SMJK YU HUA KAJANG
MARKING SCHEME
PEPERIKSAAN PERTENGAHAN TAHUN 2014
PHYSICS PAPER 3 FORM 4

<table>
<tr><th>NO</th><th>MARKING CRITERIA</th><th colspan="2">MARKS</th></tr>
<tr><td></td><td></td><td>SUB</td><td>TOTAL</td></tr>
<tr><td>1 (a) (i)</td><td>Able to state the manipulated variable
- mass/m</td><td>1</td><td>1</td></tr>
<tr><td>(ii)</td><td>Able to state the responding variable
- diameter / d</td><td>1</td><td>1</td></tr>
<tr><td>(iii)</td><td>Able to state a constant variable
- height // density // material of the cylinder</td><td>1</td><td>1</td></tr>
<tr><td>(b) (i)</td><td>Able to read the value of d
All 5 readings of d is correct
3.62, 5.13, 6.29, 7.27, 8,13
3 or 4 correct
Consistency to 2 decimal places</td><td>
2
1
1
</td><td></td></tr>
<tr><td>(ii)</td><td>Able to calculate the value of d^2
4 or 5 correct: 13.10, 26.32, 39.56, 52.85, 66.10
Consistency in 1,2 or 3 decimal places</td><td></td><td></td></tr>
<tr><td>(iii)</td><td>Zero error
Able to tabulate m, d and d^2
A. Quantities m, d and d^2 shown in heading
B. Units g, mm and mm^2 shown in heading

<table><tr><th>m/g</th><th>d / mm</th><th>d^2 / mm^2</th></tr><tr><td>5</td><td>3.62</td><td>13.10</td></tr><tr><td>10</td><td>5.13</td><td>26.32</td></tr><tr><td>15</td><td>6.29</td><td>39.56</td></tr><tr><td>20</td><td>7.27</td><td>52.85</td></tr><tr><td>25</td><td>8.13</td><td>66.10</td></tr></table></td><td>

✓
✓</td><td>1

5</td></tr>
<tr><td>(c)</td><td>Able to draw a complete graph of d^2 against m
Tick ✓ based on the following aspect

• A. Show d^2 on Y-Axis and m on the X-Axis
• B. State the units of the variables correctly
• C. Both axes are marked with uniform scale
• D. All five points are plotted correctly
[Note: 3 to 4 points plotted correctly: Only one ✓]
• E. Best Straight line is drawn
• F. Show the minimum size of graph at least 5 x 4 (2cm x 2cm) sq.
• (Counted from the origin until furthest point)</td><td>

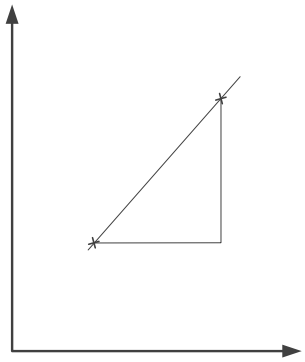
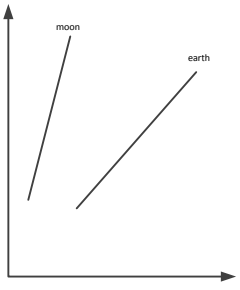
✓
✓
✓
✓✓

✓
✓</td><td></td></tr>
</table>

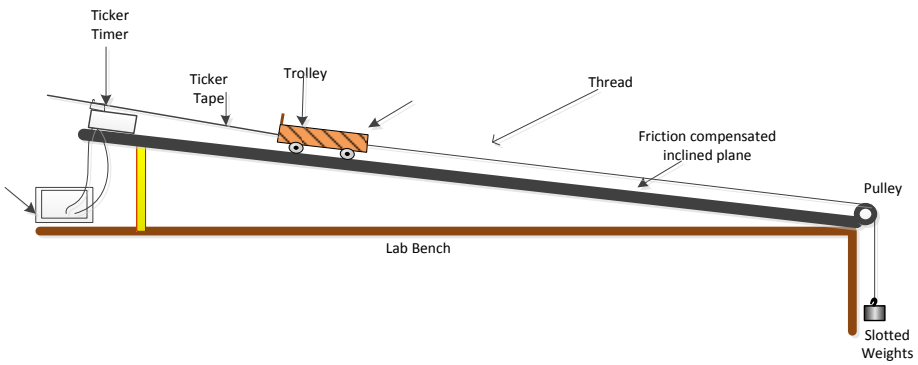
Scores:

Numbers of ✓	Scores
7 ✓	4
5-6 ✓	3
3-4 ✓	2
2 ✓	1
1 ✓	1

		4	4
(d)	**Able to state the correct relationship between d^2 and m** d^2 is directly proportional to m	1	1
(e)	Gradient of Graph	2	2
		TOTAL	**16**

2 (a) (i)	The Period T^2 increases proportionally to length l		1
(ii)	Determine T when l = 55 cm Show on the graph a verticle line drawn from l=55 cm to the graph Show the horizontal line drawn to Y-axis where $T^2 = 2.86\ s^2$ $T^2 = 2.86\ s^2$ ➔ T = 1.69 sec	1 1	2
(b)	Show on Diagram 2.2 the triangle drawn to get the gradient  Gradient of graph k = 5.00 s^2m^{-1} or 0.05 $s^2\ cm^{-1}$	2 1	3
(c)	g = 39.4/k = 39.4 / 5 = 7.88 ms^{-2} If using k = 0.05 ➔ g = 39.4/0.05 = 788 cms^{-2} = 7.88 ms^{-2} Allow for 2% error in calculation Accepted answer : 7.72 < g < 8.03		2
(d)	Draw a straight line 	1	2

