

PERKASA SPM 2022

#JOMBANGKIT

SPM PHYSICS 2022

SKOR
A+
Physics

#amazing Physics 
amazing Physics with Tcer Alina

“Ilmu itu didapati dengan lidah
yang gemar bertanya dan akal
yang suka berfikir”

-Abdullah Ibnu Abbas-

CONTOH MUKA HADAPAN

NO. KAD PENGENALAN

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ANGKA GILIRAN

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**LEMBAGA PEPERIKSAAN
KEMENTERIAN PENDIDIKAN MALAYSIA**

SIJIL PELAJARAN MALAYSIA 2022

FIZIK

Kertas 2

Feb/Mac

2½ jam

4531/2

Dua jam tiga puluh minit

1. Tulis nombor kad pengenalan dan angka giliran anda pada petak yang disediakan.
2. Kertas soalan ini adalah dalam dwibahasa.
3. Soalan dalam Bahasa Melayu mendahului soalan yang sepadan dalam Bahasa Inggeris.
4. Calon dibenarkan menjawab keseluruhan atau sebahagian soalan sama ada dalam Bahasa Melayu atau Bahasa Inggeris.
5. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.

Untuk Kegunaan Pemeriksa			
Kod Pemeriksa:			
Bahagian	Soalan	Markah Penuh	Markah Diperoleh
A	1	4	
	2	5	
	3	6	
	4	9	
	5	9	9
	6	9	9
	7	9	9
	8	9	9
B	9	20	20
	10	20	
C	11	20	20
Jumlah			

P1 = 35

P2 = 76

P3 = 10

Min Skor: 78%



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

1. FORCE AND MOTION I

$$a = \frac{v - u}{t}$$

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

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

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

$$\text{Momentum} = mv$$

$$F = ma$$

$$F = \frac{mv - mu}{t}$$

$$Ek = \frac{1}{2}mv^2$$

$$Ep = mgh$$

2. GRAVITATION

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

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

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

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

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

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

$$U = -\frac{Gm_1m_2}{r}$$

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

$$T^2 = \frac{4\pi^2 r^3}{GM}$$

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

$$g = 9.81 \text{ ms}^{-2} @ \text{N kg}^{-1}$$

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

3. HEAT

$$Q = mc\theta$$

$$Q = ml$$

$$Q = Pt$$

$$P_1V_1 = P_2V_2$$

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

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

4. WAVES

$$f = \frac{1}{T}$$

$$v = f\lambda$$

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

5. LIGHT & OPTICS

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

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

$$n = \frac{1}{\sin C}$$

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

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

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

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

The **KEY** to **SUCCESS** is to start
BEFORE you are **READY**

6. FORCE AND MOTION II

$$F = kx$$

$$E = \frac{1}{2} Fx$$

$$E = \frac{1}{2} kx^2$$

7. PRESSURE

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

$$P = h\rho g$$

$$\rho = \frac{m}{V}$$

$$\frac{F_1}{A_1} = \frac{F_2}{A_2}$$

$$A_1 h_1 = A_2 h_2$$

$$F_b = \rho V g$$

8. ELECTRICITY

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

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

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

$$V = IR$$

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

$$E = V + Ir$$

$$P = IV$$

$$P = \frac{V^2}{R}$$

$$P = I^2 R$$

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

$$E = \frac{F}{d}$$

9. ELECTROMAGNETISME

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

$$n = \frac{\text{Output power}}{\text{Input power}} \times 100\%$$

10. ELECTRONIC

$$E = eV$$

$$E = \frac{1}{2} mv^2$$

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

$$e = 1.66 \times 10^{-19} \text{ C}$$

11. PHYSICS NUCLEAR

$$N = \left(\frac{1}{2}\right)^n N_0$$

$$E = mc^2$$

$$c = 3.00 \times 10^8 \text{ m s}^{-1}$$

$$1 \text{ a.m.u.} = 1.66 \times 10^{-27} \text{ kg}$$

12. QUANTUM PHYSICS

$$E = hf$$

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

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

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

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

$$P = nhf$$

$$hf = W + \frac{1}{2} mv^2_{\text{maks}}$$

$$W = hf_0$$

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

$$e = 1.66 \times 10^{-19} \text{ C}$$

Stay
FOCUSED
and
NEVER
GIVE UP

Be amazing@perkasaSPM #SPM2022



SPM FORMAT 2022

SUBJECT PHYSICS: 4531

ITEM	PAPER 1 (4531/1)	PAPER 2 (4531/2)	PAPER 3 (4531/3)
TYPE OF INSTRUMENT	Written Test		Experiment Test
NO. OF QUESTION	40	SECTION A: structure: 8 (45699999) (answer ALL questions) (60 marks) SECTION B: 2 questions (choose 1) (20 marks) SECTION C: 1 question (20 marks)	1 PRACTICAL tasks  clue: - aim - experiment and variable - tabulate data - plotting graph - relationship - gradient (relate with the equation given) - precaution - WHY & HOW (explanation)
TOTAL MARKS	40	100	15
DURATION	1 Hour 15 Minutes	2 Hours 30 Minutes	45 Minutes
CONSTRUCT	Recall Understand Apply Analyse	Recall Understand Apply Analyse Evaluate Invent by applying	Recall Understand Apply Scientific Process Skills Manipulation Process Skills

**LEARNING SKILL
IN PHYSICS**

Skill 1 - Understanding
 Skill 2 - Calculation
 Skill 3 - Comparison
 Skill 4 - Modification
 Skill 5 - Making Decisions

SEDIA
AWAL
TUMPUAN
ULANGKAJI



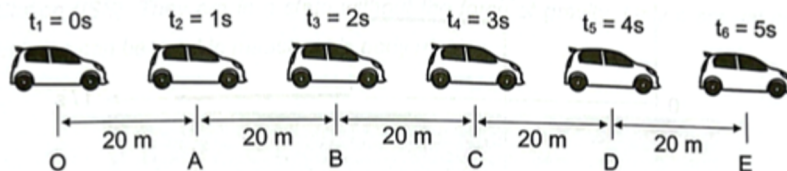
PAPER 1

- Terdiri daripada 40 soalan (objektif & aneka pilihan)
- Merangkumi topik tingkatan 4 & 5
- Susunan soalan mengikut topik tingkatan 4 & 5
- Soalan pengiraan hanya dalam 3 atau 4 soalan sahaja (soalan lain merujuk kepada pemahaman konsep, fakta, hukum, prinsip, analisis, aplikasi...)

Contoh 1: TRIAL KEDAH 2022 (Soalan No. 2)

- 2 Rajah 2 menunjukkan pergerakan bagi sebuah kereta dari keadaan pegun bagi 5 saat pertama.

Diagram 2 shows movement of a car from stationary for the first 5 seconds.



