

3-35ac. Determine the resistance, tolerance and reliability?

a. Brown Green Yellow Silver

$$15 \times 10^4 \pm 10\% = \boxed{150k\Omega \pm 15k\Omega}$$

c. Yellow Violet Blue Gold

$$47 \times 10^6 \pm 5\% = \boxed{47M\Omega \pm 2.35M\Omega}$$

3-36bc. Determine the color codes required if you need the following resistors.

b. $820\Omega \pm 10\%$

Gray, Red, Brown, Silver

c. $15\Omega \pm 20\%$

Brown, Green, Black

4-2a. Determine R for each of the following.

a. $E = 50V$, $I = 2.5 A$

$$R = \frac{E}{I} = \frac{50V}{2.5A} = \boxed{20\Omega}$$

4-4. A 48 Ohm hot water heater is connected to a 120V source. What is its resistance?

$$I = \frac{E}{R} = \frac{120V}{48\Omega} = \boxed{2.5A}$$

4-8. A relay with a coil resistance of 240 Ohms requires a minimum of 50mA to operate. What is the minimum voltage that will cause it to operate?

$$V = IR = (.05A)240\Omega = \boxed{12V}$$

4.17. A resistive circuit element is made from 100m of 0.5mm diameter aluminum wire. If the current at 20 degrees Celsius is 200mA, what is the applied voltage?

$$\rho = 2.825 \times 10^{-8} \Omega m \quad (\text{Table 3-1})$$

$$A = \pi r^2 = \pi \left(\frac{.5 \times 10^{-3}}{2} \right)^2 = 196.3 \text{ nm}^2$$

$$R = \frac{\rho \ell}{A} = \frac{(2.825 \times 10^{-9})100}{196.3 \times 10^{-9}} = 14.4 \Omega$$

$$V = IR = (.2A)14.4\Omega = \boxed{2.88V}$$