ANSWER SCHEME PHYSICS PAPER 3 SIJIL PEPERIKSAAN MRSM 2017

SECTION A

Question	Mark Scheme	Sub Mark	Total Mark
1 (a) (i)	***State the the manipulated variable correctly*** - resistance, R	1	3
(ii)	***State the the responding variable correctly*** - Potential Different, V// Voltage, V	1	
(iii)	***State the the constant variable correctly*** - Current, I	1	
(b) (i)	***Record five values of Resistance, R*** Diagram 1.2 : 10 Ω Diagram 1.3 : 20 Ω Diagram 1.4 : 30 Ω Diagram 1.5 : 40 Ω Diagram 1.6 : 50 Ω Note: 3 – 4 readings correct, award 1 mark // If not written in the space provided, award 1 mark (Reject 1 mark : any decimal places)	2	7
(ii)	***Record five values of Potential Different,*** V Diagram 1.2 : 1.0 V Diagram 1.3 : 2.0 V Diagram 1.4 : 3.0 V Diagram 1.5 : 4.0 V Diagram 1.6 : 5.0 V Note: 3 – 4 readings correct, award 1 mark // If not written in the space provided, award 1 mark Note: - **Reject : 2 decimal places // no decimal place**	2	
(iii)	***Tabulate results for*** R, I ***and*** V ***in the space provided***		

R/Ω	I/A	V/V
10	0.1	1.0
20	0.1	2.0
30	0.1	3.0
40	0.1	4.0
50	0.1	5.0

	Mark Scheme	Sub Mark	Total Mark
	All symbols of R, I and V are correct	1	
	All units are correct	1	
	All decimal places are consistent	1	

<table>
<tr><td></td><td>Note: deduct 1 mark if no table
No penalty for second time</td><td></td><td></td></tr>
<tr><td>(c)</td><td>Plot a complete graph of V against R
Tick (√) based on the following aspects:

A: Show V on the vertical axis and R on the horizontal axis
B: State the units of variables correctly
C: Both axes are marked with uniform scale
D: All five points are plotted correctly
(note: if only three points plotted correctly, award √)
E: Best fit straight line is drawn
F: Show the minimum size of graph at least
5 x 4 (2cm x 2 cm) square
(counted from the origin until the furthest point)

Score:
<table><tr><th>Number of √</th><th>Score</th></tr><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></table></td><td>√
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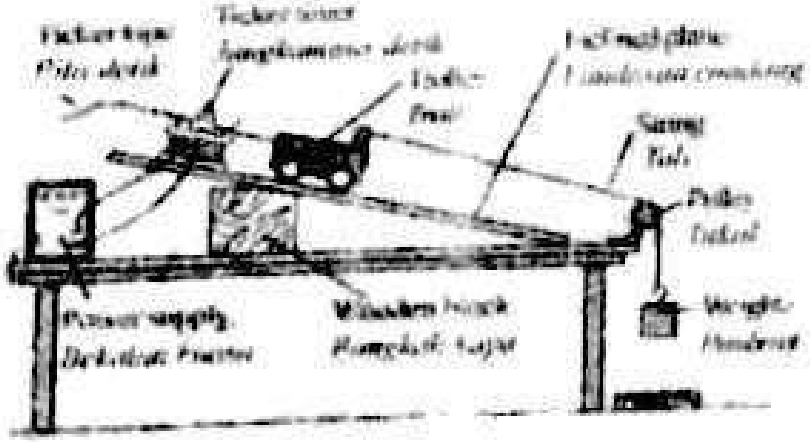
√</td><td>5</td></tr>
<tr><td>(d)</td><td>State the correct relationship between V and R
V is directly proportional to the R</td><td>1</td><td>1</td></tr>
<tr><td></td><td>Total</td><td></td><td>16</td></tr>
</table>

