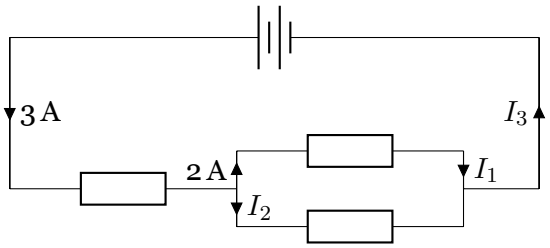
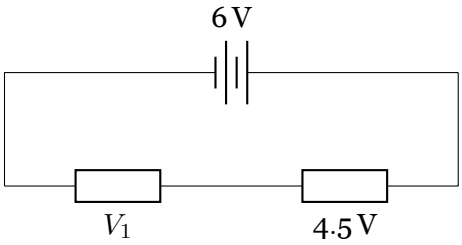
Solving Circuits Part 1

1. In each of the questions below use Kirchoff's Laws to calclate the missing currents and potential differences.

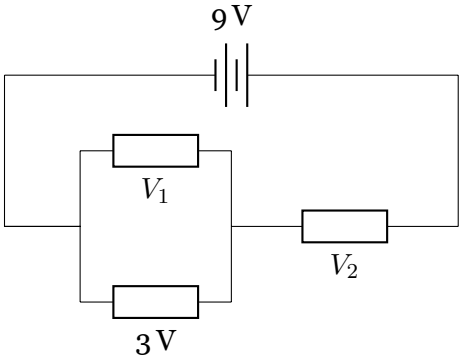
(a)



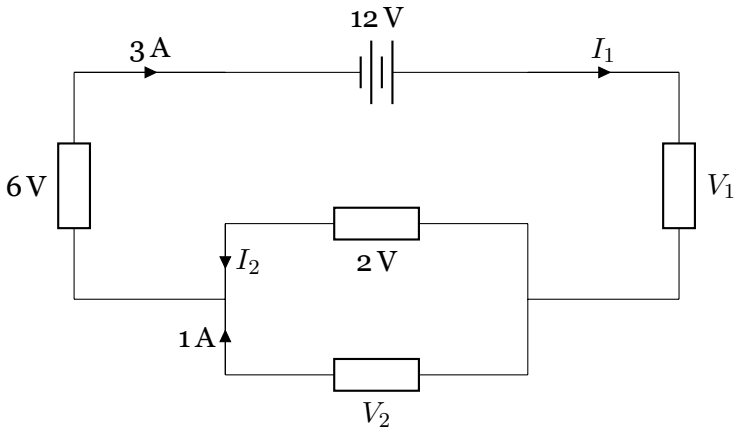
(b)



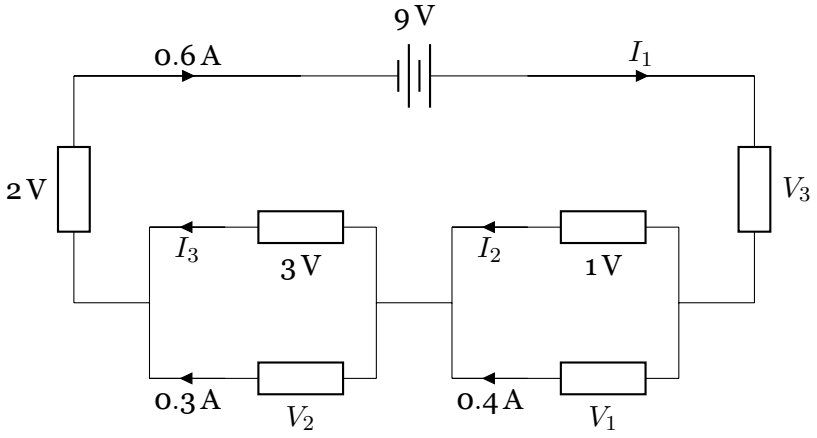
(c)



(d)



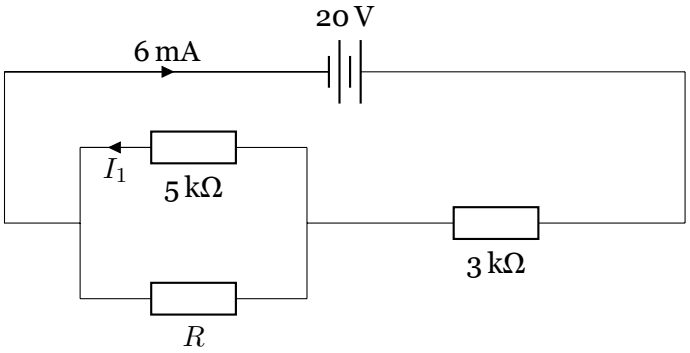
(e)