	Gravitational acceleration on the moon surface is small, therefore the gradient k is very large. (about 5 times more than on earth)	1	
(e)	A graph of T vs l will not produce a straight line. Therefore gradient cannot be determined The graph of T against l is a curve.		1
(f)	**One** Precaution. Choose any one 1. The amplitude of oscillation must be kept at 10^o or less to get better results. 2. The number of oscillation to calculate the period T could be increased. 3. Use 2 or more trials for every length		1
	TOTAL	**12 marks**	

3 (a)	**One Suitable Inference** Acceleration of the sledge depends on the number of dogs attached to it		1
(b)	**State one suitable hypothesis** The greater the force applied, the greater is the acceleration produced or The acceleration of an object increases when the net force acting on the object increases		1
(c) (i)	**Aim of experiment** To investigate the relationship between force and acceleration when the mass is kept constant	1	10
(ii)	**Vaiables in the experiment** Manipulative Variable: Force Responding variable: acceleration Constant Variable: Mass	1 1	
(iii)	**List of apparatus and materials** Trolley, ticker timer, ticker tape, slotted weight of 20g each, pulley, power supply, inclined plane	Any 3 1	
(iv)	**Arrangement of apparatus**  	1	
(v)	**Procedure of experiment** The ticker timer which is connected to the 12V A.C. power supply is switched on and the trolley is pulled down the runway by means of slotted weight attached to it **Controlling the manipulated variable** 1. At first, a 20g mass with a force F1 is attached to the trolley through a	1	

frictionless pulley as shown.
2. The weights F1 is released and the trolley accelerates.
3. The ticker tape obtained is cut into 5-ticks strips and a chart of the motion of the trolley is made. 1

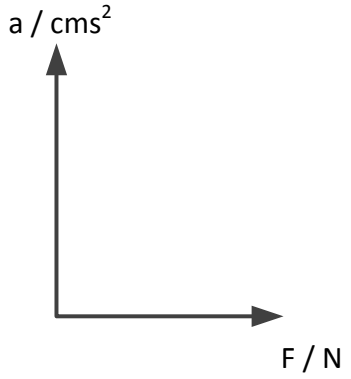
Method of measuring the responding variable
4. Acceleration is calculated from a = (v-u)/t and recorded 1
5. The above steps 3 to 4 are repeated with force F2, F3, F4 & F5 that represents 2,3,4 and 5 units of slotted weights.

(vi) **The way to tabulate the data**

Force, F/N	Acceleration a/ cms^{-2}
F1	a1
F2	a2
F3	a3
F4	a4
F5	a5

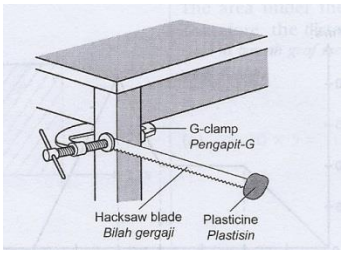
1

(vii) **The way you would analyse the data**
Draw a graph of a vs F



1

12 marks

<table>
<tr><td>4 (a)</td><td>The time taken for the body to stop spinning is influenced by the mass</td><td></td><td>1</td></tr>
<tr><td>(b)</td><td>The bigger the mass , the longer the body will spin</td><td></td><td>1</td></tr>
<tr><td>(c) (i)</td><td>Aim
To investigate the relationship between mass and the period of oscillation</td><td>1</td><td rowspan="6">10</td></tr>
<tr><td>(ii)</td><td>Variables
Manipulated : The mass of the plasticine
Responding: The Period of oscillation
Constant: The length of the hacksaw blade</td><td>
1
1</td></tr>
<tr><td>(iii)</td><td>Hacksaw blade, stop watch, plasticine, G-Clamp</td><td>1</td></tr>
<tr><td>(iv)</td><td>Arrangement of apparatus
 
</td><td>1</td></tr>
<tr><td>(v)</td><td>Procedure
1. The hacksaw blade is clamped horizontally.

Controlling the manipulated variable
2. Plasticine with mass of 30g is made into a ball an inserted into the end of the blade.
3. The blade is displaced horizontally and released, and a stop watch is started simultaneously.

Method of measuring the responding variable
4. The time taken for 20 complete oscillation is recorded.
5. The Period of oscillation is calculated
6. Repeat the experiment at least 3 times
7. Repeat steps 2 through 6 but change the mass of the plasticine to 50g, 80g, 100g and 120g.</td><td>1

1

1</td></tr>
<tr><td>(vi)</td><td>The way you would tabulate the data

<table>
<tr><th rowspan="2">Mass of plasticine m/g</th><th colspan="3">Time for 20 oscillations, 20T/s</th><th rowspan="2">Period T/s</th></tr>
<tr><th>Trial 1</th><th>Trial 2</th><th>Average</th></tr>
<tr><td>30</td><td></td><td></td><td></td><td></td></tr>
<tr><td>50</td><td></td><td></td><td></td><td></td></tr>
<tr><td>80</td><td></td><td></td><td></td><td></td></tr>
<tr><td>100</td><td></td><td></td><td></td><td></td></tr>
<tr><td>120</td><td></td><td></td><td></td><td></td></tr>
</table></td><td>1</td></tr>
<tr><td>(vii)</td><td>Plot a graph of Period T /s against mass m/g</td><td>1</td><td></td></tr>
<tr><td></td><td>TOTAL</td><td colspan="2">12 MARKS</td></tr>
</table>