Rajah 2
Diagram 2

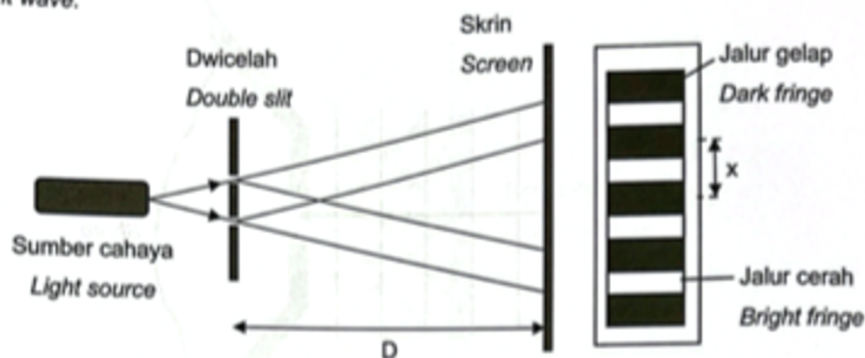
Pernyataan manakah benar bagi menggambarkan pergerakan kereta itu?

Which statement is true to describe the movement of the car?

- A Pecutan OA lebih besar dari pecutan AB
Acceleration OA is greater than acceleration AB
- B Pecutan BC lebih besar dari pecutan CD
Acceleration BC is greater than acceleration CD
- C Halaju AD lebih besar dari halaju DE
Velocity AD is greater than velocity DE
- D Halaju AB lebih besar dari halaju BE
Velocity AB is greater than velocity BE

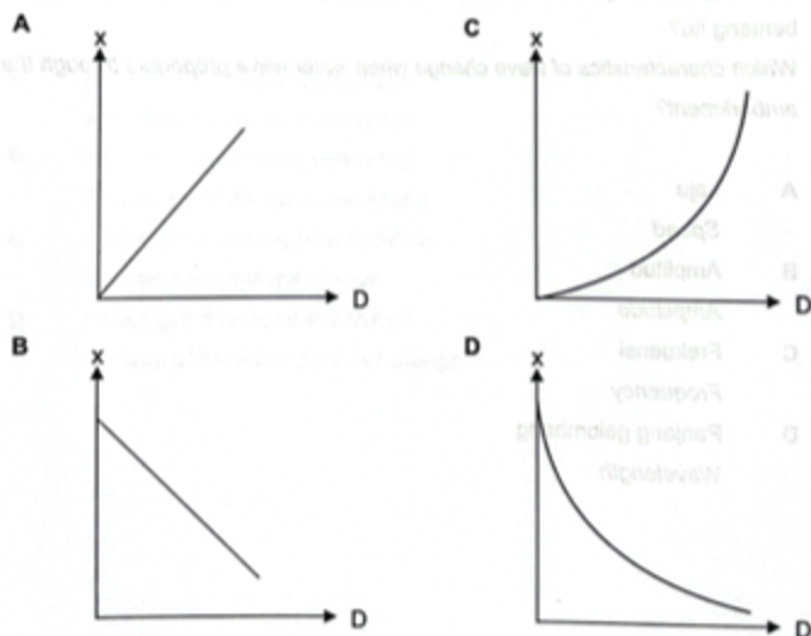
Contoh 2: TRIAL KEDAH 2022 (Soalan No. 15)

- 15 Rajah 11 menunjukkan susunan radas untuk mengkaji interferens gelombang cahaya.
Diagram 11 shows the arrangement of an apparatus to investigate the interference of light wave.



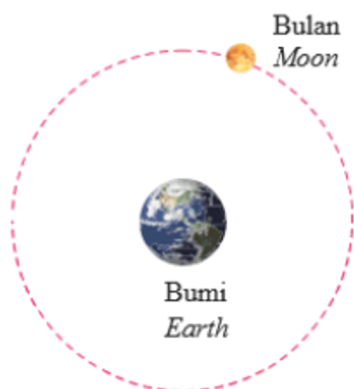
Rajah 11
Diagram 11

Graf manakah yang menunjukkan hubungan yang betul antara D dan x ?
Which graph shows the correct relationship between D and x ?



Contoh 3: TRIAL MELAKA 2022 (Soalan No. 7)

- 7 Rajah 3 menunjukkan bulan yang mengorbit bumi.
Diagram 3 shows the moon that orbiting the earth.



Rajah 3
Diagram 3

Tentukan daya graviti yang dikenakan oleh bumi terhadap bulan.
Determine the gravitational force exerted by earth on the moon.

Jisim bumi / *Earth mass* = 5.97×10^{24} kg ,

Jisim bulan / *Moon mass* = 7.35×10^{22} kg,

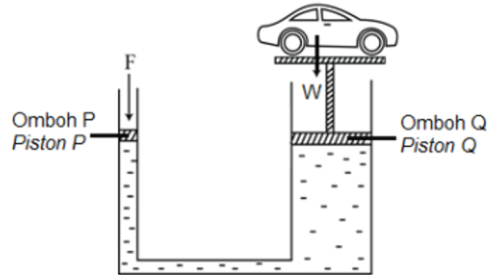
Jarak antara pusat bumi ke pusat bulan / *Distance between earth centre to moon centre*
= 3.83×10^8 m

[$G = 6.67 \times 10^{-11} \text{ Nm}^2\text{kg}^{-2}$]

- A 2.00×10^{17} N
- B 2.00×10^{20} N
- C 7.65×10^{25} N
- D 7.65×10^{28} N

Contoh 4: TRIAL PAHANG (SET1) 2022 (Soalan No. 29)

29. Rajah 19 menunjukkan sebuah sistem hidraulik mudah. Satu daya bermagnitud F perlu dikenakan ke atas omboh P untuk menaikkan kereta seberat W yang disokong oleh omboh Q. Pernyataan manakah adalah betul?
The Diagram 19 shows a simple hydraulic system. A force of magnitude F is required to be applied to piston P to lift a car of weight W which is supported by piston Q. Which of the following statement is correct?



Rajah 19
Diagram 19

- A. F adalah lebih besar daripada W .
 F is greater than W .
- B. Jarak yang dilalui oleh omboh P adalah sama dengan jarak yang dilalui oleh omboh Q.
The distance moved by piston P is the same as the distance moved by piston Q.
- C. Tekanan yang dikenakan pada omboh P adalah lebih besar daripada yang diperolehi oleh omboh Q.
The pressure applied on piston P is greater than the pressure experienced by piston Q.
- D. Tekanan yang dikenakan ke atas omboh P adalah sama dengan tekanan yang dikenakan ke atas omboh Q.
The pressure applied on piston P is the same as the pressure experienced by piston Q.

Contoh 5: TRIAL PAHANG (SET1) 2022 (Soalan No. 33)

33. Sebuah televisyen berlabel "220V, 500W" disambungkan kepada bekalan elektrik bernilai 220 V. Berapakah nilai tenaga elektrik digunakan selama 2 minit?

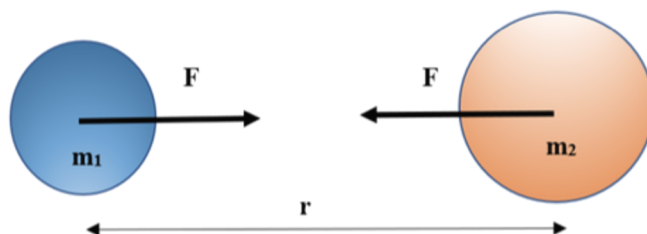
A television labelled "220 V, 500 W" is connected to an electrical supply of 220 V. What is the amount of electrical energy consumed in 2 minutes?

