DC Power (52:01)

Identify how to calculate power in terms of energy and time. Identify units for energy and power.

Calculate the power necessary to accomplish a 20J over a span of 1s

Calculate the power necessary to accomplish a 20J over a span of 10s.

Identify how to calculate electrical power in terms of voltage and current. Identify how the units of V times units of A yields units of W.

Identify why low voltage and low current is characterized by low power.

Identify why high voltage and high current is characterized by high power.

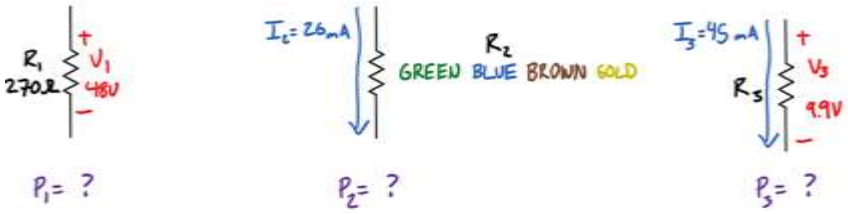
Given a 12V source and 60Ω resistor calculate the current and power supplied by the source and consumed by the load.

Describe how power input relates to power output

Identify how to calculate electrical power in terms of voltage and resistance.

Identify how to calculate electrical power in terms of resistance and current.

Solve for power. Check work using another permutation of Ohm's Law and the power equations.



Calculate current and power for a 240Ω resistor that experiences 0 to 24V in 2V increments. Draw a plot of current and power. Describe the shape of the power curve.

Algebraically manipulate $P = V^2/R$ to solve for R.

Algebraically manipulate $P = V^2/R$ to solve for V.

Algebraically manipulate $P = VI$ to solve for V.

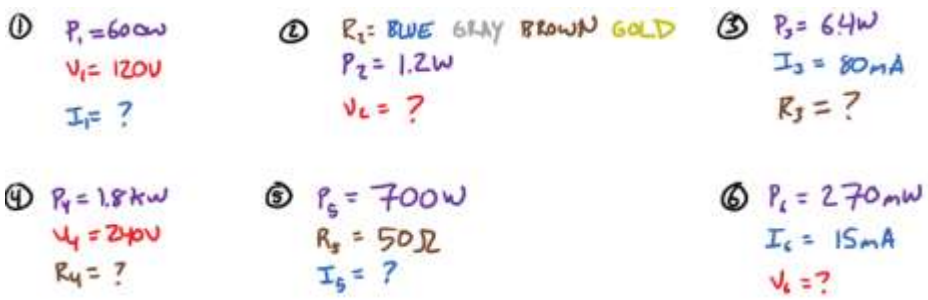
Algebraically manipulate $P = VI$ to solve for I.

Algebraically manipulate $P = I^2R$ to solve for I.

Algebraically manipulate $P = I^2R$ to solve for R.

Illustrate all 12 permutations of Ohm's Law and the power equations.

Given known values for each scenario, solve for the third unknown value using the most efficient and direct means possible. Check your work using use another algebraic permutation of Ohm's Law or the power equations.



Given a device that operates on 80V and draws 4A of current that runs for 12 hours a day, calculate how much energy in units of kWh it consumes.

Given a device known to consume 5kWh of energy from a 120V source after 8 hours of use, determine the power rating of the device and the anticipated amount of current draw.

Given a device modeled as a 120Ω resistor intended to operate using 60V determine the power rating of the device and how much energy the device uses over a span of 16 hours in units of kWh.

Given a device that draws 8A of current while accomplishing a 1.2kWh task over a 30 minute time span determine the power rating of the device and the supply voltage necessary to operate the device.

Calculate the efficiency of a 100W incandescent bulb that produces 5W of radiant power.

Calculate the efficiency of a 25W LED bulb that produces 5W of radiant power.

Calculate the energy consumed by a 100W incandescent bulb used 4 hours a day for a year. Calculate the cost if the price of energy is $0.12/kWh.

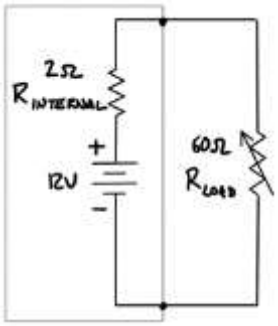
Calculate the energy consumed by a 25W LED bulb used 4 hours a day for a year. Calculate the cost if the price of energy is $0.12/kWh.

Calculate the current drawn by a 100W incandescent bulb from a 120V source.

Calculate the current drawn by a 25W LED bulb from a 120V source.

Discuss how reduced current affects system cost.

Given a battery with an internal resistance determine the power input, the power output, the losses, and efficiency of this system. Identify the working voltage of the battery in this present condition.



Given the load in the previous system changes to 20Ω determine the power input, the power output, the losses, and efficiency of the system. Identify the working voltage of the battery in this present condition. Discuss why efficiency decreased.

Given a 2MW generator operating at 700V determine the power losses, useable power output, and efficiency of this system given the transmission line is modeled as a 150mΩ resistor. Discuss why power is not transmitted in this fashion.

Describe a transformer. Identify why power is typically transmitted using AC rather than DC.

Given a 2MW generator operating at 35kV determine the power losses, useable power output, and efficiency of this system given the transmission line is modeled as a 150mΩ resistor.

Illustrate an IV curve of a solar panel at different illumination levels.

Define the term STC.

Identify the two properties that produce maximum power for a solar panel.

Calculate the power output of a solar panel at open circuit conditions.

Calculate the power output of a solar panel at short circuit conditions.

Illustrate a plot of power for a solar panel.

Describe a wattmeter.

Illustrate how to install a 4 terminal wattmeter.

Illustrate how to install a 3 terminal wattmeter.