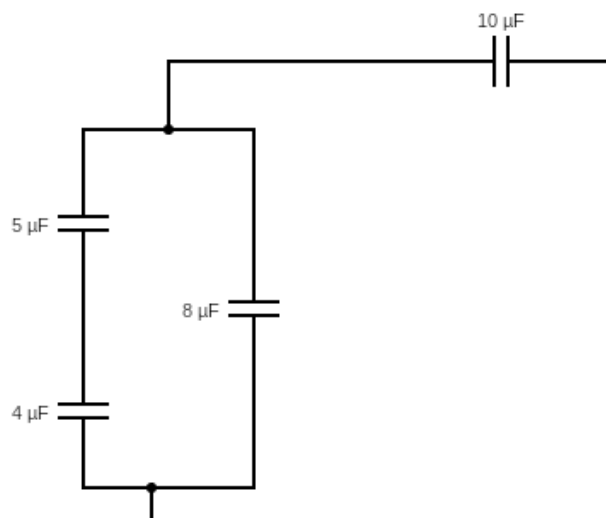


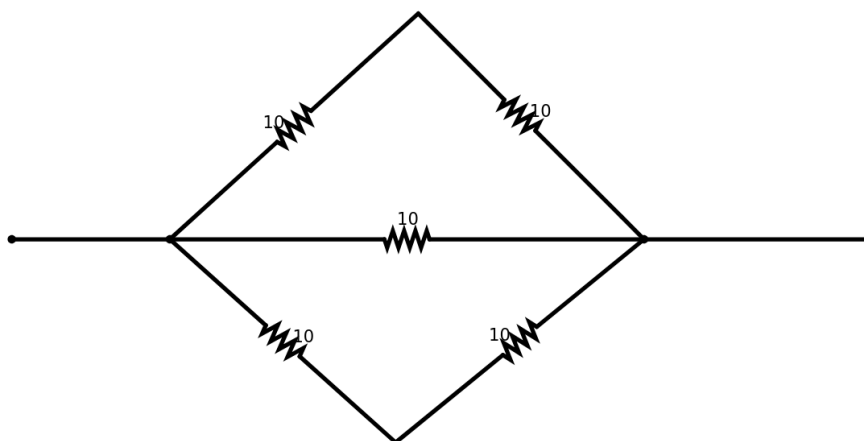
PHYS1120
Summer 2025

Show all work for credit!
Due Date: 25 July

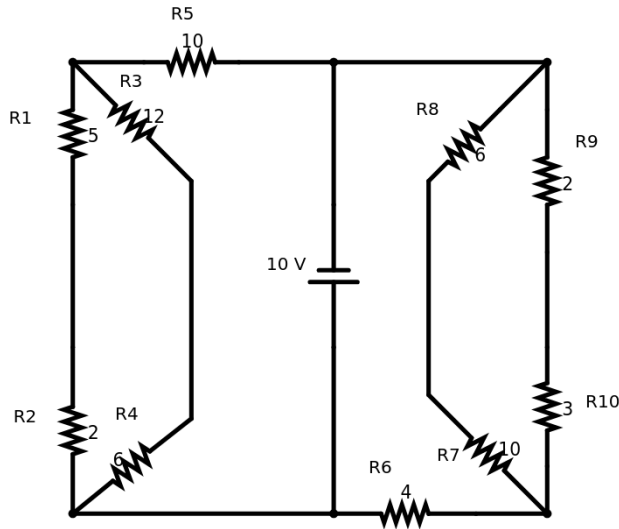
1. Find the equivalent capacitance for the circuit below.



2. 5 Amps of current flows through a gold wire, with diameter 5 mm. If gold has on average 1 free electron per gold atom, calculate the drift velocity of the electrons in this wire. Gold has an atomic weight of $196.97\ \text{g mol}^{-1}$ and density $19,283\ \text{kg m}^{-3}$.
3. Find the equivalent resistance for the circuit below.

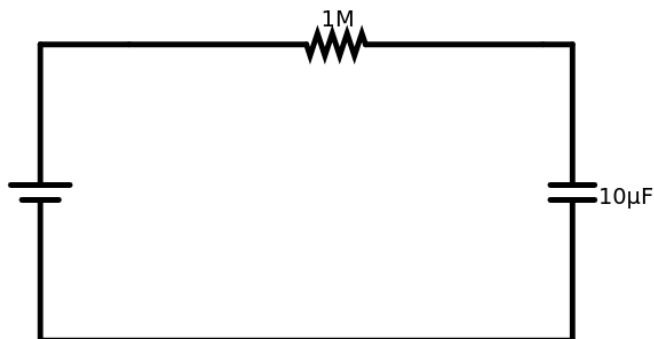


4. Find the current through each resistor.



5. The circuit for an RC circuit is shown below.

- Calculate the time constant τ for the RC circuit.
- How much time is needed to charge the capacitor to 99 % of its charge capacity?



Answer key: (1) $5.055 \mu \text{ F}$; (2) $2.70 \times 10^{-5} \text{ m s}^{-1}$; (3) 5Ω ; (4) $I_1 = I_2 = 0.479$, $I_3 = I_4 = 0.186$, $I_5 = 0.665$, $I_6 = 1.280$, $I_7 = I_8 = 0.305$, $I_9 = I_{10} = 0.976$; (5a) 10 s ; (5b) 46.1 s

How many hours (approximately) did it take you to complete this assignment?