- A. 400 J
B. 1000 J
C. 26400 J
D. 60000 J

Contoh 6: TRIAL SMKA SABK 2022 (Soalan No. 7)

- 7 Rajah 6 menunjukkan daya graviti, F yang bertindak ke atas dua jasad berjisim m_1 dan m_2

Diagram 6 gravitational force, F acting on two bodies with mass m_1 and m_2 respectively



Rajah 6
Diagram 6

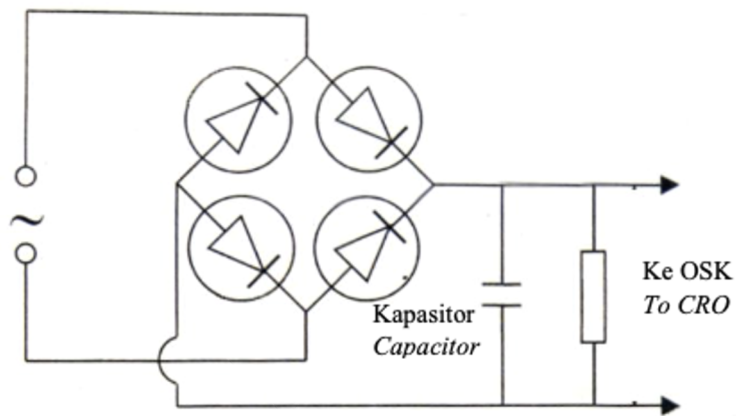
Antara berikut yang manakah menerangkan hubungan antara F , m_1 , m_2 dan r ?

Which of the following explains the relationship between F , m_1 , m_2 and r ?

	F dengan m_1 dan m_2 <i>F with m_1 and m_2</i>	F dengan r <i>F with r</i>
A	$F \propto m_1 m_2$	$F \propto r^2$
B	$F \propto 1/m_1 m_2$	$F \propto r^2$
C	$F \propto m_1 m_2$	$F \propto 1/r^2$
D	$F \propto 1/m_1 m_2$	$F \propto 1/r^2$

Contoh 7: TRIAL SMKA SABK 2022 (Soalan No. 34)

- 34** Rajah 23 menunjukkan satu litar rektifikasi gelombang penuh.
Diagram 23 shows a circuit of the full-wave rectification



Rajah 23
Diagram 23

Apakah fungsi kapasitor dalam litar di atas?
What is the function of the capacitor in the circuit?

- A** sebagai perata arus
as a current smoother
- B** sebagai suis automatik
as an automatic switch
- C** sebagai amplifier arus
as a current amplifier
- D** sebagai pembahagi voltan
as a voltage divider

Section A

[60 marks]

Answer **all** questions in this section.

- 1 Rajah 1 menunjukkan satu tiub digunakan untuk mengalirkan air dari akuarium ke dalam baldi.

Diagram 1 shows a tube used to flow out the water from an aquarium into a pail.

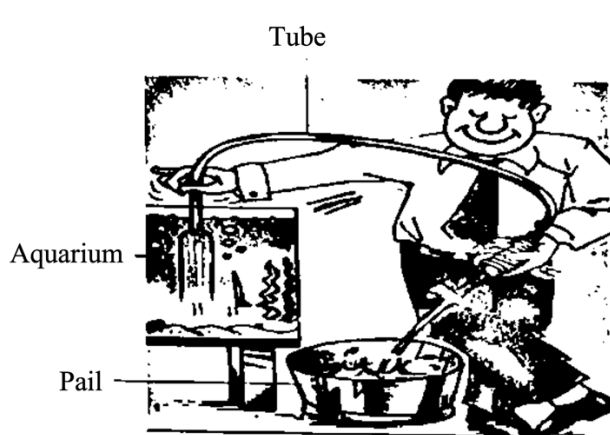


Diagram 1

- (a) Berdasarkan Rajah 1, namakan kaedah yang digunakan.

Based on Diagram 1, name the method used.

.....
[1 mark]

- (b) Apakah kuantiti fizik yang menyebabkan air mengalir keluar dari akuarium?

What is the physical quantity that causes water to flow out from the aquarium?

.....
[1 mark]

Gariskan perkataan yang betul.

Underline the correct word.

Kadar pemindahan air dapat ditingkatkan dengan

Rate of water transfer can be increased by

- (i) (mengurangkan, menambahkan) diameter tiub.
(reduce, increase) the diameter of the tube.

[1 mark]

- (ii) (merendahkan, meninggikan) kedudukan baldi.
(lower, higher) the position of the pail.

[1 mark]

TOTAL 4 marks

- 2 Rajah 2 menunjukkan satelit J dan satelit K mengelilingi Bumi. Hukum Kepler Ketiga menjelaskan hubungan antara tempoh orbit satelit mengelilingi Bumi dan jejari orbit tersebut. *Diagram 2 shows the satellite J and satellite K orbiting the Earth. Kepler's Third Law explains the relationship between the orbital period of a satellite around the Earth and its orbital radius.*

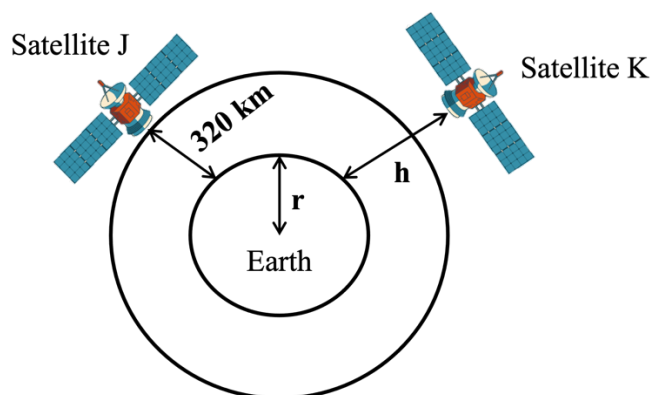


Diagram 2

- (a) Nyatakan Hukum Kepler Ketiga
State Kepler's Third law.

[1 mark]

- (b) Satelit J dan satelit K masing-masing berada pada ketinggian 320 km dan h dari permukaan Bumi. Tempoh orbit satelit K mengelilingi Bumi adalah lima kali ganda tempoh orbit satelit J. Kira jejari orbit satelit K. [jejari Bumi, $r = 6370$ km]
Satellite J and satellite K are at a height of 320 km and h respectively from the Earth's surface. The orbital period of satellite K orbiting the Earth is five times the orbiting period of satellite J. Calculate the orbital radius of satellite K.
[Radius of the Earth, $r = 6370$ km]

[3 marks]

- (c) Apakah yang berlaku kepada laju linear satelit K, jika satelit itu sedang mengelilingi bumi dengan ketinggian, h yang lebih besar.
What happens to the linear speed of satellite K, if the satellite is orbiting the earth with greater height, h .

[1 mark]

TOTAL 5 marks

- 3 Rajah 3.1 menunjukkan rektifier tetimbang yang terdiri daripada empat diod K, L, M dan N dan satu perintang R.

Diagram 3.1 shows a bridge rectifier consist of four diodes K, L, M and N and a resistor, R.

