Problem 6

(II) Time intervals measured with a stopwatch typically have an uncertainty of about 0.2 s, due to human reaction time at the start and stop moments. What is the percent uncertainty of a hand-timed measurement of (*a*) 5 s, (*b*) 50 s, (*c*) 5 min?

Solution

The percent uncertainty of $t \pm \Delta t$ is

$$P = \frac{\Delta t}{t} \times 100\%.$$

Part (a)

For 5 ± 0.2 s it is

$$P = \frac{0.2}{5} \times 100\% \approx 4\%.$$

Part (b)

For 50 ± 0.2 s it is

$$P = \frac{0.2}{50} \times 100\% \approx 0.4\%.$$

Part (c)

For $5(60) \pm 0.2$ s it is

$$P = \frac{0.2}{5(60)} \times 100\% \approx 0.07\%.$$