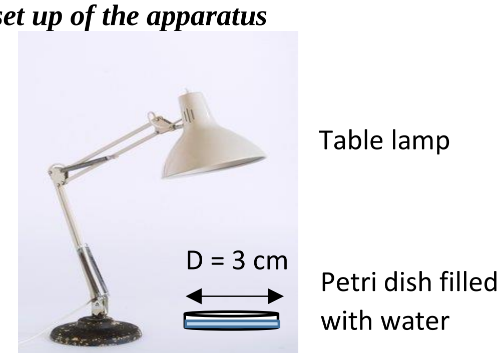
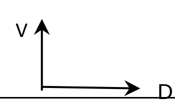
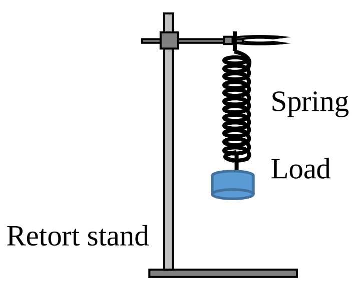
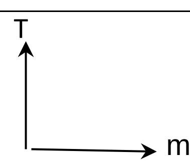
**SKEMA F5 P3 2020 SET 1**

<table>
<tr><th colspan="2">Q1</th><th>Answer</th><th>Sub Mark</th><th>Total Mark</th></tr>
<tr><td>(a)</td><td>(i)</td><td>Stating the correct manipulated variable.<br>mass/ m</td><td>1</td><td rowspan="3">3</td></tr>
<tr><td></td><td>(ii)</td><td>Stating the correct responding variable.<br>depth of plasticine/ d</td><td>1</td></tr>
<tr><td></td><td>(iii)</td><td>Stating a correct fixed variable.<br>height/h</td><td>1</td></tr>
<tr><td>(b)</td><td></td><td>
<table>
<tr><th>mass, m/g</th><th>depth, d/cm</th></tr>
<tr><td>100.0</td><td>0.96</td></tr>
<tr><td>200.0</td><td>1.86</td></tr>
<tr><td>300.0</td><td>2.88</td></tr>
<tr><td>400.0</td><td>3.90</td></tr>
<tr><td>500.0</td><td>4.80</td></tr>
</table>
</td><td>2</td><td>2</td></tr>
<tr><td>(c)</td><td></td><td>Tabulating results of the experiment<br>Labels m d and W are shown<br>Correct unit for d , m and W<br>Correct conversion of m to W<br>Minimum 3 correct readings for d to 2 decimal places (+/- 0.01)<br>All readings d are correct to 2 decimal places(consistent)
<table>
<tr><th>mass, m/g</th><th>Weight, W/N</th><th>depth, d/cm</th></tr>
<tr><td>100.0</td><td>1</td><td>0.96</td></tr>
<tr><td>200.0</td><td>2</td><td>1.86</td></tr>
<tr><td>300.0</td><td>3</td><td>2.88</td></tr>
<tr><td>400.0</td><td>4</td><td>3.90</td></tr>
<tr><td>500.0</td><td>5</td><td>4.80</td></tr>
</table>
</td><td><br>1<br>1<br>1<br>1<br>1</td><td>5</td></tr>
<tr><td>(d)</td><td>(i)</td><td>Plotting the V against I graph<br>A. d on the y-axis and m on the x-axis.<br>B. Units stated for both d and m correctly<br>C. The scales on both axes are regular and not an odd scale.<br>D. 5 points plotted correctly from table(reading is wrong, plotting from table correct, mark can be given)<br>E. 3 points plotted correctly from table.<br>F. Line of best fit.<br>G. Graph size a minimum of 5×4 (5 boxes on y-axis, 4 boxes on x-axis).
<table>
<tr><th>No of ticks</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>5</td><td>5</td></tr>
</table>

| | | | | |
|---|---|---|---|---|
| | (ii) | **Stating the correct relationship**<br>*d* is directly proportional to m | 1 | **1** |
| **Total** | | | | **16** |

| **Q 2** | | **Answer** | **Sub Mark** | **Total Mark** |
|---|---|---|---|---|
| (a) | (i) | inversely proportional | 1 | 1 |
| | (ii) | 1. $1/f = 1/2.5 = 0.4\ Hz^{-1}$<br>2. extend the graph and show on graph with appropriate vertical and/or horizontal line corresponding to $0.4\ Hz^{-1}$<br>3. $\lambda = 8$ cm | 1<br>1<br>1 | **3** |
| | (iii) | **1. Drawing the gradient triangle**<br>Triangle size a minimum of 6cm x 8cm<br>2. **Substitution**<br>(values from student's triangle)<br>3. **Answer with correct unit**<br>20 cmHz | 1<br>1<br>1 | **3** |
| (b) | | $\lambda = v\ (1/f)$<br>$v =$ gradient $= 20\ cms^{-1}$ | 1<br>1 | **2** |
| (c) | | $v / 20 = 10 / 4$<br>$v = 50\ cms^{-1}$ | 1<br>1 | **2** |
| (d) | | When measuring the values of $\lambda$, make sure the eyes are perpendicular to the scale on the metre rule//<br>Repeat the experiment to get an average value of $\lambda$ | 1 | **1** |
| **Total** | | | | **12** |

