Current flows in the circuit from the + terminal of the battery to the - terminal.

Above, the wire B points to the right and below the wire to the left. 
Cones deflect to the left.

Below, the wire B points to the right. 
Some 130° deflection occurs at A.

\[ i = n Anu = n A u E \]
\[ E = \frac{i}{nAn} = \frac{1.5 \times 10^{18} \text{ e}^{-1/5}}{(6.3 \times 10^{-8} \text{ e}^{-7/3} \text{ m}^{-3})(1 \times 10^{-2} \text{ m}^2)(1.2 \times 10^{-7} \text{ m/s} \text{Vm}^{-1})} \]
\[ = 20 \text{ V/m} \]

direction follows filament (down most).

-5

(a) Current is to the left, so electrons flow to the right.

(b) Half of the electrons go through B1 and half through B2. So \( 1.5 \times 10^{18} \) electrons per second pass \( P_2 \).

(c) \( B_1 > B_2 = B_3 \). All current goes through \( B_1 \), but only half of current goes through \( B_2 \) and \( B_3 \).

\[ i = n Anu = n A u E \]
\[ E = \frac{i}{nAn} = \frac{3 \times 10^{18} \text{ electron/s}}{(6.3 \times 10^{-8} \text{ e}^{-7/3} \text{ m}^{-3})(1 \times 10^{-2} \text{ m}^2)(1.2 \times 10^{-7} \text{ m/s} \text{Vm}^{-1})} \]
\[ = 40 \text{ V/m} \]

direction follows current in filament, mostly to the left.