Scale x betul : x3 x4 x5

Question	Mark scheme	Sub Mark	Total Marks
2 (a) (i)	*State the relationship between h and m* h is directly proportional to m	1	1
(ii)	*Determine the value of* h *Draw a straight line from* m = 0.20 kg h = 0.022 m *(range: 0.022 – 0.025) m* **Reject : answer without unit**	1 1	2
(iii)	*Calculate the gradient, k of the graph* Draw a sufficient large triangle (7 cm vertical) $k = \frac{(0.078 - 0)\text{ m}}{(0.7 - 0)\text{ kg}}$ $= 0.111\text{ m kg}^{-1}$ (accept : 0.111 – 0.112)	1 1 1	3
(b)	*Calculate the value of p* $p = \frac{m}{Ah}$ Reciprocal of gradient $= \frac{1}{A} \cdot \frac{m}{h}$ $\frac{m}{h} = \frac{1}{0.111\text{ m kg}^{-1}}$ $= 9.009\text{ kg m}^{-1}$ //e.c.f (accept : 2 and 3 decimal point only) $= \frac{1}{(4.0 \times 10^{-3}\text{ m}^2)} \times 9.009\text{ kg m}^{-1}$ $p = 2252.25\text{ kg m}^{-3}$ *(range: 2252 – 2232)* 2232 – 2273	1 1 1 1	3
(c)	*Calculate the buoyant force, F_b* $F_b = pgV$ $= 2252.25\text{ kg m}^{-3}\ (10\text{ N kg}^{-1})(5.0 \times 10^{-4}\text{ m}^3)$ //e.c.f $= 11.27\text{ N}$ *(range: 11.15 – 11.28)* **Reject : answer without unit**	1 1	2
(d)	*State one precaution* Eye position must be perpendicular to scale of voltmeter to avoid parallax error **Reject : answer without the word "voltmeter"**	1	1
	Total		12

– kalau p lg amik dari graf dan ganti maka hilang 3 mark

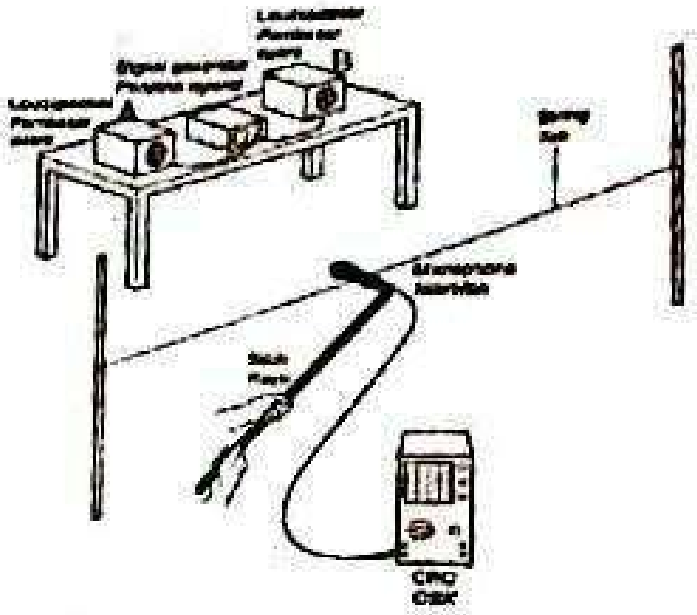
SECTION B

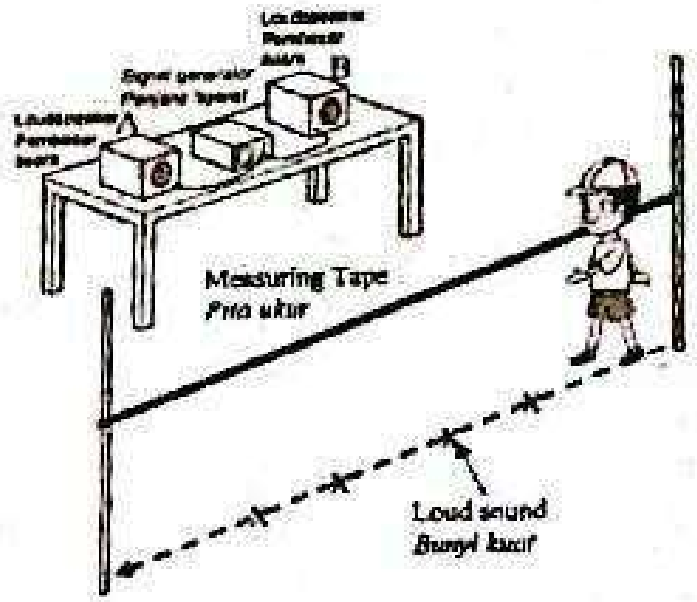
Question	Mark Scheme	Sub Mark	Total Mark
3 (a)	**State a suitable inference** The acceleration depends on the force applied // The acceleration is influenced/ affected by the force applied	1	1
(b)	**State a relevant hypothesis** When force applied increases, the acceleration will also increases	1	1
(c)	**Describe a complete and suitable experimental framework**		
(i)	**State the aim of the experiment** To investigate the relationship between force applied and acceleration.	1	
(ii)	**State the manipulated variable and the responding** - Manipulated Variable : Force applied, F // number/weight of slotted weight (Reject : mass of slotted weight // mass)	1	
	- Responding Variable : Acceleration of the trolley// Acceleration	1	
	- Constant Variable : Mass of trolley (Reject : weight of trolley // mass)	1	
(iii)	**State the complete list of apparatus and materials** iii) List of apparatus and materials. Ticker timer, Ticker tape, Power supply, Trolley, Smooth pulley, Runway/inclined plane , Wooden block, slotted weight. metre rule	1	
(iv)	**State a functional arrangement of the apparatus** iv) Arrangement of apparatus 	1	

