

SKEMA FIZIK KERTAS 3  
 UJIAN DIAGNOSTIK 2 NEGERI MELAKA 2020

Section A

NO	MARKING CRITERIA	MARK																														
		SUB	TOTAL																													
1(a)	(i) State the manipulated variable correctly - Time / Masa	1	1																													
	(ii) State the responding variable correctly - Temperature // Increase in temperature suhu // kenaikan suhu	1	1																													
	(iii) State the constant variable correctly - Mass of the water // power of the heater - jisim air // kuasa pemanas	1	1																													
(b)	State the value of $\theta_0$ within the acceptable range $\theta_0 = 25\text{ }^\circ\text{C}$	1	1																													
(c)	(i) Record the readings of $\theta$ correctly All five readings of $\theta$ correct	1	1																													
	(ii) Tabulate the results for $t$ , $\theta$ and $\Delta\theta$ correctly <table border="1" style="margin-left: 20px;"> <thead> <tr> <th><math>t / \text{s}</math></th> <th><math>\theta / \text{ }^\circ\text{C}</math></th> <th><math>\Delta\theta / \text{ }^\circ\text{C}</math></th> </tr> </thead> <tbody> <tr> <td>20</td> <td>32</td> <td>7</td> </tr> <tr> <td>40</td> <td>39</td> <td>14</td> </tr> <tr> <td>60</td> <td>46</td> <td>21</td> </tr> <tr> <td>80</td> <td>53</td> <td>28</td> </tr> <tr> <td>100</td> <td>60</td> <td>35</td> </tr> </tbody> </table> <p>Give a tick (✓) based on the following:                      A • Columns <math>t</math>, <math>\theta</math> and <math>\Delta\theta</math>                      B • Correct units for <math>t</math>, <math>\theta</math> and <math>\Delta\theta</math>                      C • All 5 values of <math>\theta</math> correct                       D • All 5 values of <math>\Delta\theta</math> correct                      [Note : 3 or 4 values of <math>\Delta\theta</math> correct : ✓]                      E • All values of <math>\theta</math> and <math>\Delta\theta</math>                      written as whole numbers or                      consistent to <math>0.5\text{ }^\circ\text{C}</math>.</p> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Number of ✓</th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>6 ✓</td> <td>5</td> </tr> <tr> <td>5 ✓</td> <td>4</td> </tr> <tr> <td>3 - 4 ✓</td> <td>3</td> </tr> <tr> <td>2 ✓</td> <td>2</td> </tr> <tr> <td>1 ✓</td> <td>1</td> </tr> </tbody> </table>	$t / \text{s}$	$\theta / \text{ }^\circ\text{C}$	$\Delta\theta / \text{ }^\circ\text{C}$	20	32	7	40	39	14	60	46	21	80	53	28	100	60	35	Number of ✓	Marks	6 ✓	5	5 ✓	4	3 - 4 ✓	3	2 ✓	2	1 ✓	1	1
$t / \text{s}$	$\theta / \text{ }^\circ\text{C}$	$\Delta\theta / \text{ }^\circ\text{C}$																														
20	32	7																														
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6 ✓	5																															
5 ✓	4																															
3 - 4 ✓	3																															
2 ✓	2																															
1 ✓	1																															


(d)	<p>Draw a complete graph of <math>\Delta\theta</math> against <math>t</math></p> <p>Give a tick (✓) based on the following:</p> <ul style="list-style-type: none"> <li>A • <math>\Delta\theta</math> at the <math>y</math>-axis, <math>t</math> at the <math>x</math>-axis</li> <li>B • Correct units at both axes</li> <li>C • Uniform scale at both axes</li> <li>D • 5 points plotted correctly [Note : 4 points plotted correctly : ✓]</li> <li>E • Line of best fit is drawn</li> <li>F • Minimum size of graph 5 x 4 big squares</li> </ul> <p>(Big square : 2 cm x 2 cm) (From the origin to the last point)</p> <p>Marks awarded :</p> <table border="1" data-bbox="500 829 1015 1039"> <thead> <tr> <th>Number of ✓</th> <th>Marks</th> </tr> </thead> <tbody> <tr> <td>7 ✓</td> <td>5</td> </tr> <tr> <td>5-6 ✓</td> <td>4</td> </tr> <tr> <td>3-4 ✓</td> <td>3</td> </tr> <tr> <td>2 ✓</td> <td>2</td> </tr> <tr> <td>1 ✓</td> <td>1</td> </tr> </tbody> </table>	Number of ✓	Marks	7 ✓	5	5-6 ✓	4	3-4 ✓	3	2 ✓	2	1 ✓	1	<p>5</p> <p>✓</p> <p>✓</p> <p>✓</p> <p>✓✓</p> <p>✓</p> <p>✓</p> <p>5</p>	<p>5</p> <p>5</p>
Number of ✓	Marks														
7 ✓	5														
5-6 ✓	4														
3-4 ✓	3														
2 ✓	2														
1 ✓	1														
(e)	<p>State the correct relationship between <math>\Delta\theta</math> and <math>t</math></p> <p><math>\Delta\theta</math> is directly proportional to <math>t</math></p> <p><math>\Delta\theta</math> berkadar langsung dengan <math>t</math></p>	<p>1</p>	<p>16</p>												

