ubah bergerak balas.

Based on your graph in 3(c), state the relationship between manipulated variable and responding variable.

[1 marks/ markah]

[The END]