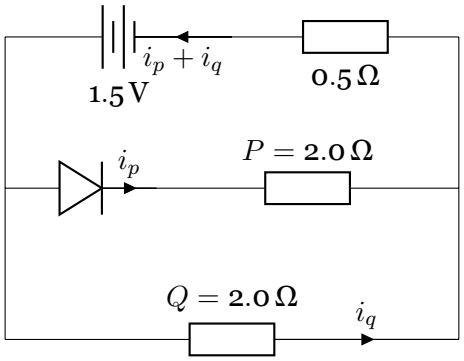
(f) *If you have finished...* Calculate the resistance of the individual resistors in (e) above and the effective resistance of the whole circuit.

Solving Circuits Part 2

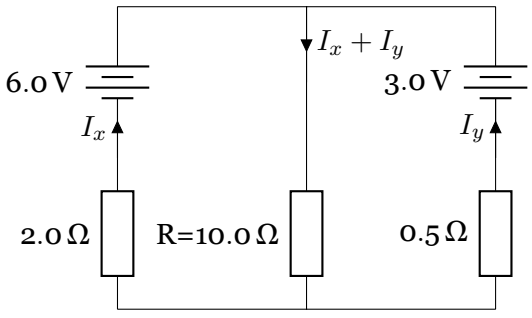
2. In the circuit below, calculate:
   (a) the p.d. across the 3 kΩ resistor;
   (b) the current through the 5 kΩ resistor;
   (c) the resistance of resistor R.



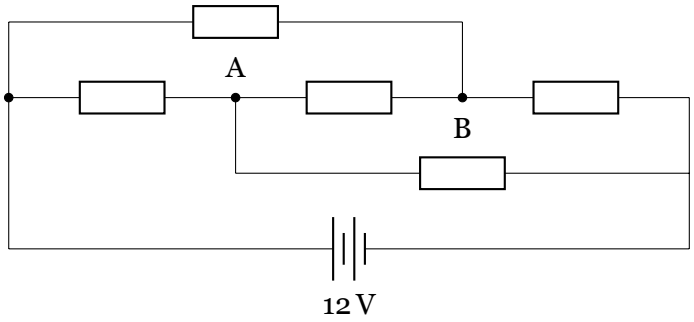
3. The circuit below includes a silicon diode which has a constant p.d. across it of 0.6 V. Calculate the current through resistors P and Q and the cell current.



4. Calculate the current through and potential difference across resistor R.



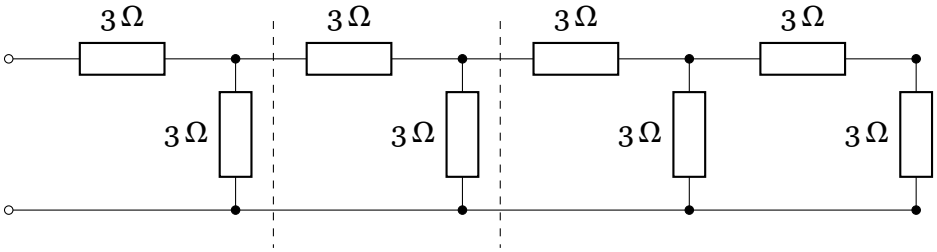
5. Five resistors having the same resistance, 100 Ω, are connected as shown in the circuit below. A battery of 12 V and negligible internal resistance is connected across the circuit.



   (a) By considering the arrangement of resistors, determine the potential difference between the points A and B.

   (b) Determine the current flowing through each of the resistors and the current through the battery.

6. A transmission line can be represented by a chain of resistors. Such a chain has elements which consist of two 3 Ω resistors. These elements are connected to form the chain as shown in the diagram.



   (a) Calculate the resistance between the terminals of such a chain which consists of:

      i. 2 elements only (i.e. 4 resistors);

      ii. 3 elements only (i.e. 6 resistors);

   (b) By calculating the resistance of an infinitely long chain of resistors, show that adding more elements to a chain which is already 3 elements long produces negligible change in resistance.