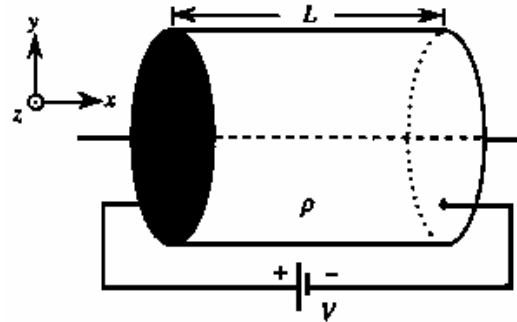


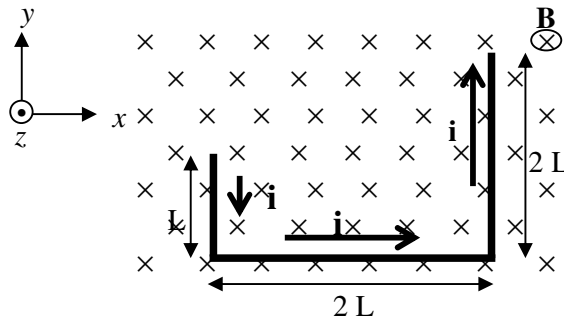


Q-1) A battery of V volts is connected across the ends of a cylindrical conductor of length L and resistivity ρ , as shown in Figure. The number of free electrons per unit volume of this conductor is n . In terms of these parameters, find the magnitude and direction (according to given axes) of:

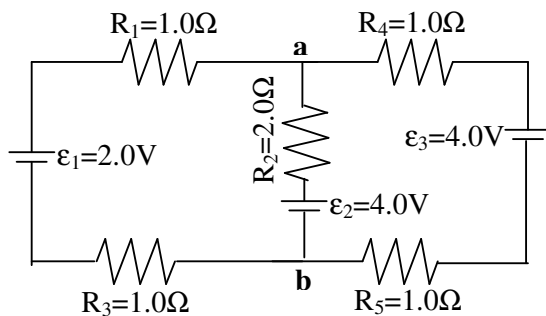


- the current density \mathbf{J} in the conductor
- the drift velocity \mathbf{v}_d of the free electrons in the conductor.

Q-2) A wire 5 meter long carries a current of 10 Amp. and consists of three segments as seen in figure. If this wire is placed in a uniform magnetic field of 0.5 Tesla perpendicular to the current, determine the magnitude and direction of the net force on the wire. ($L=1$ m)



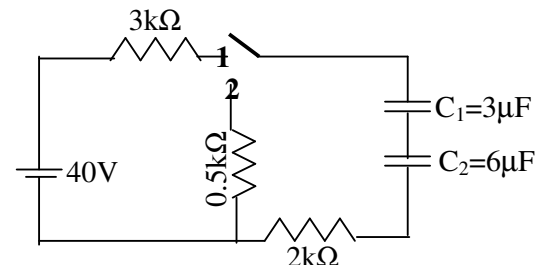
Q-3) For the given net work determine;



- the current passing through on each resistance,
- the potential difference between a and b (V_{ab})

Q-4) For a given RC circuit; calculate,

- the time constant (τ_1) in position 1.
- the V_{C1} and V_{C2} potential of capacitors at $t=20$ msec in position 1.
- the time constant (τ_2) in position 2.
- What can you say about the potentials of the capacitors when $t \geq 5\tau_2$ in position 2.



$1\mu=10^{-6}$ $1k=10^3$