UNIVERSITY OF TORONTO
Faculty of Arts and Science

FIRST YEAR PHYSICS LAB

Calculators without stored data are permitted
No other aids are allowed.

All experimental observations must be recorded in PEN in the exam booklet and data must be plotted (using pen *or* pencil) on the graph paper provided. You are expected to record and analyze your data in the same manner as is normally expected in the lab.

DC CIRCUITS

You are provided with a regulated power supply, two digital multimeters and an "unknown" resistor. Let **V** be the voltage across the resistor for a given current **i** through it. Design a circuit to measure five values of **V** and **i**. Draw a clear circuit diagram. Interpret your results graphically, indicating reasons for choosing the form of the plot and hence derive a value of the resistance of the resistor.

- Measure the unknown resistance directly using the multimeter as an ohmmeter.
- Design the appropriate circuit for the unknown resistor.
- Make the usual assumptions about the reading errors in digital instruments for the random errors in your readings of **V** and **i** (i.e. ½ of the last digit) and assume accuracy of the digital instruments to be (1% of reading + 1 digit).

TEST STRATEGY ADVICE: Remember to quote units throughout. You will be given credit for your estimate of errors; however it is more important that you have taken adequate data and produced a graph of the results, so leave your error calculations to the last. It is more important to have your results suitably plotted than to achieve the full set of five points. If one of the points doesn't fit your line or curve, it is advisable to repeat that measurement.