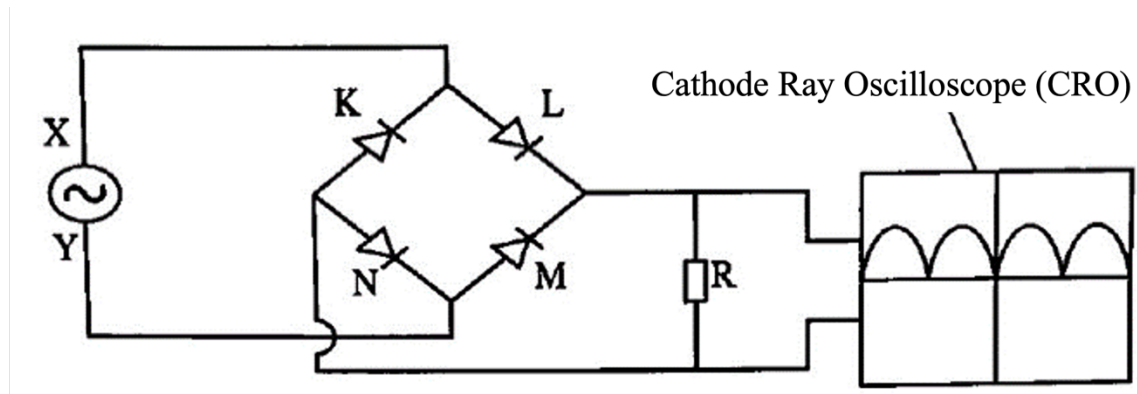


Diagram 3.1

- (a) Berdasarkan Rajah 3,
Based on Diagram 3,

- (i) Namakan jenis rektifikasi.
Name the type of rectification.

.....
[1 mark]

- (ii) Lengkapkan arah pengaliran arus yang melalui diod-diod K, L, M dan M dan perintang, R.
Complete the direction of current flow passing through diodes K, L, M and N and the resistor, R.

X → → R → → Y
Y → → R → → X

[2 marks]

- (b) Diode K dalam Rajah 3 telah rosak.
The K diode in Diagram 3 is faulty.

- (i) Lakarkan surihan output pada skrin OSK pada Rajah 3.2.
Sketch the output trace on the CRO screen on Diagram 3.2.

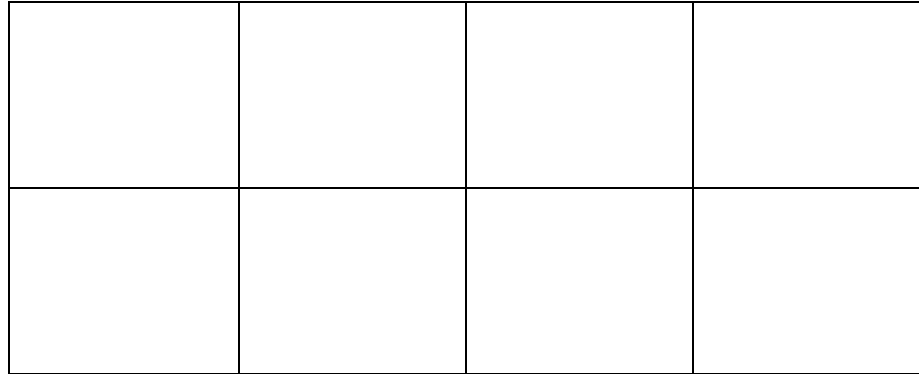


Diagram 3.2

[2 marks]

- (ii) Terangkan jawapan anda dalam 3(b)(i).
Explain your answer in 3(b)(i).

.....
[1 mark]

TOTAL 6 marks

- 4 Rajah 4.1 menunjukkan seorang budak lelaki melompat dari sebatang dahan pokok ke dalam sebuah tasik. Dahan itu bergetar seketika sebelum berhenti.
Diagram 4.1 shows a boy jumping from a tree branch into a lake. The branch vibrates before it stopped.

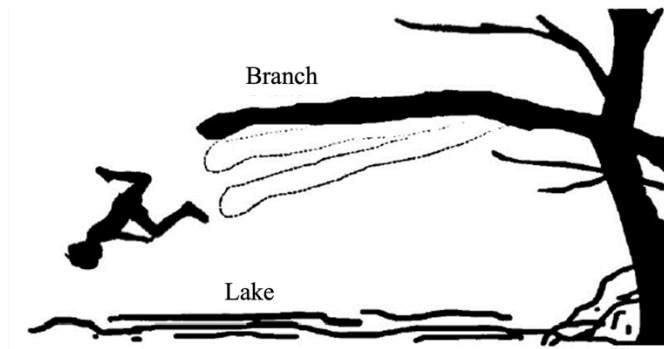


Diagram 4.1

- (a) Nyatakan fenomena yang berlaku kepada dahan itu.
State the phenomenon that occurs to the branch.

.....
[1 mark]

- (b) (i) Apakah yang berlaku kepada amplitud getaran dahan itu? Jelaskan jawapan anda.
What happen to the amplitude of vibration of the branch? Explain your answer.

.....
[2 marks]

- (ii) Lakarkan graf amplitud melawan masa bagi getaran dahan tersebut dalam Rajah 4.2.
Sketch a graph of amplitude against time for the vibration of the branch in Diagram 4.2.

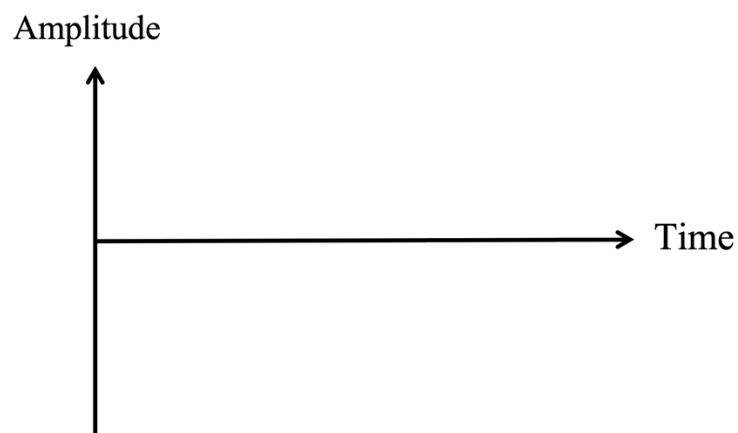


Diagram 4.2

[1 mark]

- (c) Apabila budak lelaki itu terjun ke dalam tasik, gelombang air terhasil. Rajah 4.3 menunjukkan graf sesaran melawan masa bagi gelombang air tersebut.
When the boy jumps into the lake, a water waves is produced. Diagram 4.3 shows a graph of displacement against time for the water waves.

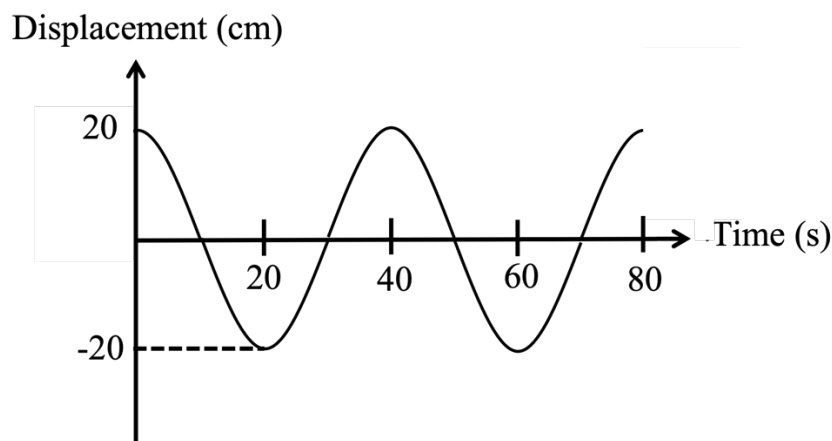


Diagram 4.3

- (i) Berdasarkan Rajah 4.3, tentukan amplitud dan panjang gelombang bagi gelombang air itu.
Based on Diagram 4.3, determine the amplitude and the wavelength of the water waves.

