Question #78815, Engineering / Mechanical Engineering

Power in a dc circuit is calculated as the product of current and voltage if the value of current and voltage are given by 6.3A and 110.2V and the uncertainties involved in their measurement being 0.06A and 0.1V .Calculate the power dissipated by the loads and the uncertainty involved in measurement.

Solution

The power dissipated by the loads:

$$P = UI = (6.3)(110.2) = 690\ W.$$

$$\frac{\Delta P}{P} = \frac{\Delta U}{U} + \frac{\Delta I}{I} = \frac{0.1}{(6.3)} + \frac{0.06}{(110.2)} = 0.0164$$

The uncertainty involved in measurement:

$$\Delta P = P\left(\frac{\Delta P}{P}\right) = (6.3)(110.2)(0.0164) = 10\ W.$$