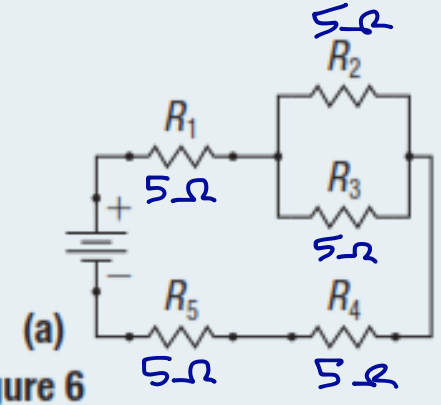
Resistance and Circuit analysis

EQUIVALENT RESISTANCE IN MIXED CIRCUITS

Practice

1. What is the total resistance of the mixed circuits shown in **Figure 6**? Note that each resistor has resistance 5.0 Ω. T/I [ans: (a) 17.5 Ω; (b) 6.3 Ω]



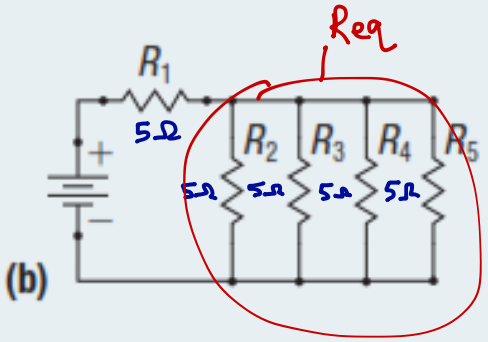


Figure 6

$R_T = R_1 + R_{eq} + R_4 + R_5$

$= 5\Omega + \frac{5}{2}\Omega + 5\Omega + 5\Omega$

$R_T = 17.5\Omega$

$R_T = R_1 + R_{eq}$

$= 5\Omega + \frac{5\Omega}{4}$

$= 5\Omega + 1.25\Omega$

$R_T = 6.25\Omega$

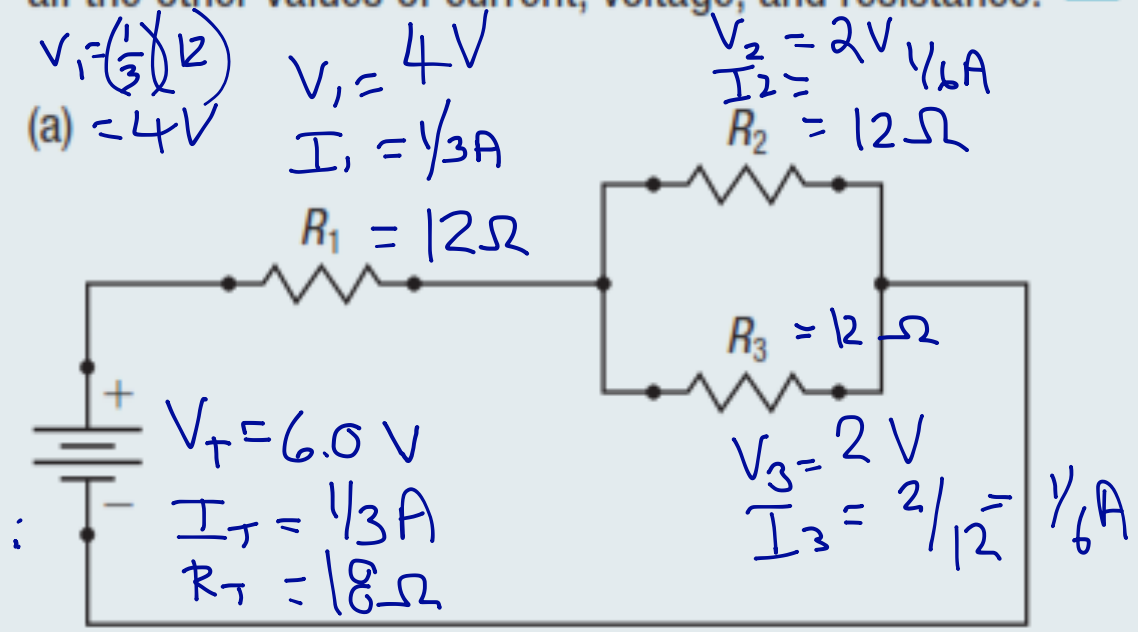
Circuit analysis

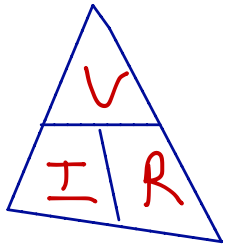
- To analyse a circuit means to find all the unknown values of voltage, current, and resistance.

- Use a combination of equivalent resistance, Kirchoff's laws, and Ohm's Law.

Circuit analysis Example

1. For each of the circuit diagrams below, the source has a voltage of 6.0 V. Each resistor has resistance 12.0 Ω. Find all the other values of current, voltage, and resistance. T/I





	V	I	R
1	4V	1/3A	12Ω
2	2V	1/6A	12Ω
3	2V	1/6A	12Ω
T	6.0V	1/3A = 0.33A	18Ω

$R_T = R_1 + R_{eq}$
$= 12\Omega + 12/2$
$= 18\Omega$

$I_T = \frac{V_T}{R_T}$
$= 6/18 = 0.33A$

Work

- Read 7.4 and 7.6
- Pg. 337 # 1,2
- Pg. 339 # 4,6 — Yesterday
- Pg. 340 #7 → Yesterday
- Pg. 342 #9 → $\frac{1}{R_{eq}} = \frac{1}{R_2} + \frac{1}{R_3}$