



**MAJLIS PENGETUA SEKOLAH MALAYSIA  
(CAWANGAN PULAU PINANG)**

**MODUL LATIHAN BERFOKUS SPM 2020  
4531/3 (PP)**

**FIZIK**

**Kertas 3**

**PERATURAN PEMARKAHAN**

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**UNTUK KEGUNAAN PEMERIKSA SAHAJA**

**AMARAN**

Peraturan pemarkahan ini adalah **SULIT** dan **Hak Cipta MPSM Pulau Pinang**. Kegunaannya khusus untuk pemeriksa yang berkenaan sahaja. Sebarang maklumat dalam peraturan pemarkahan ini tidak boleh dimaklumkan kepada sesiapa. Peraturan pemarkahan ini tidak boleh dikeluarkan dalam apa-apa bentuk media.

## SECTION A / BAHAGIAN A

## QUESTION 1 / SOALAN 1

Question	Answer	Mark	Total Mark																		
1	(a)(i) Height of trolley on the inclined plane from the floor, $h$ <i>Ketinggian troli di atas landasan dari permukaan lantai, <math>h</math></i>	1																			
	(ii) Speed of trolley, $v$ / <i>Laju troli, <math>v</math></i>	1																			
	(iii) Mass of trolley / <i>Jisim troli</i>	1																			
	(b) (i) $s_1 = 6.0 \text{ cm}$ $s_2 = 7.9 \text{ cm}$ $s_3 = 10.0 \text{ cm}$ $s_4 = 11.9 \text{ cm}$ $s_5 = 14.0 \text{ cm}$  <u>Value of <math>s</math></u> 5 values correct ----- (2) 4 or 3 values correct -----(1) 2 values and below -----(0)	2																			
	(ii) $v_1 = 30.0 \text{ cms}^{-1}$ $v_2 = 39.5 \text{ cms}^{-1}$ $v_3 = 50.0 \text{ cms}^{-1}$ $v_4 = 59.5 \text{ cms}^{-1}$ $v_5 = 70.0 \text{ cms}^{-1}$  <u>Value of <math>v</math></u> 5 values correct ----- (2) 4 or 3 values correct -----(1) 2 values and below -----(0)  <b>Accept 1 - 2 decimal places (ignore consistency d.p)</b> <b>Accept ecf (error carried forward) for <math>v</math></b>	2																			
	(iii) <table border="1" data-bbox="365 1501 868 1738"> <thead> <tr> <th><math>h / \text{cm}</math></th> <th><math>s / \text{cm}</math></th> <th><math>v / \text{cms}^{-1}</math></th> </tr> </thead> <tbody> <tr> <td>10.0</td> <td>6.0</td> <td>30.0</td> </tr> <tr> <td>20.0</td> <td>7.9</td> <td>39.5</td> </tr> <tr> <td>30.0</td> <td>10.0</td> <td>50.0</td> </tr> <tr> <td>40.0</td> <td>11.9</td> <td>59.5</td> </tr> <tr> <td>50.0</td> <td>14.0</td> <td>70.0</td> </tr> </tbody> </table> 1 mark – 3 columns for $h$ , $s$ , and $v$ 1 mark – correct units for each $h$ , $s$ , and $v$ 1 mark – all values of $s$ and $v$ are consistent to 1 d.p	$h / \text{cm}$	$s / \text{cm}$	$v / \text{cms}^{-1}$	10.0	6.0	30.0	20.0	7.9	39.5	30.0	10.0	50.0	40.0	11.9	59.5	50.0	14.0	70.0	3	
$h / \text{cm}$	$s / \text{cm}$	$v / \text{cms}^{-1}$																			
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Question	Answer	Mark	Total Mark
(c)	<p><b>Draw the graph of <math>\theta</math> against <math>x</math>.</b></p> <p>A - Label y-axis and x-axis correctly ✓</p> <p>B - States the unit at the axis correctly ✓</p> <p>C - Both axes with the even and uniform scale ✓</p> <p>D - 5 points correctly plotted: ✓ ✓ - at least 3 points correctly plotted ✓</p> <p>E - a smooth best straight line ✓</p> <p>F - minimum size of the graph is 5 x 4 squares of 2 cm x 2 cm. ✓ 7 ✓ - 5 marks 6-5 ✓ - 4 marks 3-4 ✓ - 3 marks 2 ✓ - 2 marks 1 ✓ - 1 mark</p>	5	
(d)	<p><math>v</math> increases linearly with <math>h</math>. <math>v</math> bertambah secara linear dengan <math>h</math>.</p>	1	
	Total		16

