

## Problem E2 - Marking Scheme

<b>A.1</b>	Correct data points $\geq 25$ (0.8 pt) If data points are less than 25, (-0.05 pt) for each missing data points. For each missing or wrong number in third column (-0.02 pt)	0.8 pt
<b>A.2</b>	25 data points are properly plotted (0.3 pt) If data points are less than 25, (-0.02 pt) for each missing data points. Missing trend line (- 0.05 pt) Missing each axis titles (-0.02 pt) Too small (-0.05 pt)	0.3 pt
<b>A.3</b>	Correct values of slope (0.05 pt) and intercept (0.05 pt) according to data.	0.1 pt
<b>A.4</b>	Correct answer (0.7 pt) and uncertainty (0.1 pt) The value of h depends on the setup number. First interval      less than 2% difference with setup value (0.7pt) Second interval    less than 3% difference with setup value (0.5pt) Third interval      less than 4% difference with setup value (0.3pt) Correct value of uncertainty (0.1 pt)	0.8 pt
<b>B.1</b>	Correct data points $\geq 15$ (0.6 pt) If data points are less than 15, (-0.05 pt) for each missing data points. For each missing or wrong number in third column (-0.02 pt)	0.6 pt
<b>B.2</b>	Correct method (0.05 pt) and correct final equation (0.05 pt)	0.1 pt
<b>B.3</b>	15 data points are properly plotted (0.2 pt) If data points are less than 15, (-0.02 pt) for each missing data points Missing trend line (- 0.04 pt) Missing each axis titles (-0.02 pt) Too small (-0.04 pt)	0.2 pt
<b>B.4</b>	Correct values of slope (0.05 pt) and intercept (0.05 pt) according to data.	0.1 pt
<b>B.5</b>	Correct answer (0.5 pt) and uncertainty (0.1 pt) The value of h depends on the setup number. First interval      less than 3% difference with setup value (0.5pt) Second interval    less than 5% difference with setup value (0.3pt) Correct value of uncertainty (0.1 pt)	0.6 pt
<b>C.1</b>	Correct data points $\geq 15$ (0.6 pt) If data points are less than 15, (-0.05 pt) for each missing data points. For each missing or wrong number in third column (-0.02 pt)	0.6 pt

<b>C.2</b>	Correct method (0.05 pt) and correct final equation (0.05 pt)	0.1 pt
<b>C.3</b>	15 data points are properly plotted (0.2 pt) If data points are less than 15, (-0.02 pt) for each missing data points Missing trend line (- 0.04 pt) Missing each axis titles (-0.02 pt) Too small (-0.04 pt)	0.2 pt
<b>C.4</b>	Correct values of slope (0.05 pt) and intercept (0.05 pt) according to data	0.1 pt
<b>C.5</b>	Correct answer (0.45 pt) and uncertainty (0.15 pt) First interval $1.31 < N < 1.34$ (0.45 pt) Second interval $1.30 < N < 1.35$ (0.25 pt) Uncertainty formula (0.05 pt) and correct value of uncertainty (0.1 pt)	0.6 pt
<b>D.1</b>	Correct data points $\geq 25$ (0.7 pt) If data points are less than 25, (-0.05 pt) for each missing data points.	0.7 pt
<b>D.2</b>	correct final equation for u (0.3 pt) and w (0.5 pt)	0.8 pt
<b>D.3</b>	Correct u, w $\geq 25$ (1.2 pt) If the number of u, w are less than 25, (-0.05 pt) for each missing or wrong data points.	1.2 pt
<b>D.4</b>	25 data points are properly plotted (0.3 pt) If data points are less than 25, (-0.02 pt) for each missing data points Missing each axis titles (-0.02 pt) Too small (-0.05 pt)	0.3 pt
<b>D.5</b>	Finding the right linear region and drawing trendline (0.05 pt) more than 15 data points in linear region (0.05 pt) Correct values of slope (0.05 pt) and intercept (0.05 pt) according to data.	0.2 pt
<b>D.6</b>	Correct answer (1.3 pt) and uncertainty (0.3 pt) First interval $1.30 < N_B < 1.35$ : 0.7 pt Second interval $1.28 < N_B < 1.37$ : 0.4 pt First interval $1.30 < N_A < 1.35$ : 0.6 pt Second interval $1.27 < N_A < 1.38$ : 0.3 pt correct value of uncertainty for $N_B$ (0.1 pt) Uncertainty formula for $N_A$ (0.1 pt) and correct value of uncertainty for $N_A$ (0.1 pt)	1.6 pt