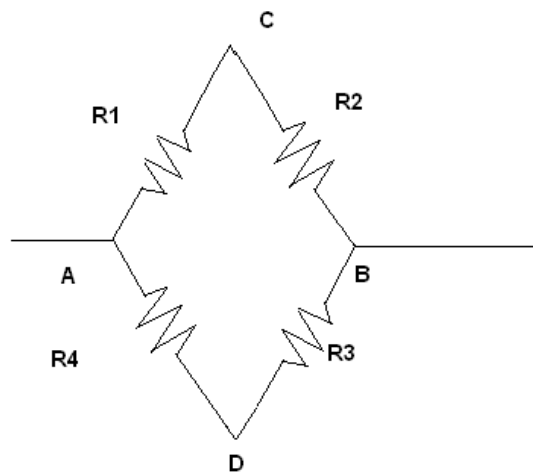
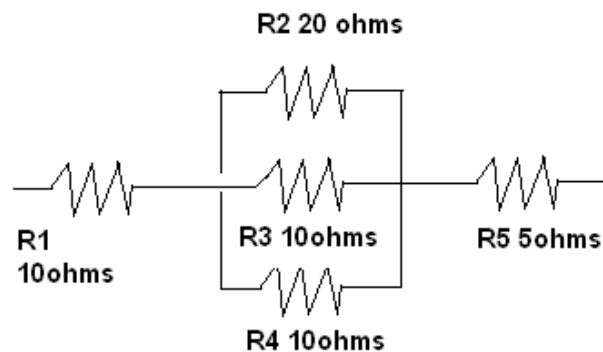


Exercises for the Falstad simulator

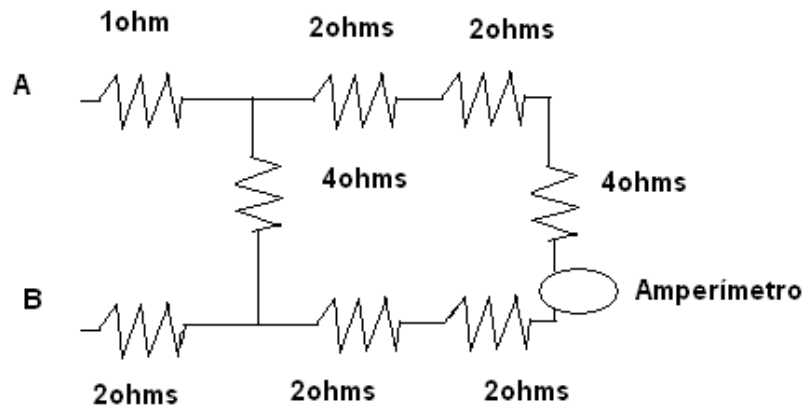
- The circuit shown in the figure contains four resistors R1, R2, R3 and R4. The values are as follows: R1 = 100 Ω ; R4 = 50 Ω . R3 is a variable resistor. R2 is a resistor whose value is unknown and which we wish to determine. When resistor R3 is 60 Ω , the ammeter connected between C and D does not show any current flowing through.
 - What is the voltage drop between C and D?
 - What is the value of R2?



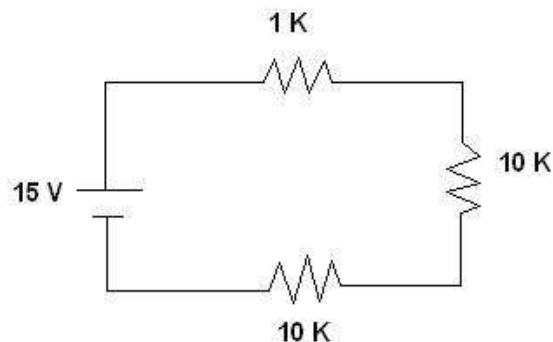
- We have a coil of copper wire and we wish to cut a piece that has a resistor of 1 Ω . What details are missing to enable us to carry out this operation? Calculate the characteristics of the conductor for the details provided.
- Three equal resistors of 5 Ω each are combined forming a triangle. A voltage drop of 15 V is applied between two of the sides of this triangle. What current does flow through each of the resistors?
- The voltage drop between the ends of resistor R1 shown in the figure is 50 V. Calculate:



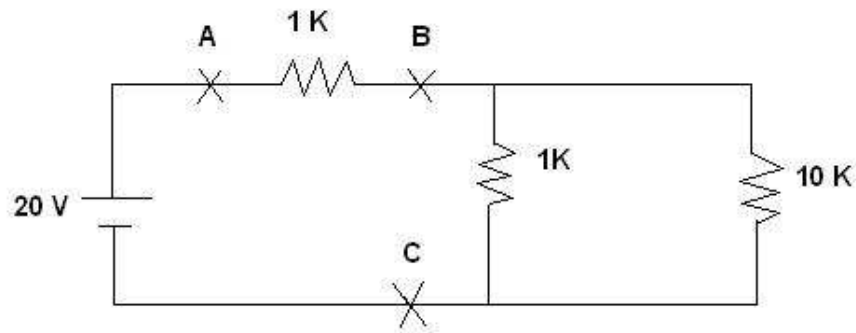
- a) The current through resistors R2, R3 and R4
 - b) The voltage drop on a resistor R2
5. Determine the equivalent resistor of the network in the following figure. What is the voltage drop between A and B if the ammeter shows 1 A?



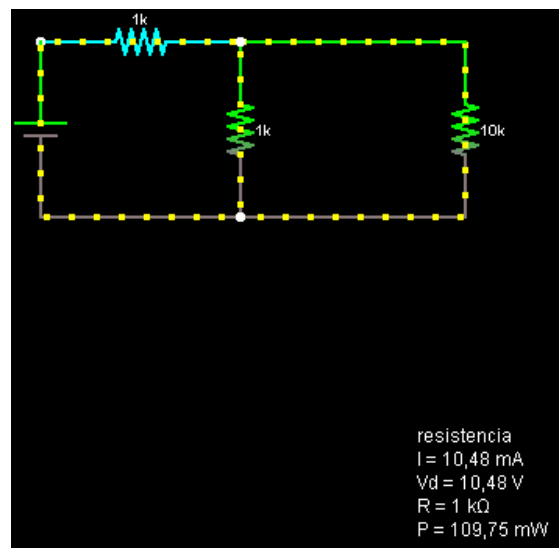
6. Two groups of lamps are assembled in series. Each group composes of six lamps that are the same and are connected in parallel. A voltage drop of 200 V is applied between the ends of the assembled circuit.
- Knowing that the resistor of each lamp is 180Ω , calculate:
- a) The voltage drop in each of them
 - b) The current that flows through each of them
 - c) If two lamps from each group are disconnected, what is now the current that flows through each of them?
7. Given the circuit shown in the figure:
- a) Measure the total resistor of the circuit
 - b) Do a *screen capture* for the circuit
 - c) Calculate the voltage drop of $1 \text{ K}\Omega$ resistor
 - d) Calculate the voltage drop of $10 \text{ K}\Omega$ resistor



8. Given the circuit shown in the figure:
- Measure the total resistor of the circuit
 - Do a *screen capture* for the circuit
 - Calculate the voltage drop between A and B (V_{ab})
 - Calculate the voltage drop between B and C (V_{bc})



This circuit is presented in Falstad in the below figure.



Other Exercises

- The needle of a very sensitive ammeter shows 10mA with the internal resistor $R_1 = 50 \Omega$.
 - What resistor R_2 needs to be connected to the device and in what way in order to transform it into an ammeter capable of measuring current up to 10 A?
 - And if we want to convert it into a voltmeter capable of measuring voltage of 100 V?

2. One ampere-hour (Ah) refers to the amount of electricity transmitted in 1 hour via a constant 1A electrical current. Calculate:
 - a) The Ah charge in Coulomb;
 - b) The charge transmitted via an electrical current of 100mA in 20 minutes (expressed in Ah)
3. A car battery has a 36 Ah capacity (the charge it can provide us when totally discharged). The motor starter is switched on for 2 sec to start a car. It is fed by a 90 A current. How many times could we activate motor starter without recharging the battery? (the battery may run out when its capacity goes below 5 Ah)