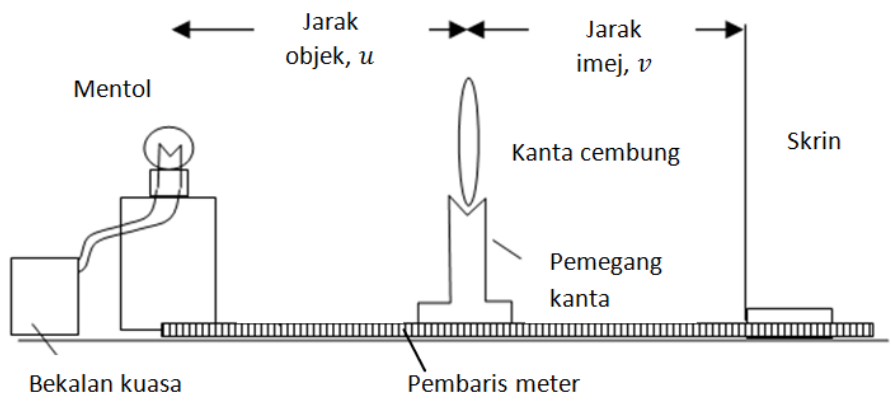


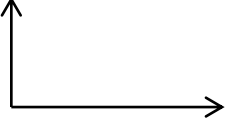
2 (b) (i)	$R = \frac{\rho l}{A}$ $\rho = \frac{RA}{l} = \frac{\text{gradient}}{l}$ $= \frac{1.75\Omega\text{mm}^2}{150\text{mm}}$ $= 1.12 \times 10^{-2} \Omega\text{mm}$ <p>@</p> $1.12 \times 10^{-5} \Omega\text{m}$	<p>Tunjukkan perkaitan</p> <p>Tunjukkan gantian</p> <p>Jawapan yang betul</p> <p>1</p> <p>1</p> <p>1</p>
2 (b) (ii)	<p>Make sure the all the connections all the tightly connected.  <i>Pastikan semua sambungan disambung dengan ketat //</i></p> <p>Switch off the circuit if no reading is taken to avoid wire from getting too hot  <i>Tutup suis litar jika tidak membuat bacaan untuk mengelakkan terlalu panas. //</i></p> <p>The position of eye should be perpendicular with the scale of Ammeter/Voltmeter when taking the reading  <i>Kedudukan mata mestilah berserenjang dengan skala ammeter/volmeter semasa mengambil bacaan</i></p>	1
	JUMLAH	12

## SECTION B / BAHAGIAN B

## QUESTION 3 / SOALAN 3

3	(a)	<b>State a suitable inference</b> The distance of image is influenced by the distance of object <i>Jarak imej</i> dipengaruhi oleh <i>jarak objek</i>	1	1
	(b)	<b>State a relevant hypothesis</b> The longer the object distance, the shorter the image distance Jika <i>jarak objek bertambah</i> , maka <i>jarak imej berkurang</i>	1	1
	(c)(i)	<b>State the aim of experiment</b> To study the relationship between the object distance and the image distance <i>Untuk mengkaji hubungan antara jarak objek dan jarak imej.</i>	1	1
	(ii)	<b>State the manipulated variable and the responding variable</b> <b>Manipulated</b> : object distance // jarak objek, <b>Responding</b> : image distance // jarak imej	1 1	2
		<b>State ONE variable that kept constant</b> Focal length (of the lens) <i>Panjang fokus (kanta)</i>	1	1
	(iii)	<b>Complete list of apparatus and materials</b> <b>Bulb/ray box / candle/other object</b> , power supply, connecting wire, convex lens, screen, <b>meter rule</b> <b>Mentol/kotak sinar/lilin/ dll (sebagai objek)</b> , bekalan kuasa, wayar penyambung, kanta cembung, skrin, <b>pembaris meter</b>  (accept – if label in diagram or stated in procedure)	1	1

