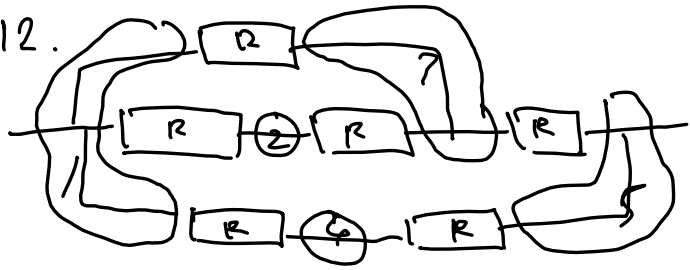
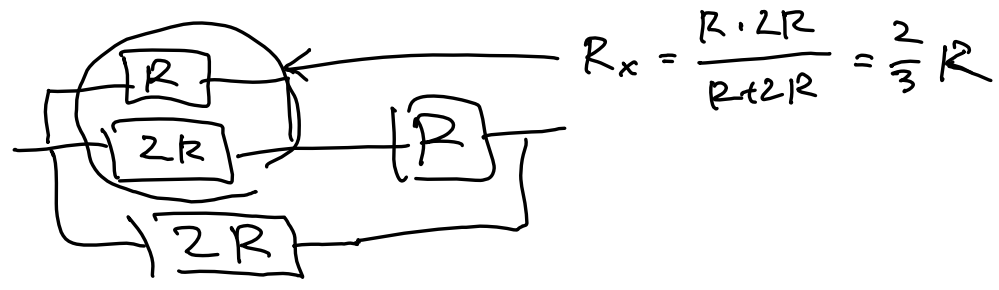


12.

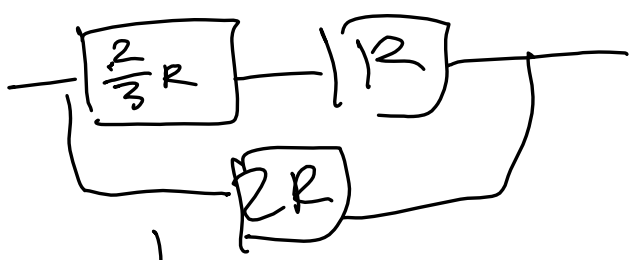


a) # nodes: 5

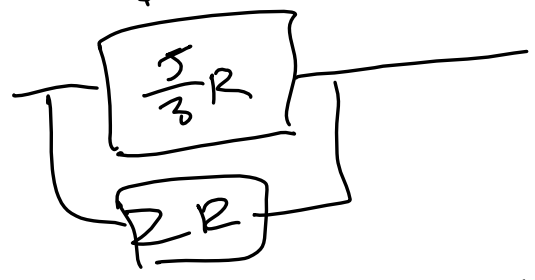
b) find R_T if $R = 22k\Omega$



↓



↓



↓

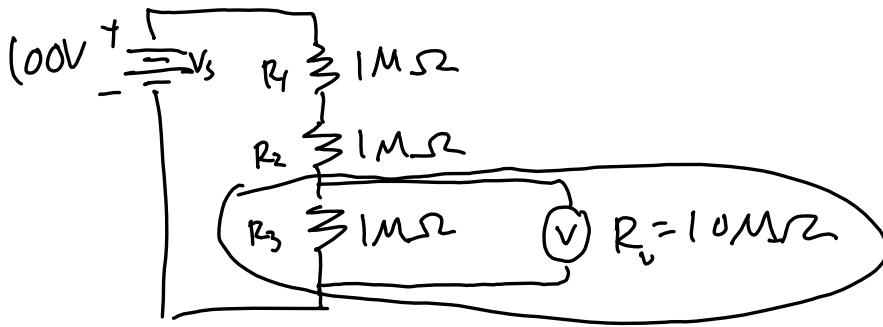


$$R_T = \frac{\frac{5}{3}R \cdot 2R}{\frac{5}{3}R + 2R}$$

$$= \frac{10}{11} R$$

$$= \frac{10}{11} \cdot 22k\Omega = \boxed{20k\Omega}$$

14.



ideal: $R_v = \infty \Omega \rightarrow V_{R_3} = \frac{1}{3} \cdot 100\text{V} = \underline{\underline{33.3\text{V}}}$

real: $R_v = 10\text{M}\Omega$

$$R_{\text{load}} = \frac{1\text{M}\Omega \cdot 10\text{M}\Omega}{11\text{M}\Omega} = \frac{10}{11}\text{M}\Omega$$

$$V_{\text{load}} = V_s \cdot \frac{R_{\text{load}}}{R_{\text{total}}} = 100\text{V} \cdot \left(\frac{10}{11}\text{M}\Omega\right) \left(2 + \frac{10}{11}\text{M}\Omega\right)^{-1}$$

$\frac{32}{11}$

$$= 100\text{V} \cdot \frac{10}{11}\text{M}\Omega \cdot \frac{1}{32\text{M}\Omega}$$

$$= \frac{1000}{32}\text{V} = \boxed{31.25\text{V}}$$

>2V difference!