

1.2 Uncertainty Questions

1. i) 0.004 A (needs to have a unit)

ii) $\frac{0.004}{0.325} = 0.0123 = 0.01$ (to one significant figures)

iii) $= \frac{0.004}{0.325} \times 100 = 1.23\% = 1\%$ (to one s.f.)

2. Average = 4.425

Uncert = $\frac{\text{biggest} - \text{smallest}}{2} = \frac{4.925 - 4.217}{2} = 0.354 = 0.4$ (to one s.f.)

\therefore Average = 4.4 ± 0.4 (note agreement in decimal places)

3. $82^\circ \pm 1^\circ$

$\sin 82^\circ = 0.990$

$\sin 83^\circ = 0.993$
 $\sin 81^\circ = 0.988$ } Difference = 0.005
 $\div 2 = 0.0025$
 ≈ 0.003

\downarrow
 0.990 ± 0.003

4. Student B is most accurate because it is closest to the real value (c)



5. Student A, because it has more significant figures (b)

6. Student A mistakenly measured 4 oscillations (d)

(The answer is not that the watch is running too fast, if this was the case, the time value would be larger).

7. Average = 1.578

uncertainty = $\frac{\text{largest} - \text{smallest}}{2} = \frac{1.78 - 1.34}{2} = 0.22 = 0.2$ (one s.f.)

Average = $1.6 \pm 0.2 \text{ m}$