Amplitud : cm
Amplitude

Panjang gelombang: cm
Wavelength

[2 marks]

- (ii) Frekuensi gelombang air itu ialah 5 Hz. Berdasarkan jawapan anda di 4(c)(i), hitung laju gelombang air itu.
The frequency of the water waves is 5 Hz. Based on your answer in 4(c)(i), calculate the speed of the water waves.

[2 marks]

- (iii) Jika kedalaman air bertambah, apakah yang berlaku kepada panjang gelombang bagi gelombang air tersebut?
If the depth of water increases, what happens to the wavelength of the water waves?

.....
 [1 mark]

TOTAL 9 marks

- 5 Rajah 5.1 menunjukkan sebuah bongkah P yang berada di atas permukaan kasar ditarik oleh pemberat Q melalui sebuah takal. Daya paduan yang bertindak ke atas sistem itu adalah F.
Diagram 5.1 shows a block P on a rough surface is pulled by a load Q through a pulley. Resultant force acts on the system are F.

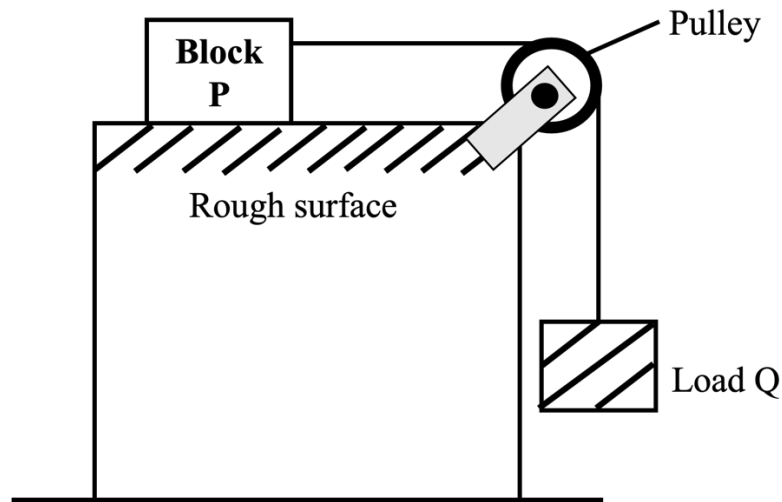
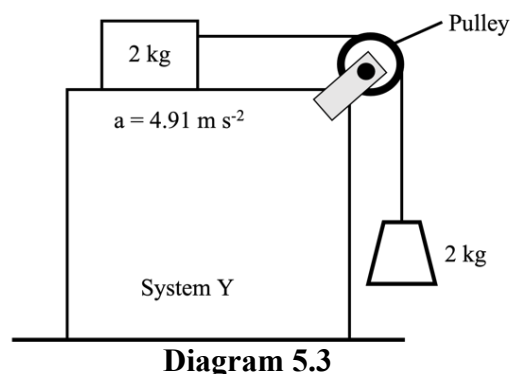
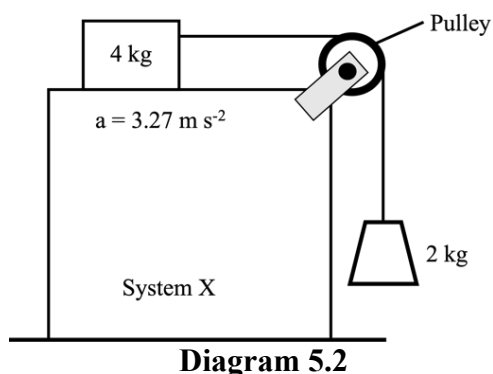


Diagram 5.1

- (a) Apakah maksud daya paduan?
What is the meaning of resultant force?
-
- [1 mark]
- (b) (i) Pada Rajah 5.1, tanda dan label daya geseran antara bongkah P dengan permukaan kasar.
On Diagram 5.1, mark and label the friction force between block P and the rough surface.
- [1 mark]
- (ii) Nyatakan keadaan gerakan bongkah P dan pemberat Q jika daya paduan adalah sifar.
State the motion of block P and load Q if the resultant force is zero.
-
-
- [2 marks]

- (c) Rajah 5.2 dan Rajah 5.3 menunjukkan sistem X dan sistem Y di atas permukaan licin dan ditarik oleh pemberat yang serupa.

Diagram 5.2 and Diagram 5.3 shows system X and system Y on smooth surface pulled by identical load.



Berdasarkan Rajah 5.2 dan Rajah 5.3,
Based on Diagram 5.2 and Diagram 5.3,

- (i) Bandingkan pecutan yang dihasilkan dalam sistem X dan sistem Y.
Compare the acceleration produced in system X and system Y.

.....
 [1 mark]

- (ii) Bandingkan jumlah jisim dalam sistem X dan sistem Y.
Compare the total mass in the system X and system Y.

.....
 [1 mark]

- (iii) Adakah terdapat perbezaan antara daya paduan yang bertindak dalam sistem X dan sistem Y.
Is there any difference between the resultant force acting on system X and system Y.

.....
 [1 mark]

- (d) Berdasarkan jawapan anda dalam (c)
Based on your answer in (c)

- (i) Berikan satu kesimpulan yang melibatkan daya, jisim dan pecutan.
Give one conclusion involving force, mass, and acceleration.

.....
 [1 mark]

- (ii) Namakan hukum fizik yang terlibat.
Name the physics law that involved.

.....
 [1 mark]

TOTAL 9 marks

- 6 Rajah 6.1 dan Rajah 6.2 menunjukkan dua litar elektrik yang mengandungi diod semikonduktor.

Diagram 6.1 and Diagram 6.2 show two electrical circuits consist of semiconductor diode.

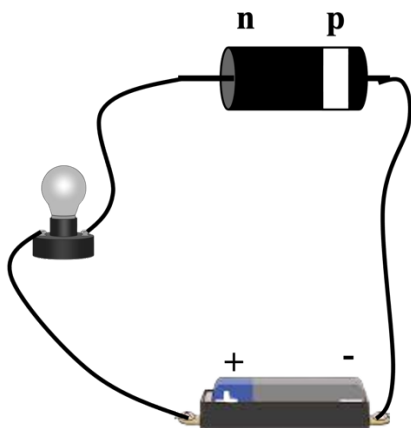


Diagram 6.1

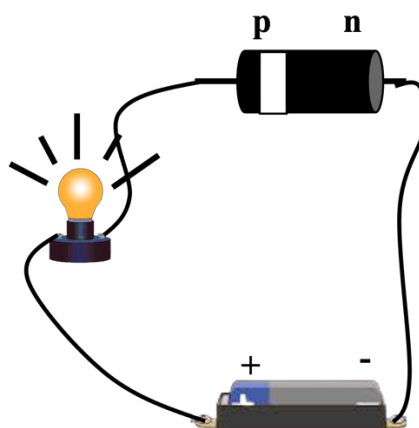


Diagram 6.2

- (a) Apakah yang dimaksudkan dengan semikonduktor?
What is the meaning of semiconductor?

