

Question 7.

1. Using series equivalent resistance we have

$$30\Omega + 10\Omega = 40\Omega$$

Then we use parallel equivalent resistance

$$\frac{1}{R_p} = \frac{1}{40} + \frac{1}{10}$$

$$R_p = \frac{1}{0.05} = 20\Omega$$

and again using series equivalent resistance

$$20\Omega + 35\Omega = \textcircled{55\Omega}$$

2. Ohm's law $\Rightarrow V = IR$

$$I = \frac{V}{R} = \frac{10}{55} = \textcircled{0.182A}$$

$$3. \text{ Voltage-drop} = 35 \times 0.182 = \textcircled{6.37V}$$

$$4. V_A = 10 - V_{35} = \cancel{10} - 6.37 = \textcircled{3.63V}$$

$$5. V = IR \Rightarrow I_2 = \frac{V}{R} = \frac{3.63}{40} = \textcircled{0.091A}$$

$$6. \text{ Voltage drop across } 30\Omega \Rightarrow I_{xR} = 0.091 \times 30 = 2.73V$$

$$\text{Voltage drop across } 10\Omega \Rightarrow I_{xn} = 0.091 \times 10 = 0.91V$$

$$\text{checks out} \Rightarrow 2.73 + 0.91 = 3.64V \checkmark$$

$$7. I_1 = I_2 + I_3 \Rightarrow I_3 = I_1 - I_2 = 0.182 - 0.091 = \textcircled{0.091A}$$

$$8. V = IR \Rightarrow 0.091 \times 40\Omega = \textcircled{3.64V} \rightarrow \underline{\text{same as step 4}}$$

Question 9:

1. total resistance when $R_L = 33\Omega \Rightarrow$

$$5 + 2 + 33 = 40$$

$$I_L = \frac{1000}{40\Omega} = 25A.$$

2. Voltage across $R_L = I_L \times R_L$

$$= 25 \times 33 \\ = 825V$$