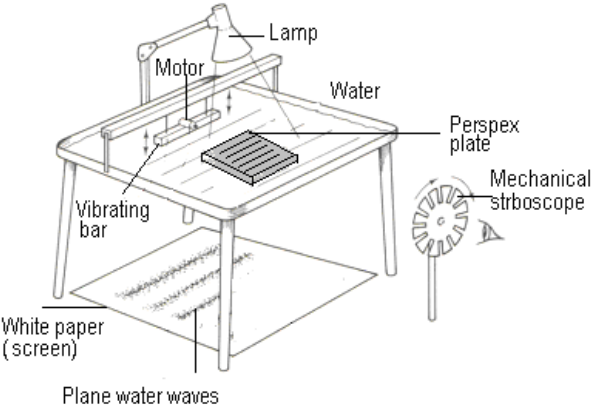
(iv)	<p><b>Arrangement of apparatus :</b></p>  <p><b>Must label: screen, convex lens, object</b></p>	1	1
(v)	<p><b>State the method of controlling the manipulated variable</b></p> <p>Start the experiment by putting the convex lens at the distance, <math>u = 15.0</math> cm from the bulb.  <i>Mulakan eksperimen dengan meletakkan kanta cembung pada jarak, <math>u = 15.0</math> cm dari mentol</i></p> <p><b>State the method of measuring the responding variable</b></p> <p>Adjust the screen until the sharp and clear image formed on the screen.      Measure the image distance using meter rule  <i>Skrin dilaraskan sehingga imej yang jelas dan tajam terbentuk di atas skrin. Ukur jarak imej, <math>v</math> dengan menggunakan pembaris meter</i></p> <p><b>Repeat the experiment at least 4 times</b></p> <p>The experiment is repeated with object distance, <math>u = 20.0</math> cm, <math>25.0</math> cm, <math>30.0</math> cm dan <math>35.0</math> cm  <i>Ulang eksperimen dengan jarak objek, <math>u = 20.0</math> cm, <math>25.0</math> cm, <math>30.0</math> cm dan <math>35.0</math> cm</i></p>	1  1  1	3

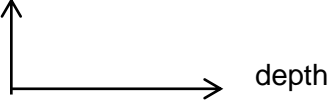
	(vi)	<b>Tabulation of data:</b>  <table border="1" data-bbox="326 260 1138 510"> <thead> <tr> <th data-bbox="326 260 761 331">Object distance <i>Jarak objek, <math>u</math> / cm</i></th> <th data-bbox="761 260 1138 331">Image distance <i>Jarak imej, <math>v</math> / cm</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="326 331 761 369">15</td> <td data-bbox="761 331 1138 369"></td> </tr> <tr> <td data-bbox="326 369 761 407">20</td> <td data-bbox="761 369 1138 407"></td> </tr> <tr> <td data-bbox="326 407 761 445">25</td> <td data-bbox="761 407 1138 445"></td> </tr> <tr> <td data-bbox="326 445 761 483">30</td> <td data-bbox="761 445 1138 483"></td> </tr> <tr> <td data-bbox="326 483 761 510">35</td> <td data-bbox="761 483 1138 510"></td> </tr> </tbody> </table>	Object distance <i>Jarak objek, <math>u</math> / cm</i>	Image distance <i>Jarak imej, <math>v</math> / cm</i>	15		20		25		30		35		<b>1</b>	<b>1</b>
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15																
20																
25																
30																
35																
	(vii)	<b>Analyze the data.</b>  image distance / jarak imej 	<b>1</b>	<b>1</b>												
		<b>Total marks</b>	<b>13</b>	<b>13</b>												
		<b>Maximum</b>	<b>12</b>	<b>12</b>												



