DATA ANALYSIS TASK – Mark Scheme

<table>
<tr><th colspan="2">Question</th><th>Marking details</th><th>Marks Available</th></tr>
<tr><td>(a)</td><td></td><td>Re-arrange the equation as $T^2 = \frac{4\pi^2 H}{g} - \frac{4\pi^2 d}{g}$ (1)

The re-arrangement should be explicit, i.e. the initial squaring step shown, e.g.

$T^2 = (2\pi)^2 \frac{H - d}{g}$ or $T^2 = 4\pi^2 \frac{H - d}{g}$

Explicit comparison with $y = mx + c$ (1), e.g.

$T^2 = \frac{4\pi^2 H}{g} - \frac{4\pi^2}{g} d$</td><td>2</td></tr>
<tr><td>(b)</td><td></td><td>Unit for T^2 given as s^2. (1)
Third column correct with all values to 3 sig figs (1) [see below].
Fourth column correct with all values to 2 (or 3) sig figs (1) [see below].

<table>
<tr><th>Period of one oscillation (T) (s)</th><th>Period of oscillation squared (T^2) (s^2)</th></tr>
<tr><td>3.11</td><td>9.67 ± 0.10</td></tr>
<tr><td>3.04</td><td>9.24 ± 0.10</td></tr>
<tr><td>2.97</td><td>8.82 ± 0.10</td></tr>
<tr><td>2.91</td><td>8.47 ± 0.10</td></tr>
<tr><td>2.83</td><td>8.01 ± 0.10</td></tr>
<tr><td>2.77</td><td>7.67 ± 0.10</td></tr>
<tr><td>2.69</td><td>7.24 ± 0.10</td></tr>
<tr><td>2.62</td><td>6.86 ± 0.10</td></tr>
<tr><td>2.53</td><td>6.40 ± 0.10</td></tr>
<tr><td>2.46</td><td>6.05 ± 0.10</td></tr>
</table>
</td><td>3</td></tr>
<tr><td>(c)</td><td></td><td>Axes labelled with units – correct orientation [ecf on incorrect units in table – if no units are given in the table there is no ecf here]. (1)
Suitable scales (not involving awkward factors, e.g. 3 / over ½ each axis used). (1)
All points plotted correctly to within ½ small square division. (1)
All error bars plotted correctly. (1)
Correct steepest and least steep lines consistent with the error bars. (1)
See exemplification on pages 6-11 for additional guidance on marking this section.</td><td>5</td></tr>
</table>