.....
[1 mark]

- (b) Menggunakan Rajah 6.1 dan Rajah 6.2, bandingkan
Using Diagram 6.1 and Diagram 6.2, compare

- (i) Nyalaan mentol
The bulb lighting

.....
[1 mark]

- (ii) Pengaliran arus dalam litar
Current flows in the circuit

.....
[1 mark]

- (iii) Cara sambungan diod semikonduktor ke terminal sel kering.
Way of connection of semiconductor diode to dry cell terminals.

.....
[1 mark]

- (c) (i) Hubungkan pengaliran arus dengan cara sambungan diod semikonduktor ke terminal sel kering.

Relate the current flows with the way of connection of semiconductor diode to dry cell terminals.

..... [1 mark]

- (ii) Berdasarkan jawapan anda dalam 6(c)(i), nyatakan satu fungsi diod semikonduktor.

Based on your answer in 6(c)(i), state one function of semiconductor diode.

..... [1 mark]

- (d) Rajah 6.3 menunjukkan sebuah litar rektifikasi gelombang dan surihan pada skrin osiloskop sinar katod bagi arus input dan arus output selepas melalui diod semikonduktor.

Diagram 6.3 shows a wave rectification circuit and the tracing of cathode ray oscilloscope screen of input current and output current after passing through the semiconductor diode.

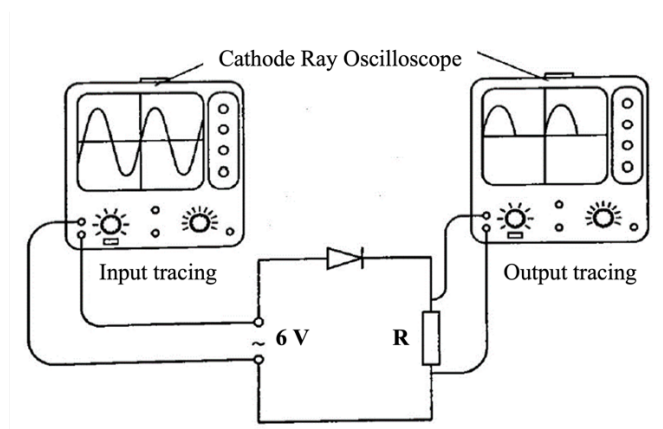


Diagram 6.3

- (i) Berdasarkan Rajah 6.3, mengapakah bentuk gelombang surihan output pada skrin osiloskop sinar katod berubah selepas melalui diod?

Based on Diagram 6.3, why the shape of tracing output wave on the cathode ray oscilloscope screen changes after passing through the diode?

..... [1 mark]

- (ii) Jelaskan bagaimana untuk menghasilkan arus mantap pada perintang R dalam Rajah 6.3.

Explain how to produce steady current at resistor R in diagram 6.3.

..... [2 marks]

TOTAL 9 marks

- 7 Rajah 7.1 menunjukkan tukul berjisim 0.8 kg digunakan untuk mengetuk paku. Paku itu bergerak masuk ke dalam kayu disebabkan oleh daya impuls.

Diagram 7.1 shows a 0.8 kg hammer used to hit the nail. The nail moves inside the wood because of impulsive force.

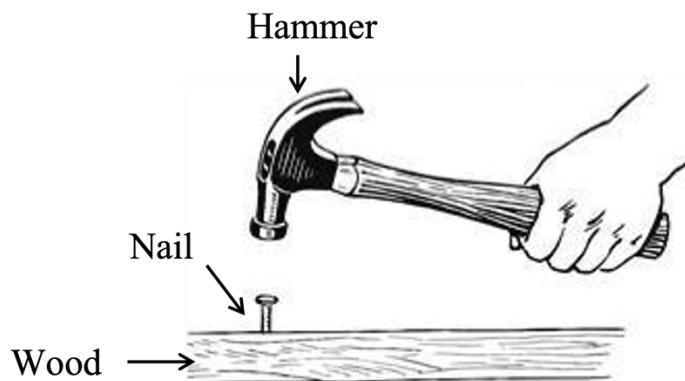


Diagram 7.1

- (a) Apakah maksud daya impuls?
What is the meaning of impulsive force?

.....
[1 mark]

- (b) (i) Jika kelajuan tukul semasa mengetuk paku adalah 20 m s^{-1} dan kemudian berhenti dalam masa 0.05 s, hitung daya impuls yang dikenakan ke atas paku tersebut.
If the velocity of the hammer while hitting and stopped in 0.05 s, calculate the impulsive force acted on the nail.

[2 marks]

- (ii) Apakah yang berlaku kepada daya impuls jika kelajuan tukul semasa mengetuk paku bertambah?
What happen to the impulsive force it the speed of hamering increases when it hit the nail?

.....
[1 mark]

- (c) Rajah 7.2 menunjukkan proses pemasangan jubin lantai. Gandin digunakan untuk mengetuk permukaan jubin tanpa memecahkannya.
Diagram 7.2 shows the process of installing floor tiles. Mallet is used to knocking the tile surface without breaking it.

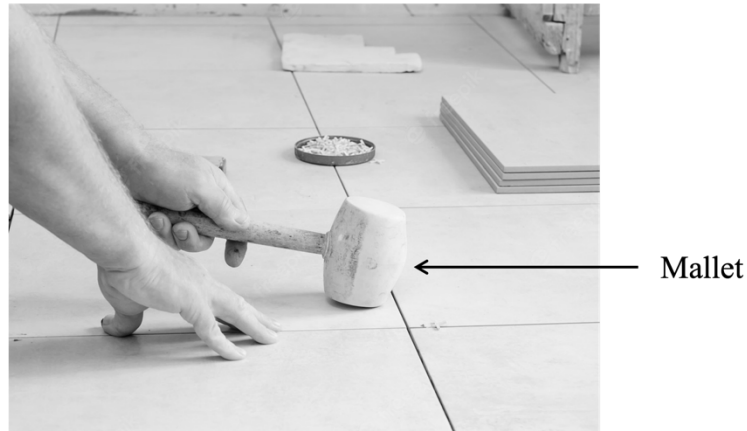


Diagram 7.2

Rajah 7.3 menunjukkan ciri-ciri tiga ganding X, Y dan Z.
Diagram 7.3 shows the characteristics of three mallet X, Y and Z.

Mallet X	
Mallet Y	
Mallet Z	

Diagram 7.3

Berdasarkan Rajah 7.3, nyatakan ciri-ciri gandin yang sesuai untuk memasang jubin tersebut. Berikan sebab untuk kesesuaian ciri-ciri tersebut.

Based on Diagram 7.3, state the suitable characteristics of the mallet used to install the floor tiles. Give reasons for the suitability of the characteristics.

- (i) Bahan kepala gandin
Head material of the mallet

.....
[1 mark]

Sebab
Reason

.....
[1 mark]

- (ii) Jenis pemegang
Type of handle

.....
[1 mark]

Sebab
Reason

.....
[1 mark]

- (iii) Berdasarkan jawapan anda di 7(c)(i) dan 7(c)(ii), pilih gandin yang paling sesuai digunakan untuk memasang jubin lantai tanpa memecahkannya.
Based on the answer in 7(c)(i) and 7(c)(ii), choose the most suitable mallet that can be used to install the floor tiles without breaking it.

