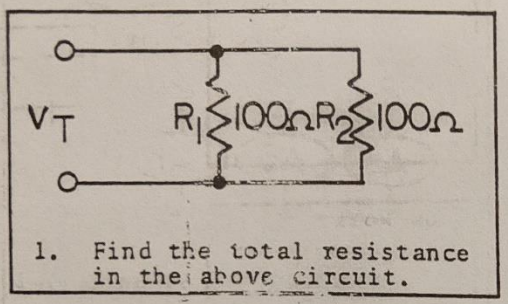
Cayce Beames
Sept 29, 2019
MECH-0010
Professor Gillette

WORKSHEET

PARALLEL CIRCUIT ANALYSIS #1

Solve the following circuit problems. Be certain to show work, and record your answer in the answer box.



1. Find the total resistance in the above circuit.

Show work

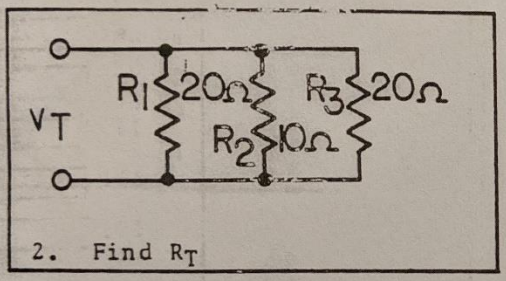
$R_T = \frac{100 \times 100}{100+100}$

$= \frac{10000}{200}$

$= \frac{100}{2}$

$= 50\Omega$

1. 50Ω



2. Find R_T

Show work

$R_T = \frac{1}{\frac{1}{20}+\frac{1}{10}+\frac{1}{20}}$

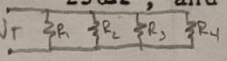
$= \frac{1}{\frac{1}{20}+\frac{2}{20}+\frac{1}{20}}$

$= \frac{1}{\frac{4}{20}} = \frac{1}{\frac{1}{5}}$

$= \frac{1}{1} \cdot \frac{5}{1} = 5\Omega$

2. 5Ω

3A. Draw a parallel circuit which contains the following resistors 100Ω, 200Ω, 250Ω, and 1000Ω.



$R_1 = 100\Omega$
$R_2 = 200\Omega$
$R_3 = 250\Omega$
$R_4 = 1K\Omega$

3B. Find the total resistance of the circuit.

Show work

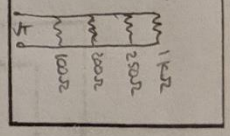
$R_T = \frac{1}{\frac{1}{100}+\frac{1}{200}+\frac{1}{250}+\frac{1}{1000}}$

$= \frac{1}{\frac{10}{1000}+\frac{5}{1000}+\frac{4}{1000}+\frac{1}{1000}}$

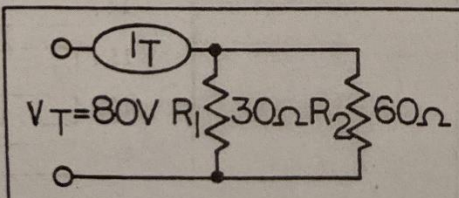
$= \frac{1}{\frac{20}{1000}}$

$= \frac{1}{1} \cdot \frac{1000}{20} = 50\Omega$

3A. SCHEMATIC



3B. 50Ω



4. Find R_T
5. Find I_T

Show work

$R_T = \frac{30 \times 60}{30+60}$

$= \frac{1800}{90} = 20\Omega$

$I_T = \frac{80V}{20\Omega}$

$= 4A$

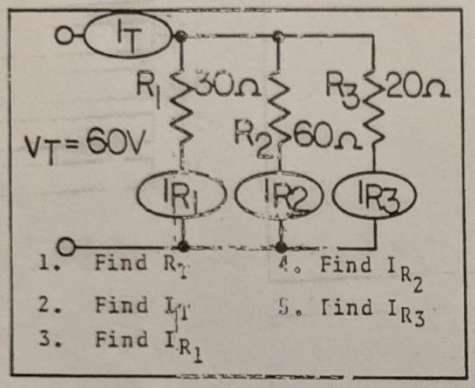
4. 20Ω
5. 4A

Cayce Beames
Sept 29, 2019
MECH-2010
Professor Gillette

WORKSHEET

PARALLEL CIRCUIT ANALYSIS #2

Solve the following circuit problems. Be certain to show work, and record your answer in the answer box.