Question	Answer	Mark	Total mark
2 (a)	(i) $x$ directly proportional to $1/a$ // $x$ is inversely proportional to $a$ // $x$ berkadar langsung dengan $1/a$ // $x$ berkadar songsang dengan $a$	1	1
	(ii) If $a = 2.0$ m $1/a = \frac{1}{2} 0.5 \text{ m}^{-1}$ From the graph $x = 1.5$ m	1 1 1	3
	(iii) Draw a sufficient large triangle on the graph at least 6cm x 8cm ( 3 big squares x 4 big squares)  Gradient = $\frac{(3.0 - 0)}{(1.2 - 0)}$  = $2.5 \text{ m}^2$ (correct unit)	1  1  1	3

(b)		$\lambda = \frac{ax}{D}$ $= \frac{2.5}{D}$ <p>Gradient = <math>\frac{x}{a}</math></p> $= ax$ <p><math>\lambda = 2.5/5 = 0.5 \text{ m (correct unit)}</math></p>	1 1 1 1	4
(c)		<p>-This experiment is carried out in an open space to reduce the effect of reflection</p> <p>-Position of eye must be perpendicular to the reading of scale of meter rule to reduce parallax error</p> <p><i>-Eksperimen dijalankan dikawasan lapang untuk mengurangkan kesan pantulan</i></p> <p><i>-Kedudukan mata berserenjang dengan skala bacaan pembaris meter untuk mengurangkan ralat paralaks</i></p>	1	1
		Total mark		12

3	(a)	<p>Inference: Height of image depends on object distance <i>Tinggi imej bergantung kepada jarak objek</i></p>	1	1
	(b)	<p>Hypothesis: The height of image increases as the object distance decreases <i>Tinggi imej akan meningkat apabila jarak objek berkurang</i></p>	1	1
	(c) (i)	<p>Aim of the experiment : To investigate the relationship between object distance and height of image <i>Untuk menyiasat hubungan antara jarak objek dengan tinggi imej</i></p>	1	1
	(ii)	<p>Variables in the experiment:</p> <p>Manipulated variable: Object distance <i>Pembolehubah manipulasikan: Jarak objek</i></p> <p>Responding variable: Height of image</p>	1 1	3

	<p><i>Pembolehubah bergerak balas: Tinggi imej</i>  Constant variable: Focal length of lens  <i>Pembolehubah dimalarkan: Panjang fokus kanta.</i></p>	1	
(iii)	<p>List of apparatus and materials:</p> <p>Ray box, metre rule, convex lens, lens holder, white screen and arrow on transparent paper  <i>Kotak sinar, pembaris meter, kanta cembung, pemegang kanta, skrin putih dan anak panah pada kertas lutsinar .</i></p>	1	1
(iv)	<p>Arrangement of the apparatus:</p>	1	1
(v)	<p>Procedure:</p> <ul style="list-style-type: none"> <li>– The apparatus is set up as shown in the diagram  <i>Radas disediakan seperti rajah yang ditunjukkan</i></li> <li>– Power supply is switched on  <i>Bekalan kuasa dihidupkan</i></li> </ul> <p>Method of controlling the manipulated variable</p> <ul style="list-style-type: none"> <li>– Experiment is started with object distance 10.0 cm  <i>Eksperimen dimulakan dengan jarak objek 10.0 cm</i></li> </ul> <p>Method of measuring the responding variable.</p> <ul style="list-style-type: none"> <li>– Screen is adjusted to get a sharp image  <i>Skrin dilaraskan untuk mendapatkan imej yang tajam</i></li> <li>– The height of image is measured using the metre rule  <i>Tinggi imej diukur dengan pembaris meter</i></li> </ul> <p>Repeat the experiment at least 4 times</p> <ul style="list-style-type: none"> <li>– The experiment is repeated with object distance of 20.0 cm, 30.0 cm, 40.0 cm and 50.0 cm  <i>Eksperimen diulang dengan jarak objek ialah 20.0 cm, 30.0 cm, 40.0 cm dan 50.0 cm</i></li> </ul>	1  1  1	3

