

### Chapter 5, Solution 85.

In the op amp circuit of Fig. 5.104, find the value of  $R$  so that the power absorbed by the  $10\text{-k}\Omega$  resistor is  $10\text{ mW}$ . Take  $v_s = 2\text{ V}$ .

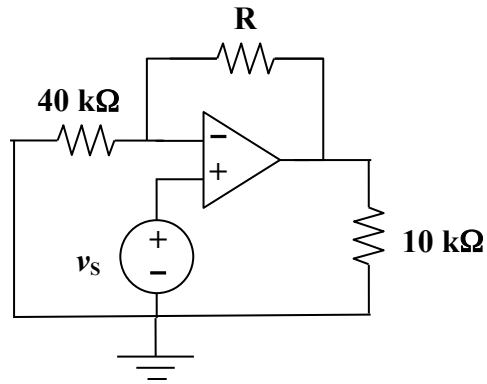


Figure 5.104  
For Prob. 5.85.

### Solution

This is a noninverting amplifier.

$$v_o = (1 + R/40\text{k})v_s = (1 + R/40\text{k})2$$

The power being delivered to the  $10\text{-k}\Omega$  give us

$$P = 10\text{ mW} = (v_o)^2/10\text{k} \text{ or } v_o = \sqrt{10^{-2} \times 10^4} = 10\text{ V}$$

Returning to our first equation we get

$$10 = (1 + R/40\text{k})2 \text{ or } R/40\text{k} = 5 - 1 = 4$$

Thus,  $R = 160\text{ k}\Omega$ .