

Ch 6 HW: Written; Chapter Test C Wks
Sec 6.3A

obj: How can we calculate electrical power?

Electrical Power

- Power is the rate @ which work is done.
- Electrical Power is the rate @ which electrical energy is changed into a different form of energy.
- * Unit for Power + Electrical Power is the Watt.
- * $1000\text{ W} = 1\text{ kW}$
- * One watt of Power means 1 joule of energy each second.

- A 100 watt Lightbulb changes 100 J of electrical Energy to Light for each second the Light bulb is on. (Power Rating)
- The electrical power in a circuit depends on the Voltage and Current in the circuit.

$$P = VI$$

- * An open circuit does not have electrical power.

2.0 Amps of current flows through a 25 Volt circuit. What is the power in the circuit?

Known

$$I = 2.0 \text{ Amps}$$

$$V = 25 \text{ Volt}$$

$$\begin{aligned} P &= VI \\ &= 25V (2.0A) \\ &= 50W \end{aligned}$$

Unknown

$$P = ?$$

Electrical Energy

- The total energy that is changed while the circuit is closed.
- The Electrical Energy is directly related to the Electrical Power and the time the circuit is closed.

$$E = Pt$$

* Power must be in kilowatts (kw) and time must be in hours.

* The unit for Electrical Energy is the Kilowatt-hour. (kWh)

A 400 watt oven cooks a Turkey for 5 hours. How much electrical energy was used by the oven?

Known

$$P = 400 \text{ watts}$$

$$t = 5 \text{ hrs}$$

Unknown

$$E = ?$$

$$E = Pt$$

$$= .4 \text{ kW} (5 \text{ h})$$

$$= \underline{2.0 \text{ kWh}}$$

$$\frac{400 \cancel{\text{W}}}{1000 \cancel{\text{W}}} = .4 \text{ kW}$$