## QUESTION 4 / SOALAN 4

4	(a)	<p><b>State a suitable inference</b></p> <p>Wavelength depends on the depth of water  <i>Panjang gelombang bergantung kepada kedalaman air</i></p> <p>(any suitable answer with cause and effect)</p>	1	1
	(b)	<p><b>State a relevant hypothesis</b></p> <p>The higher the depth, the higher the length of wavelength  <i>Semakin bertambah kedalaman air, semakin bertambah panjang gelombang</i></p>	1	1
	(c)(i)	<p><b>State the aim of experiment</b></p> <p>To study the relationship between the depth and the wavelength  <i>Untuk mengkaji hubungan antara kedalaman dengan panjang gelombang</i></p>	1	1
	(ii)	<p><b>State the manipulated variable and the responding variable</b></p> <p>Manipulated variable: Depth, <math>d</math>  <i>Pemboleh ubah dimanipulasikan: kedalaman, <math>d</math></i></p> <p>Responding variable: Wavelength, <math>\lambda</math>  <i>Pemboleh ubah bergerak balas: Panjang gelombang, <math>\lambda</math></i></p>	1	2
		<p><b>State ONE variable that kept constant</b></p> <p>Fixed variable: Frequency  <i>Pemboleh ubah dimalarkan: Frekuensi</i></p>	1	1
	(iii)	<p><b>Complete list of apparatus and materials</b></p> <p>Ripple tank, glass block, <b>stroboscope</b>, white paper, <b>metre rule</b>, <b>water</b>  <i>Tangki riak, blok kaca, <b>stroboskop</b>, kertas putih, <b>pembaris metre</b>, <b>water</b></i></p> <p>(accept – if label in diagram or stated in procedure)</p> <p><b>Bold = mesti ada</b></p>	1	1

	<p><b>Arrangement of apparatus:</b></p>  <p>(Mesti label: <b>lampu dan air</b>)</p>	1	1
	<p><b>State the method of controlling the manipulated variable</b></p> <p>A ripple tank filled with water is set up. A rectangular glass block is immersed in the centre of the tank so that the depth of water is 1 cm.</p> <p><i>Tangki riak yang diisi dengan air disediakan. Blok kaca bentuk segiempat tepat diletakkan di tengah tangki riak agar kedalamannya 1 cm</i></p> <p><b>State the method of measuring the responding variable</b></p> <p>The motor is <b>switched on</b>. The wavelength is observed <b>through stroboscope</b> and is <b>measured</b></p> <p><i>Motor <b>dihidupkan</b> Panjang gelombang dibekukan <b>menggunakan stroboskop, dan diukur.</b></i></p> <p><b>Repeat the experiment at least 4 times</b></p> <p>Repeat the experiment with 4 different values of depth such as 2 cm, 3 cm, 4 cm and 5 cm</p> <p><i>Ulang eksperimen dengan kedalaman yang berbeza, seperti 2 cm, 3 cm, 4 cm, and 5 cm</i></p>	1	3
		1	1

	<p><b>Tabulation of data:</b></p> <table border="1" data-bbox="326 260 1138 537"> <thead> <tr> <th data-bbox="326 260 761 363">Depth <i>Kedalaman, d / cm</i></th> <th data-bbox="761 260 1138 363">wavelength <i>Panjang Gelombang, <math>\lambda</math> / cm</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="326 363 761 396">1</td> <td data-bbox="761 363 1138 396"></td> </tr> <tr> <td data-bbox="326 396 761 430">2</td> <td data-bbox="761 396 1138 430"></td> </tr> <tr> <td data-bbox="326 430 761 464">3</td> <td data-bbox="761 430 1138 464"></td> </tr> <tr> <td data-bbox="326 464 761 497">4</td> <td data-bbox="761 464 1138 497"></td> </tr> <tr> <td data-bbox="326 497 761 537">5</td> <td data-bbox="761 497 1138 537"></td> </tr> </tbody> </table>	Depth <i>Kedalaman, d / cm</i>	wavelength <i>Panjang Gelombang, <math>\lambda</math> / cm</i>	1		2		3		4		5		<b>1</b>	<b>1</b>
Depth <i>Kedalaman, d / cm</i>	wavelength <i>Panjang Gelombang, <math>\lambda</math> / cm</i>														
1															
2															
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5															
	<p><b>Analyze the data.</b></p> <p>wavelength</p>  <p>depth</p>	<b>1</b>	<b>1</b>												
	<p><b>Total marks</b></p>	<b>13</b>	<b>13</b>												
	<p><b>Maximum</b></p>	<b>12</b>	<b>12</b>												