.....
[1 mark]

TOTAL 9 marks

- 8 Rajah 8 menunjukkan struktur loji janakuasa nuklear. Loji ini menghasilkan tenaga nuklear melalui tindak balas pembelahan nukleus.

Diagram 8 shows a structure of nuclear power plant. The plant produce nuclear energy through nuclear fission reaction.

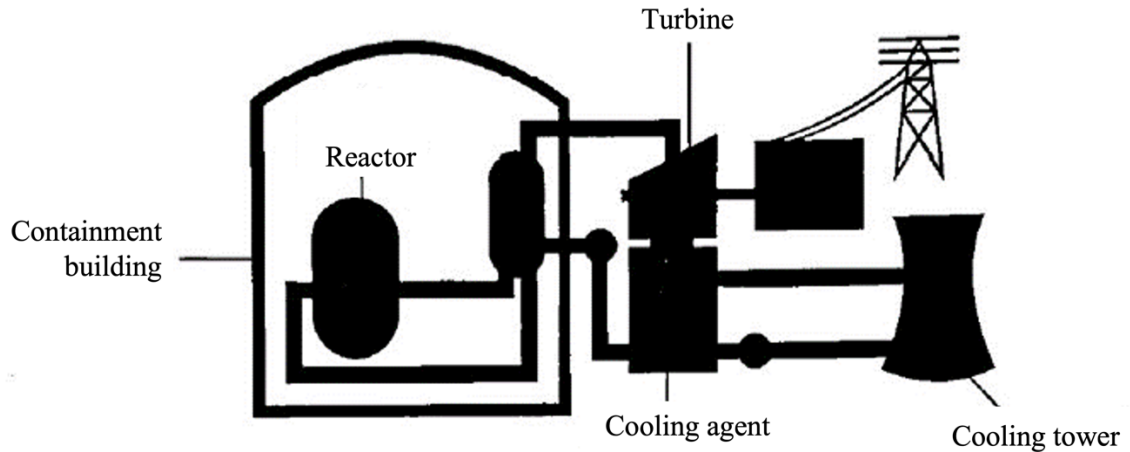


Diagram 8

- (a) Apakah yang dimaksudkan dengan pembelahan nukleus?
What is meant by nuclear fission?

.....
[1 mark]

- (b) Hitung tenaga yang terhasil dari tindak balas pembelahan nukleus jika cacat jisim ialah 3.088×10^{-28} kg.
Calculate the nuclear energy produced from nuclear fission reaction if the mass defect is 3.088×10^{-28} kg.

[2 marks]

- (c) Loji janakuasa nuklear dalam Rajah 8 dicadangkan untuk dibina di Malaysia.
Berikan cadangan berdasarkan aspek-aspek berikut supaya loji dapat beroperasi dengan selamat.

Nuclear power plant in Diagram 8 is proposed to built in Malaysia.

Give suggestions based on the following aspects so that the plant can be operate safely.

- (i) Lokasi loji janakuasa nuklear
Location of the nuclear power plant.

.....
[1 mark]

Sebab
Reason

.....
[1 mark]

- (ii) Ketebalan dinding bangunan pembendungan.
Thickness of the wall of containment building

.....
[1 mark]

Sebab
Reason

.....
[1 mark]

- (iii) Bahan agen penyejuk
Material of the cooling agent

.....
[1 mark]

Sebab
Reason

.....
[1 mark]

TOTAL 9 marks

Section B

[20 marks]

Answer any **one** question in this section.

- 9 Rajah 9.1 menunjukkan seorang pemain sofbol meneruskan hayunan batang pemukul selepas bola dipukul untuk meningkatkan impuls.

Diagram 9.1 shows a softball player continuing to swing the bat after the ball is hit to increase impulse.



Diagram 9.1

- (a) Apakah maksud impuls?
What is meant by impulse?

[1 mark]

- (b) Terangkan bagaimana teknik ikut lajak pada Rajah 9.1 dapat meningkatkan impuls.
Explain how follow through technique in Diagram 9.1 can increase the impuls.

[4 marks]

- (c) Rajah 9.2 menunjukkan batang pemukul sofbol.
Diagram 9.2 shows a softball bat.



Diagram 9.2

Jadual 9 menunjukkan empat jenis batang pemukul P, Q, R dan S.
Table 9 shows four types of softball bat P, Q, R and S.

Batang pemukul <i>Bat</i>	Jisim (kg) <i>Mass (kg)</i>	Bahan <i>Material</i>	Bahan tambahan pada pemegang <i>Additional material on the handle</i>	Panjang batang pemukul (cm) <i>Length of softball bat (cm)</i>
P	0.6	Kayu <i>Wood</i>	Ada grip <i>With Grip</i>	80
Q	0.8	Kayu <i>Wood</i>	Tiada grip <i>Whitout grip</i>	75
R	1.0	Logam <i>Metal</i>	Ada grip <i>With Grip</i>	85
S	1.2	Logam <i>Metal</i>	Tiada grip <i>Whitout grip</i>	70

Table 9

Anda dikehendaki menentukan jenis batang pemukul yang dapat menghasilkan pukulan bola yang paling jauh. Kaji spesifikasi keempat-empat jenis batang pemukul berdasarkan aspek yang diberi. Terangkan kesesuaian setiap spesifikasi dan seterusnya tentukan jenis batang pemukul yang paling sesuai.

Beri sebab untuk pilihan anda.

You are required to determine the type of bat that can make the farthest shot of the ball. Study the specifications of the four types of bat based on the aspects given. Explain the suitability of each specification and then determine the most suitable type of bat.

Give reasons for your answers.

[10 marks]

- (d) Pemain softball memukul dan mengenakan daya 50 N ke atas bola berjisim 0.2 kg sedang bergerak dengan halaju 72 km j⁻¹. Masa sentuhan bola dengan batang pemukul ialah 0.2 saat.

A softball player hit and exerted 50 N force on a ball with a mass of 0.2 kg which is moving at a velocity of 72 km h⁻¹. Time contact of the ball with the bat is 0.2 second.

- (i) Hitung impuls yang dialami oleh bola itu.
Calculate the impulse experienced by the ball.

[2 marks]

- (ii) Selepas bola dipukul, bola melantun ke arah bertentangan.
 Hitung halaju lantunan bola dalam unit Sistem Antarabangsa (SI).
After the ball is hit, the ball is bounced in the opposite direction.
Calculate the bounce velocity of the ball in International System of Units (SI).

[3 marks]

TOTAL 20 marks

- 10 Rajah 10.1 menunjukkan satu pad penyejuk yang digunakan oleh seorang kanak-kanak untuk mengurangkan demam. Pad penyejuk berfungsi berdasarkan prinsip keseimbangan terma. *Diagram 10.1 shows a cooling pad that is used by a child to reduce the fever. The cooling pad works based on the principle of thermal equilibrium.*



Diagram 10.1

- (a) Apakah maksud keseimbangan terma?
What is meant by thermal equilibrium? [1 mark]
- (b) Terangkan bagaimana penggunaan pad penyejuk boleh menurunkan suhu badan.
Explain how the usage of a cooling pad can lower the body temperature. [4 marks]
- (c) Rajah 10.2 menunjukkan satu bantal pemanas yang digunakan untuk melegakan kesakitan otot.
Diagram 10.2 shows a heating pillow that is used to relieve the muscle pain.