1. Find R_T
2. Find I_T
3. Find I_{R_1}
4. Find I_{R_2}
5. Find I_{R_3}

Show work

$R_T = \frac{1}{\frac{1}{30} + \frac{1}{60} + \frac{1}{20}}$

$= \frac{1}{\frac{2}{60} + \frac{1}{60} + \frac{3}{20}}$

$= \frac{1}{\frac{6}{60}} = \frac{1}{\frac{1}{10}}$

$= \frac{1}{1} \cdot \frac{10}{1} = \boxed{10\Omega}$

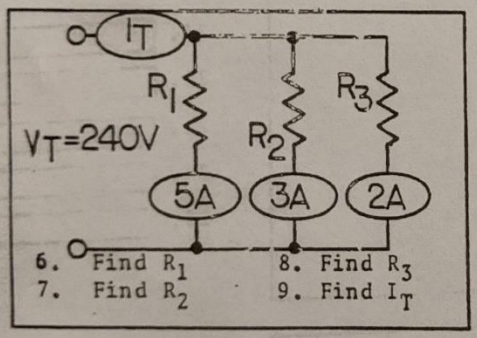
$I_T = \frac{60V}{10\Omega} = \boxed{6A}$

$I_{R_1} = \frac{60V}{30\Omega} = \boxed{2A}$

$I_{R_2} = \frac{60V}{60\Omega} = \boxed{1A}$

$I_{R_3} = \frac{60V}{20\Omega} = \boxed{3A}$

1. 10Ω
2. 6A
3. 2A
4. 1A
5. 3A



6. Find R_1
7. Find R_2
8. Find R_3
9. Find I_T

Show work

$R_1 = \frac{240V}{5A} = \boxed{48\Omega}$

$R_2 = \frac{240V}{3A} = \boxed{80\Omega}$

$R_3 = \frac{240V}{2A} = \boxed{120\Omega}$

$R_T = \frac{1}{\frac{1}{48} + \frac{1}{80} + \frac{1}{120}}$

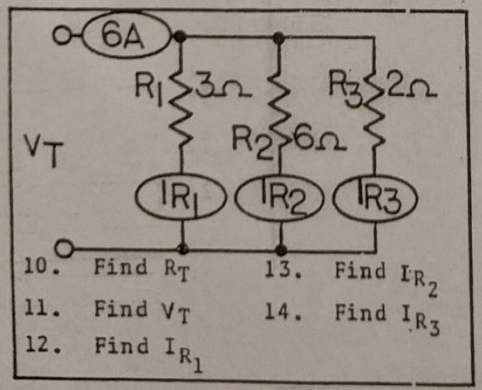
$= \frac{1}{\frac{5}{240} + \frac{3}{240} + \frac{2}{240}}$

$= \frac{1}{\frac{10}{240}} = \frac{1}{1} \cdot \frac{24}{1}$

$= \boxed{24\Omega}$

$I_T = \frac{240V}{24\Omega} = \boxed{10A}$

6. 48Ω
7. 80Ω
8. 120Ω
9. 10A



10. Find R_T
11. Find V_T
12. Find I_{R_1}
13. Find I_{R_2}
14. Find I_{R_3}

Show work

$R_T = \frac{1}{\frac{1}{3} + \frac{1}{6} + \frac{1}{2}}$

$= \frac{1}{\frac{2}{6} + \frac{1}{6} + \frac{3}{6}}$

$= \frac{1}{\frac{6}{6}} = \frac{1}{1} \cdot 1 = \boxed{1\Omega}$

$V_T = 6A \cdot 1\Omega = \boxed{6V}$

$I_{R_1} = \frac{6V}{3\Omega} = \boxed{2A}$

$I_{R_2} = \frac{6V}{6\Omega} = \boxed{1A}$

$I_{R_3} = \frac{6V}{2\Omega} = \boxed{3A}$

10. 1Ω
11. 6V
12. 2A
13. 1A
14. 3A