Handout One

The “Tool Kit” for solving series circuit problems:



Summary of the step-by-step method of problem solving:

1. Write down what the problem is asking for.

2. Write the formula(s) needed to solve for the value(s) that will solve the problem from step one.

3. If the values needed for the formula are given, plug them into the equation and solve. If the values needed are not given, use one of the above “tools” to find a formula to give what is needed.

4. Repeat step three as necessary until you are finally able to calculate a value that leads to a solution. This process results in a sequence of problems that need to be solved in order.

5. Once you are able to solve for a value, plug that value into the previously developed formula.

6. Work your way back through the steps of the process developed in steps three and four writing down each formula and solution.

7. Highlight or circle the answer to the problem from step one.

Handout Two – Circuit Example Two



Solve for the voltage drops across R1 and R2

1. Write the equations for VR1 and VR2

VR1 = I1 • R1 VR2 = I2 • R2

2. To use these equations to solve for voltage we need current. Write the equation for current

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

$^{V}/\_{R}$

3. Looking for known values in this equation, we have VT, we need RT

RT = R1 + R2 = 200 Ω + 600 Ω = 800 Ω

4. Substitute this into the formula from step two



IT = I1 = I2 = 15 mA

5. Now solve for voltage drops from step one

VR1 = I1 • R1 = 15 mA • 200 Ω = 3 V

VR2 = I2 • R2 = 15 mA • 600 Ω = 9 V

Handout Three – Sample problems with two resistors

VS

R1

R2

1. VS = 16 V, R1 = 330 Ω, R2 = 470 Ω Solve for IT.
2. b. Solve the above problem for V1 and V2

2. VS = 15 V, R1 = 2.7 kΩ, R2 = 6 kΩ Solve for IT.

2 b. Solve the above problem for V1 and V2

3. VS = 9 V, R1 = 15 kΩ, R2 = 8.6 kΩ Solve for IT.

3 b. Solve the above problem for V1 and V2

4. VS = 72.4 V, R1 = 631.41 k, R2 = 1.42 M. Solve for IT.

4 b. Solve the above problem for V1 and V2

5. IT = 25 mA, R1 = 2 kΩ, R2 = 3 kΩ Solve for Vs

6. IT = 3.33 mA, R1 = 2.7 kΩ, R2 = 1.5 kΩ Solve for Vs

7. IT = 5.2 mA, R1 = 1.2 kΩ, R2 = 3.5 kΩ Solve for Vs

8. VS = 5 V, R1 = 2.8 kΩ, V1 =1.8 V Solve for R2

9. VS = 12 V, R1 = 6.8 kΩ, V1 = 8 V Solve for R2

10. V1 = 9 V, R1 = 3.3 kΩ, V2 = 7.2 V Solve for R2 and VS

11. VS = 22 V, R1 = 5.6 kΩ, V2 = 7.2 V Solve for R2

12. VS = 20 V, R1 = 15 kΩ, V2 = 7.2 V Solve for R2

13. V1 = 16.2 V, R1 = 4.7 kΩ, V2 = 7.2 V Solve for R2 and VS

Handout Four – Sample problems with three resistors



1. VS = 15 V, R1 = 330 Ω, R2 = 470 Ω R3 = 250 Ω Solve for V1 , V2 and V3

2. VS = 15 V, R1 = 2.7 kΩ, R2 = 4.5 kΩ R3 = 6.2 kΩ Solve for V1 , V2, and V3

3. VS = 9 V, R1 = 1.5 MΩ, R2 = 860 kΩ R3 = 660 kΩ Solve for V1, V2,  and V3

4. IT = 8 mA, R1 = 1.2 kΩ, R2 = 3.3 kΩ, R3 = 2 kΩ Solve for Vs

5. IT = 3.16 µA, R1 = 2.7 MΩ, R2 = 1.5 MΩ R3 = 860 kΩ Solve for Vs

6. VS = 20 V, R1 = 15 kΩ, V2 = 6.4 V, V3 = 7.8 V Solve for IT

7. VS = 12 V, R1 = 6.8 kΩ, V2= 4 V, V3 = 5.4 V Solve for I2

8. V1 = 9 V, R1 = 3 kΩ, V2 = 7.2 V, V3 = 5.8 V Solve for R2 and R3

9. VS = 22 V, R1 = 5.6 kΩ, V2 = 7.2 V , R3 = 8.4 kΩ, Solve for R2

10. VS = 5 V, R1 = 4.8 kΩ, V1 =1.6 V, R3 = 6.4 kΩ, Solve for R2

11. V1 = 7.2 V, R1 = 4.6 kΩ, V2 = 2.8 V, V3 = 1.2 V, Solve for R2 and R3

12. RT = 900 Ω, P1 = 48 mW, I1 = 20 mA, R2 = 100 Ω, Solve for R3 and P3