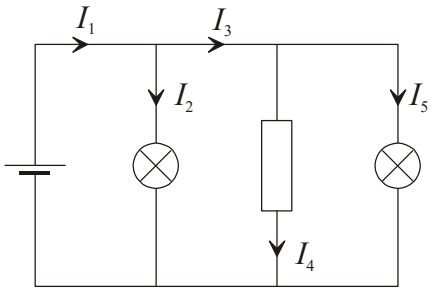
Current in circuits

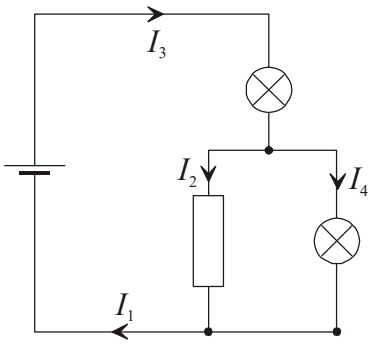
1. The two lamps in the circuit are identical.
$I_1 = 0.5\text{A}$, $I_2 = 0.2\text{A}$



   (a) What are the currents:
   (i) I_3,
   (ii) I_4,
   (iii) I_5?

   (b) How much charge passes through the battery in one second?

2. In this circuit, $I_1 = 0.25\text{A}$, $I_2 = 0.15\text{A}$

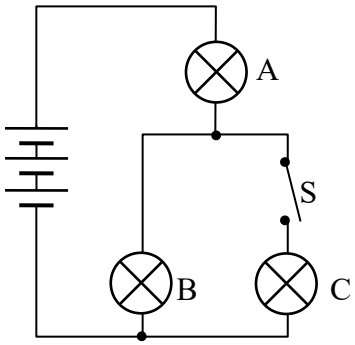


   (a) What are the currents:
   (i) I_3,
   (ii) I_4?

   (b) How much charge passes through the resistor in one minute?

   (c) What would be the current I_3 if the filament in the top lamp broke?

3. In this circuit the three lamps, A, B & C, are identical.
S is a switch.
Compare the brightness of lamps A, B & C (e.g. equal, brighter, dimmer, off):



   (a) with S open (off),

   (b) with S closed.

4. Draw a diagram of a circuit using two switches, a battery and a lamp, so that the bulb will light:

   (a) only if *both* switches are pressed,

   (b) if *either* switch is pressed (or both).

(1: 0.3A, 0.1A, 0.2A, 0.5C. 2: 0.25A, 0.1A, 9C, 0A.)