Calibrating a Ticker Timer
SPH4C

Question: What is the frequency and period of a ticker timer?

Hypothesis: The frequency of the timer is _____ dots per second.

(Turn the timer on briefly and listen to it to estimate how many cycles occur each second.)

Materials: ticker timer, ticker tape (approximately 1.5 m), carbon disc, stopwatch

Procedure:

1. Attach the carbon disc to the ticker timer.
2. Insert the ticker tape into the timer so that it's ready to be pulled through. Make sure that the dark side of the carbon disc is adjacent to the ticker tape so that dots will be produced.
3. Start pulling the tape through the timer, simultaneously starting the timer and the stopwatch. Make sure you pull at a speed that produces easily readable dots on the tape.
4. Turn the timer off once the tape has been pulled through to the end.

Data:

Count the number of dots on the entire tape and then record the number and the time taken to produce the dots.

Estimate the uncertainty in each of your measurements.

number of dots = _____ (± _____)

Δt = _____ (± _____)

Analysis:

1. Calculate the frequency (in dots per second) of the recording timer.

$$\frac{number\ of\ dots}{\Delta t} =$$

2. Calculate the period (in seconds) of the timer.

$$\frac{\Delta t}{number\ of\ dots} =$$

3. Calculate the percent error for your frequency result.
    (Ask your teacher what the accepted value is for the timer.)

$$percent\ error = \frac{|accepted\ value - experimental\ value|}{accepted\ value} =$$

(Remember to write as a percent)

Questions:

1. Why is it important not to pull the tape too quickly in this activity?

2. Why shouldn't you pull the tape too slowly?

3. Does it matter to this procedure if the dots are unevenly spaced along the tape?
    If this were the case, what would that indicate?

4. What were the sources of error that might have affected your results?
    (These should be physical factors that create uncertainty in your measurements, NOT "human error" or mistakes in measurement or calculation.)

Conclusion: The frequency of the timer was measured to be _____ dots per second,

which was within _____ % of the accepted value.