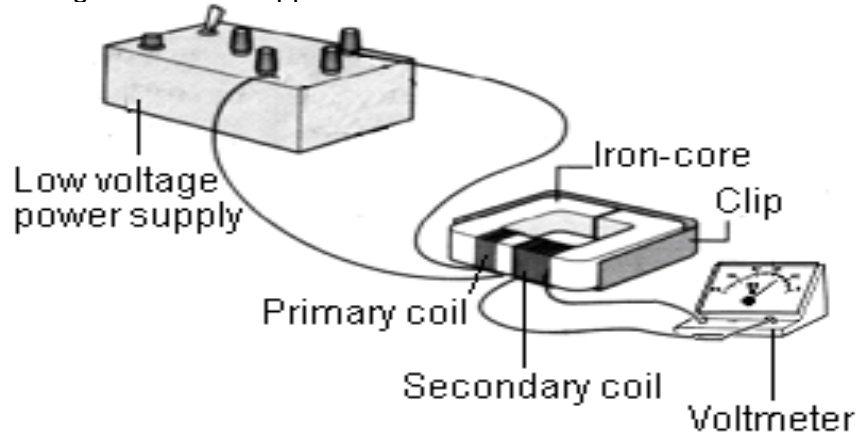
	(vi)	Tabulating data	1	1									
		<table border="1"> <thead> <tr> <th><b>Object distance <i>Jarak objek,</i> u/cm</b></th> <th><b>Height of image, <i>Tinggi imej,</i> h/cm</b></th> </tr> </thead> <tbody> <tr> <td>10.0</td> <td></td> </tr> <tr> <td>20.0</td> <td></td> </tr> <tr> <td>30.0</td> <td></td> </tr> <tr> <td>40.0</td> <td></td> </tr> <tr> <td>50.0</td> <td></td> </tr> </tbody> </table>			<b>Object distance <i>Jarak objek,</i> u/cm</b>	<b>Height of image, <i>Tinggi imej,</i> h/cm</b>	10.0		20.0		30.0		40.0
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10.0													
20.0													
30.0													
40.0													
50.0													
	(vii)	Analysing data	1	1									
		 <p>OR stated : draw a graph h against u</p>											
		TOTAL		12									

4	(a)	Inference: The output voltage of the transformer depends on the number of turns of the secondary coil.	1	1
	(b)	Hypothesis: The output voltage of the transformer increases as the number of turns of the secondary coil increases	1	1
	(c)	Aim of the experiment :		
	(i)	To investigate the relationship between the number of turns of the secondary coil and output voltage of a transformer.	1	1
	(ii)	Variables in the experiment: Manipulated variable: the number of turns of the secondary coil, $N_s$ Responding variable: The output voltage, $V_s$ Fixed variable: number of turns of the primary coil // the input voltage.	1	2
	(iii)	List of apparatus and materials:	1	1

low a.c power voltage, insulated copper wire, soft iron-core, a.c voltmeter and connection wire.

1

(iv) Arrangement of the apparatus:



1

1

(v) Procedure:

The number of turns of the primary coil  $N_p = 200$  turns.  
 The number of turns of the secondary coil  $N_s = 20$  turns  
 The low voltage of a.c power supply is switched on.  
 The reading of the voltmeter is measured,  $V_s$   
 The experiment is repeated with  $N_s = 40, 60, 80$  and  $100$  turns  
 (accept : step-down transformer)

1

3

(vi)

1

1

1

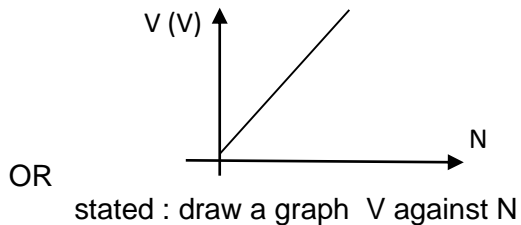
Tabulating data

Number of turn of secondary coil, $N_s$	Output voltage, $(V_s) / V$
20	
40	
60	
80	
100	

1

(vii) Analysing data

1



1

TOTAL

12

