

solution

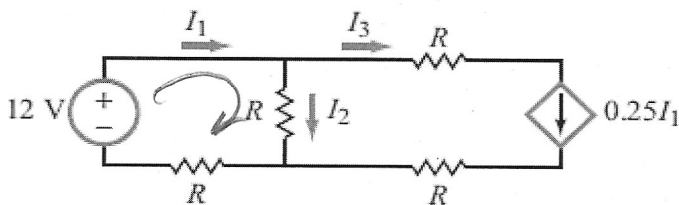
EE101 Quiz#2, January 22, 2019

Name _____

Student ID No _____

This quiz problem is from HW#2 assignments (Prob. 2.28)

(A). (5 points) Determine I_2 in the circuit below when the 12V voltage source generates 48W of power.



$$I_1 = \frac{48W}{12V} = 4 [A]$$

$$I_3 = 0.25 I_1 = 0.25 \times 4 = 1 [A]$$

$$I_2 = I_1 - I_3 = 4 - 1 = 3 [A]$$

ans

To find R, consider the first loop.

$$-12 + R I_2 + R I_1 = -12 + R \times 3 + R \times 4 = 0$$

$$\Rightarrow R = \frac{12}{7} [\Omega]$$

(B). (5 points) Determine the "total power consumed" in this circuit- Please show how you got this value.

$$\text{Power consumed} = R I_2^2 + R I_1^2 + R I_3^2 + R I_3^2$$

$$+ 0.25 I_1 (V_{dep} \text{ voltage across dependent source})$$

$$V_{dep} = ?$$

$$R I_2 = R I_3 + V_{dep} + R I_3$$

$$3R = R + V_{dep} + R$$

$$V_{dep} = R \cdot 1 = \frac{12}{7} [V] > 0$$

$$\text{Power Consumed} = \frac{12}{7} (3^2) + \frac{12}{7} (4)^2 + 2 \times \frac{12}{7} (1) + \frac{12}{7} (1)$$

$$= \frac{12}{7} (9 + 16 + 2 + 1) = \frac{12 \times 28}{7} = 48 W$$

ans