| Q3 | | Answer | Sub Mark | Total Mark |
|---|---|---|---|---|
| (a) | | ***Making the right inference***<br>Surface area affects rate of evaporation (final volume of water) //<br>Rate of evaporation depends on the surface area | 1 | 1 |
| (b) | | ***Building an appropriate hypothesis***<br>The larger the surface area the higher the rate of evaporation (final volume of water) | 1 | 1 |
| (c) | (i) | ***Stating the aim of the experiment***<br>To study the relationship between the surface area and the rate of evaporation (final volume of water) | 1 | 1 |
| | (ii) | ***Stating the correct variables***<br>Manipulated variable : surface area (diameter of petri dish), D<br>Responding variable : final volume of water,V<br>Fixed variable : initial volume of water // surrounding temperature/humidity/pressure//air velocity | 1<br>1<br>1 | 3 |
| | (iii) | ***List of appropriate apparatus and material***<br>Petri dishes with 5 different diameters, measuring cylinder, table lamp, stopwatch and water | 1 | 1 |
| | (iv) | ***Describing set up of the apparatus***<br><br> | 1 | 1 |
| | **(v)** | ***Stating the procedure of the experiment***<br>1. Set up the apparatus as shown.<br>2. Pour 30 $cm^3$ water into a petri dish of diameter, D = 3 cm, place it directly under the lamp. (Place barriers around the setup to stop air flow.)<br>3. Record the final volume of water, V after 5 mins.<br>4. Repeat steps 2 and 3 for petri dishes of diameter 4 cm, 5 cm, 6 cm and 7 cm. | 1<br><br>1<br>1 | 3 |
| | **(vi)** | ***Tabulating data***<br>Show table with T and m as headings<br>D/cm — V / $cm^3$<br>3<br>4<br>5<br>6<br>7 | 1 | 1 |
| | **(vii)** | **Analysing data**<br><br> | 1 | 1 |
| **Total** | | | | **12** |

<table>
<tr><th colspan="2">Q4</th><th>Scheme</th><th>Sub Mark</th><th>Total Mark</th></tr>
<tr><td>(a)</td><td></td><td>Making the right inference<br>Mass of the load affects period of oscillation of a loaded spring //<br>Period of oscillation of a loaded spring depends on the mass of the load</td><td>1</td><td>1</td></tr>
<tr><td>(b)</td><td></td><td>Building an appropriate hypothesis<br>The smaller the mass , the shorter the period</td><td>1</td><td>1</td></tr>
<tr><td>(c)</td><td>(i)</td><td>Stating the aim of the experiment<br>To study the relationship between the mass of the load and the period of oscillation of a loaded spring.</td><td>1</td><td>1</td></tr>
<tr><td></td><td>(ii)</td><td>Stating the correct variables<br>Manipulated variable : mass of the load, m<br>Responding variable : period of oscillation, T<br>Fixed variable : spring constant// thickness of spring//length of spring</td><td>1<br>1<br>1</td><td>3</td></tr>
<tr><td></td><td>(iii)</td><td>List of appropriate apparatus and material<br>Spring, load, retort stand, stop watch</td><td>1</td><td>1</td></tr>
<tr><td></td><td>(iv)</td><td>Describing set up of the apparatus<br><br></td><td>1</td><td>1</td></tr>
<tr><td></td><td>(v)</td><td>Stating the procedure of the experiment<br>1. Set up the apparatus as shown.<br>2. Use load of mass, m = 50 g, pull down gently on the load.<br>3. Record the time for 10 oscillations, t and calculate the period of oscillation, T = t /10.<br>4. Repeat step 2 and 3 for load of mass. m = 100g, 150g, 200g and 250g.</td><td>1<br>1<br>1</td><td>3</td></tr>
<tr><td></td><td>(vi)</td><td>Tabulating data<br>Show table with T and m as headings<br><table><tr><th>m / g</th><th>T / s</th></tr><tr><td>50</td><td></td></tr><tr><td>100</td><td></td></tr><tr><td>150</td><td></td></tr><tr><td>200</td><td></td></tr><tr><td>250</td><td></td></tr></table></td><td>1</td><td>1</td></tr>
<tr><td></td><td>(vii)</td><td>Analysing data<br><br></td><td>1</td><td>1</td></tr>
<tr><td colspan="3">Total</td><td></td><td>12</td></tr>
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