Diagram 10.2

Jadual 10 menunjukkan empat jenis bantal pemanas A, B, C dan D.
Table 10 shows four types of heating pillows A, B, C and D.

Bantal pemanas <i>Heating pillow</i>	Bahan di dalam bantal pemanas <i>Substance inside the heating pillow</i>	Muatan haba tentu bahan <i>Specific heat capacity of material</i>	Bahan untuk sarung bantal <i>Material of pillow case</i>	Takat didih bahan <i>Boiling point of material</i>
A	Gel <i>Gel</i>	Rendah <i>Low</i>	Kanvas <i>Canvas</i>	Rendah <i>Low</i>
B	Cecair <i>Liquid</i>	Tinggi <i>High</i>	Kanvas <i>Canvas</i>	Tinggi <i>High</i>
C	Gel <i>Gel</i>	Tinggi <i>High</i>	Nilon <i>Nylon</i>	Tinggi <i>High</i>
D	Cecair <i>Liquid</i>	Rendah <i>Low</i>	Nilon <i>Nylon</i>	Rendah <i>Low</i>

Table 10

Terangkan kesesuaian setiap ciri bantal pemanas dan tentukan pemanas yang paling sesuai. Berikan sebab bagi pilihan anda.

Explain the suitability of each characteristics and determine the most suitable heating pillow. Give reason for your choice.

[10 marks]

- (d) Sebuah cerek elektrik berlabel 240 V, 1 kW diisi dengan 0.8 kg air pada suhu 30 °C.

[Muatan haba tentu air, $c = 4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$]

An electric kettle labelled 240 V, 1 kW is filled with 0.8 kg of water at temperature of 30 °C. [Specific heat capacity of water, $c = 4200 \text{ J kg}^{-1} \text{ }^{\circ}\text{C}^{-1}$]

- (i) Hitung tenaga haba yang diperlukan untuk menaikkan suhu air kepada 100 °C.
Calculate the heat energy needed to raise the temperature of water to 100 °C.

[3 marks]

- (ii) Hitung masa yang diperlukan untuk air itu mendidih.
Calculate the time required for the water to boil.

[2 marks]

TOTAL 20 marks

Section C

[20 marks]

Answer **all** questions in this section.

- 11 Rajah 11.1 dan Rajah 11.2 menunjukkan sinar cahaya selari dari kedudukan yang sama. Panjang fokus kana ditentukan apabila sinar cahaya tersebut ditumpukan selepas melalui kanta.

Diagram 11.1 and Diagram 11.2 show parallel rays from the same position.

Focal length of the lens is determined when the rays converged after passing through the lens.

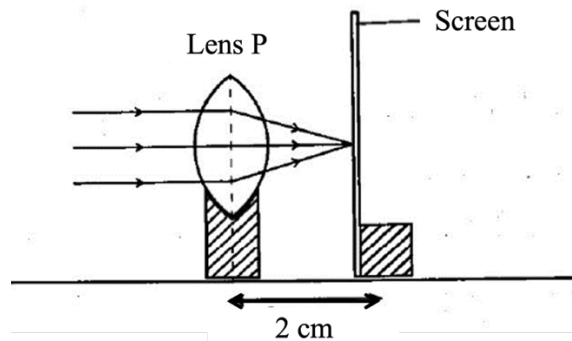


Diagram 11.1

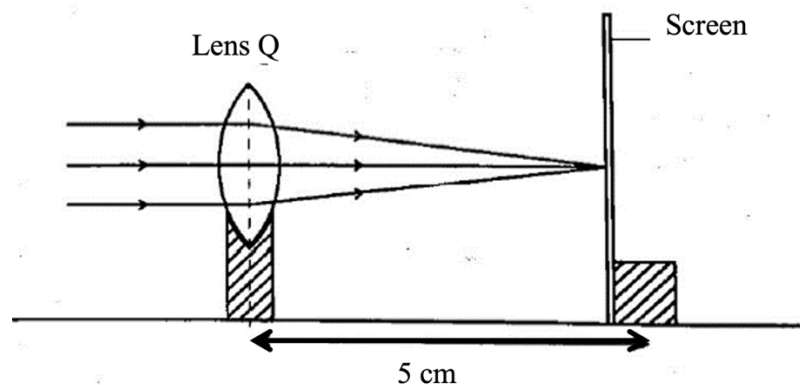


Diagram 11.2

- (a) Apakah yang dimaksudkan dengan panjang fokus?

What is meant by focal length?

[1 mark]

- (b) Perhatikan Rajah 11.1 dan Rajah 11.2, bandingkan jarak objek, ketebalan kanta dan panjang fokus. Nyatakan hubungan antara ketebalan kanta dengan panjang fokus. Namakan fenomena fizik yang terlibat.

Observe Diagram 11.1 and Diagram 11.2, compare the object distance, the thickness of the lens and the focal point. State the relationship between the thickness of the lens and the focal length. Name the physic phenomenon involved.

[5 marks]

- (c) Rajah 11.3 menunjukkan seorang ahli gemologi menggunakan satu kanta pembesar untuk menilai batu permata.

Diagram 11.3 shows a gemologist using a magnifying glass to evaluate a gemstone.

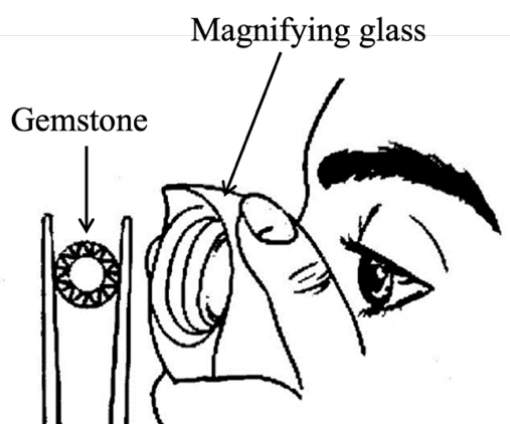


Diagram 11.3

Terangkan bagaimana ahli gemologi dapat memerhatikan imej yang besar dan maya.
Explain how the gemologist can observe a large and virtual image.

[4 marks]

- (d) Menggunakan kanta P dan kanta Q dalam Rajah 11.1 dan Rajah 11.2 anda dikehendaki merekacipta sebuah mikroskop majmuk yang boleh menilai batu-batu permata yang lebih kecil.

Using lens P and lens Q in Diagram 11.1 and Diagram 11.2, you are required to design a compound microscope which can be used to evaluate smaller gemstones.

Nyatakan dan terangkan pengubahsuaian anda berdasarkan aspek-aspek berikut:
State and explain your modification based on the following aspects:

- Kanta yang akan dipilih sebagai kanta objektif dan kanta mata.
Lens to be chosen as objective lens and eyepiece lens.
- Jarak objek bagi kanta objektif.
The object distance of the objective lens.
- Jarak objek bagi kanta mata.
The object distance of the eyepiece lens.
- Jarak antara kanta objektif dan kanta mata
The distance between the objective lens and the eyepiece lens.

[10 marks]

TOTAL 20 marks

**I'M NOT
HERE TO BE
AVERAGE
I'M HERE
TO BE
AWESOME**