(v)	**State the method to control the manipulated variable** • The apparatus is set up as shown in diagram above. • The power supply /ticker timer is switched on and the slotted weight with 1.0 N is released. **State the method to measure the responding variable** • Based on the ticker tape obtained, the acceleration of the trolley, a, is calculated using the formula $a = v - u/t$ **Reject 2nd mark if no "power supply /ticker timer is switched on" and no word released in step (v)** **Repeat the experiment at least 4 times** • Repeat the experiment for weight of 2.0 N, 3.0 N, 4.0 N and 5.0 N	1 2nd 3rd	
(vi)	State how the data is tabulated Force/Weight /N | Acceleration / ms^{-2} 1.0 | 2.0 | 3.0 | 4.0 | 5.0 |	1	
(vii)	State how the data is analysed Plot a graph of acceleration against Force / weight. Conclusion : Acceleration/ ms^{-2} Force/Weight /N	1	11 Max 10
	Total		12

Question	Mark Scheme	Sub Mark	Total Mark
4 (a)	**State a suitable inference** The distance between two consecutive (successive) loud sounds (antinodal lines) depends on the distance between two vibrating sources // The distance between two vibrating sources influence / affect the distance between two consecutive (successive) loud sounds (antinodes lines). **Reject: Without consecutive or successive**	1	1
(b)	**State a relevant hypothesis** When the distance between two consecutive (successive) loud sounds (antinodes lines) increases, the distance between two vibrating sources decreases. **Reject: Without consecutive or successive**	1	1
(c)	**Describe a complete and suitable experimental framework**		
(i)	<u>State the aim of the experiment</u> To investigate the relationship between distances two consecutive (successive) loud sounds (antinodes lines) and the distance between two vibrating sources. **Reject: Without consecutive or successive**	1	
(ii)	<u>State the manipulated variable and the responding</u> Manipulated Variable : Distance between two vibrating sources, a Responding Variable : Distance between two consecutive (successive) loud sounds (antinodes lines), x Fixed Variable : Distance between the sources and the position of student/ microphone is measured, D **Reject: Without consecutive or successive**	1 1 1	
(iii)	<u>State the complete list of apparatus and materials</u> Power supply, loudspeaker, microphone, signal generator, string, C.R.O , measuring tape/ ruler // Power supply, speaker, signal generator, measuring tape/ ruler, students	1	

(iv) State a functional arrangement of the apparatus





1

Choose either one of arrangement of the apparatus.

(v) State the method to control the manipulated variable

- Place a audio frequency generator and two loudspeakers on along bench in an open space.
- Adjust the separation, a, of the two speakers A and B to 0.5 m.
- Switch on the audio frequency generator.
- An observer stand 5m in front of A and B and walks along the line parallel to AB.

1*

	State the method to measure the responding variable • The sound wave is recorded by C.R.O//heard and the distance between two consecutive loud sounds (antinodes lines) is measured using measuring tape. **Reject 2nd mark if no "switch on" in step (v)** Repeat the experiment at least 4 times • Repeat the experiment with distance between two loudspeakers, a=1.0 m, 1.5 m,2.0 m,2.5 m and 2.5 m. **Reject : 1st mark if experiment is starting with the value less than 30 cm** ***Accept the procedure based on the arrangement of the apparatus***	2nd 3rd	
(vi)	State how the data is tabulated | Distance between two vibrating sources, a /(cm)	Distance between two consecutive (successive) loud sounds (antinodes lines), x /(cm) | |---|---| | 2.0 | | | 4.0 | | | 6.0 | | | 8.0 | | | 10.0 | |	1	
(vii)	State how the data is analysed x (cm) a (cm)	1	11 Max 10
	Total		**12**