10750252O 王二A 共6張

Electronic Circuits Homework 1

1. Figure 1 show color-coded resistors. Determine the resistance value and the tolerance of each. (2-15)

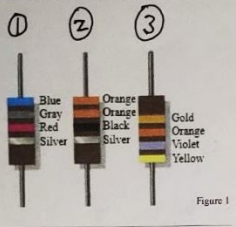
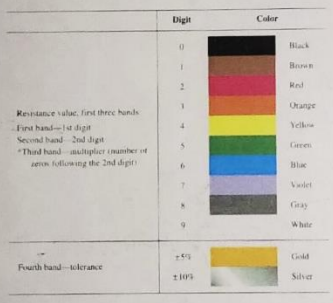


Figure 1



① $6800 \pm 680\,\Omega$ ($6.8k\Omega \pm 10\%$)

② $33 \pm 3.3\,\Omega$ ($33\Omega \pm 10\%$)

③ $47000 \pm 2350\,\Omega$ ($47k\Omega \pm 5\%$)

2. In Figure 2 what does each voltmeter indicate when the switch (SW) is in position 1? In position 2? (2-29)

position	
①	V1: 0 (V) V2: V_s (V)
②	V1: V_s (V) V2: 0 (V)

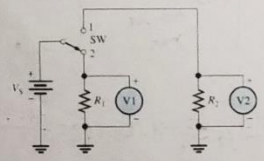


Figure 2

3. There is only one circuit in Figure 3 in which it is possible to have all lamps on at the same time. Determine which circuit it is. (2-39)

(b)

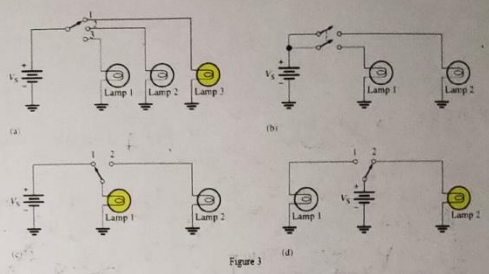


Figure 3

4. A resistor is connected across the terminals of a dc voltage source in each part of Figure 4. Determine the current in each resistor. (3-7)

$I = \frac{V}{R} = 0.0025\,(A)$ $I = \frac{V}{R} \doteq 0.000002\,(A)$ $I = \frac{V}{R} \doteq 0.008\,(A)$

Figure 4

R: $10000\,\Omega$ ($\pm 5\%$) R: $2200000\,\Omega$ ($\pm 5\%$) R: $1800\,\Omega$ ($\pm 5\%$)

V: 25 V: 5 V: 15

5. Choose the correct value of resistance to get the current values indicated in each circuit of Figure 5. (3-17)

$R = \frac{V}{I} = 4\,(\Omega)$ $R = \frac{V}{I} = \frac{12}{0.004} = 3000\,(\Omega)$ $R = \frac{V}{I} = \frac{30}{0.00015} = 200000\,(\Omega)$

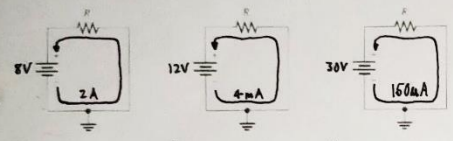


Figure 5

6. Calculate the power dissipated by a 10 kΩ resistor carrying 100 μA. (3-32)

$P = I^2R = (0.0001)^2 \cdot 10000 = 0.0001\,(W)$

7. If there are 60 V across a 620 Ω resistor, what is the power dissipation? (3-33)

$P = \frac{V^2}{R} = \frac{60^2}{620} \doteq 5.8\,(W)$

8. Figure 6 is a graph of current versus voltage for three resistance values. Determine R_1, R_2, and R_3. (3-57)

$R = \frac{V}{I}$

$R_1 = \frac{1}{2} = 0.5\,\Omega$

$R_2 = \frac{1}{1} = 1\,\Omega$

$R_3 = \frac{2}{1} = 2\,\Omega$

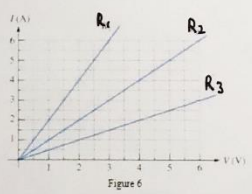


Figure 6

9. If a 300 W bulb is allowed to burn continuously for 30 days, how many kilowatt-hours of energy does it use? (3-61)

$\frac{300}{1000} \cdot (30 \cdot 24) = 216\,(kWh)$

10. The rheostat in Figure 7 is used to control the current to a heating element. When the rheostat is adjusted to a value of 8 Ω or less, the heating element can burn out. What is the rated value of the fuse needed to protect the circuit if the voltage across the heating element at the point of maximum current is 100 V? (3-65)

Voltage rating:

Should grater or equal than maximum voltage in the whole circuit: 120V

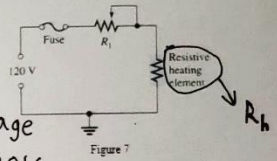


Figure 7

Current rating:

At the point of maximum current:

$V = IR$

for whole circuit: $120 = I_{max} \cdot (8 + R_h)$

for the element: $100 = I_{max} \cdot R_h$

$\Rightarrow \begin{cases} I_{max} = 2.5\,(A) \\ R_h = 40\,(\Omega) \end{cases}$

So the Current rating of the fuse should be 2.5(A)