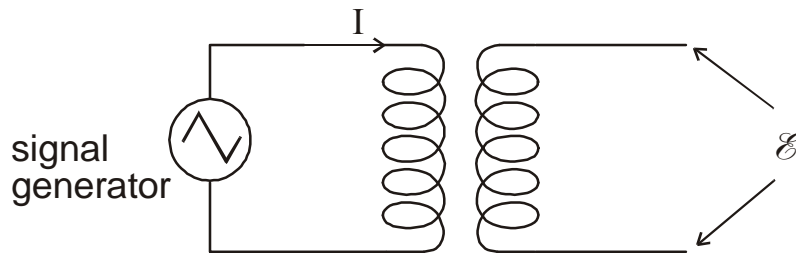


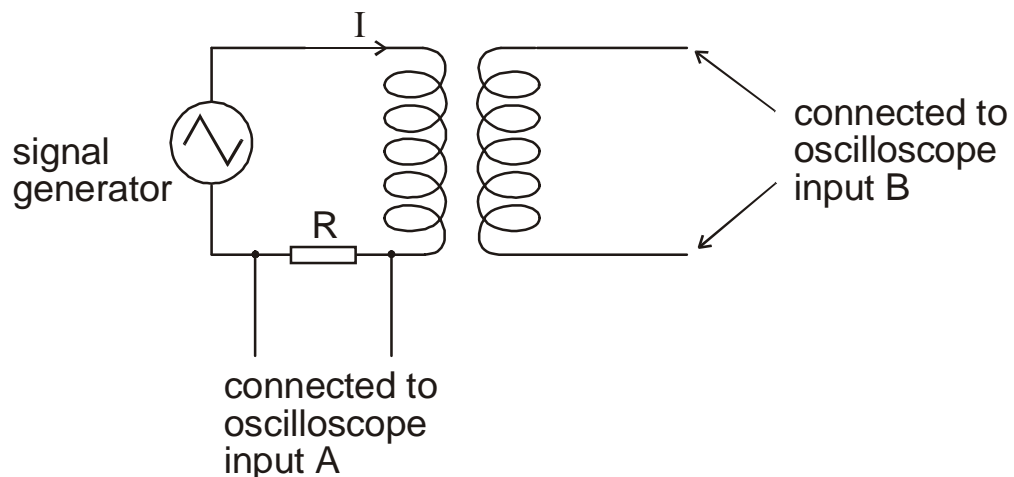
## Experiment to verify Faraday's Law of Electro-Magnetic-Induction

1. **Preparation:**
- a) Learn the law.
  - b) Make sure you understand why a signal generator with “floating” output must be used (see part 4).
2. The method suggested here uses this basic circuit



An alternating current,  $I$  of variable frequency, flowing in one coil (the primary coil), induces an alternating emf,  $\mathcal{E}$ , in the other coil (the secondary coil). In practice it is convenient to use two coils wound on the same support.

We will need to find how the current in the primary coil varies and how the induced emf in the secondary coil varies. Both these quantities can be measured using a dual beam oscilloscope.

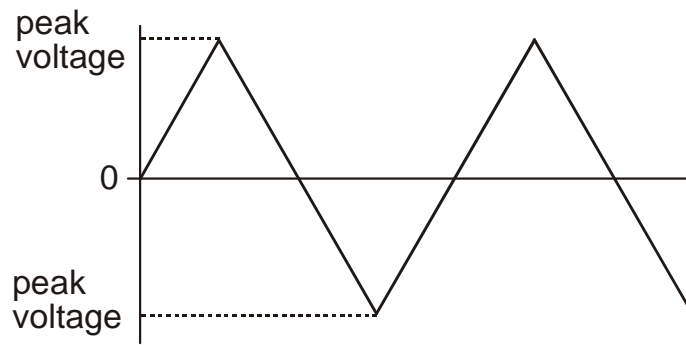


The resistor  $R$  should be about  $200\ \Omega$ . Why is this resistor needed?

Set the signal generator to “triangle” output, amplitude maximum, frequency  $\times 1\ \text{kHz}$ . Why do we choose this “shape” of signal?

Measure  $\mathcal{E}$  for frequencies,  $f$ , in the range 500 Hz to 5 kHz.

Each time the frequency is changed, verify that the peak voltage given by the signal generator remains the same.



3. You will be expected to explain

- *why* the signal generator is set to “triangle” output and *why* you must maintain a constant peak voltage
- *why* resistor R is needed
- *how* your results verify Faraday’s law (assuming that they do!)

Your report should also include a diagram showing what you saw on the oscilloscope screen.

4. The experiment will be done using a coil like the one shown below. In this case the primary and secondary coils are *two halves of the same coil*. In other words, the two coils are already connected together (as shown in the circuit diagram). This means you must use a signal generator which does *not* have one side of its output connected to ground (the output must be “floating”).

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