5. PLANCK'S CONSTANT (8 points) In a simplistic model, light emitting diodes can be considered to only pass current when lit, and then they have a constant voltage drop $V_t = \frac{E}{e}$ across them. $E = hf$ is the energy of the light quanta emitted and $e = 1.60 \times 10^{-19}\,\mathrm{C}$ is the elementary charge. Speed of light in vacuum $c = 3.00 \times 10^8\,\mathrm{m/s}$.

You have a assorted light emitting diodes numbered 1–6, each with a $R = 680\,\Omega$ series resistor. From the datasheets it is known for the peak wavelengths of the diodes to be 940 nm, 620 nm, 590 nm, 525 nm, 470 nm, and 450 nm.

i) *(2 points)* Find out which wavelength corresponds to which diode.

ii) *(4 points)* Measure the Planck's constant h that corresponds to our simplistic model. This does not have to correspond to real Planck's constant.

iii) *(2 points)* Estimate the uncertainty.

Equipment: voltage source (batteries) with an unknown voltage, ammeter, assorted light emitting diodes with series resistor. Take care not to short the battery with the ammeter. You may ignore the internal resistances of the batteries and the ammeter.