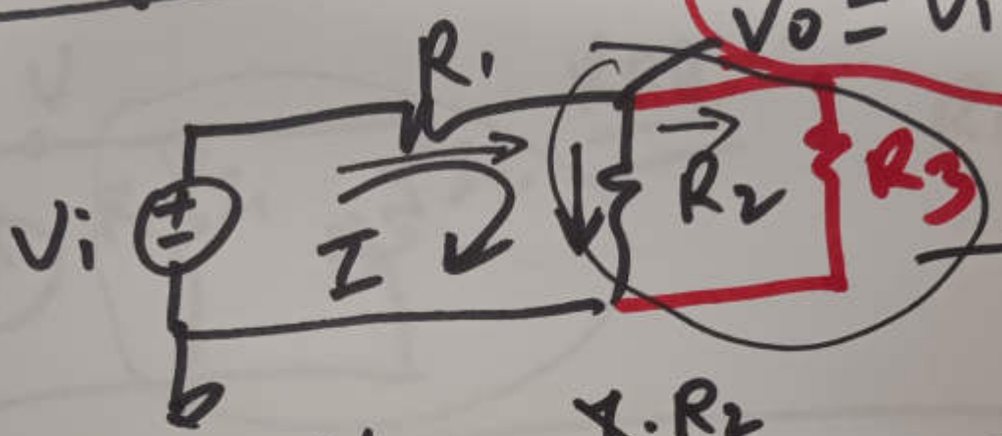
① Voltage divider

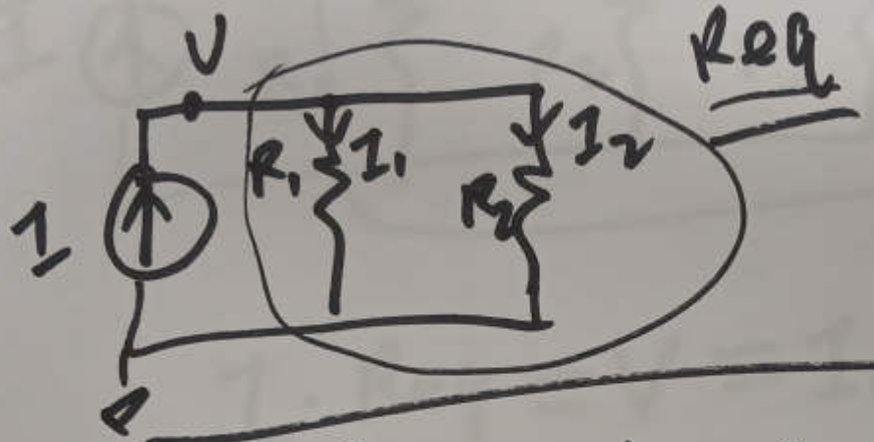
$$V_o = V_i \frac{R_2}{R_1+R_2}$$



$$\frac{V_o}{V_i} = \frac{I \cdot R_2}{I \cdot (R_1+R_2)} = \frac{R_2}{R_1+R_2}$$

$$V_o = V_i \cdot \frac{R_2 \| R_3}{R_1 + R_2 \| R_3}$$

(2) Current Divider

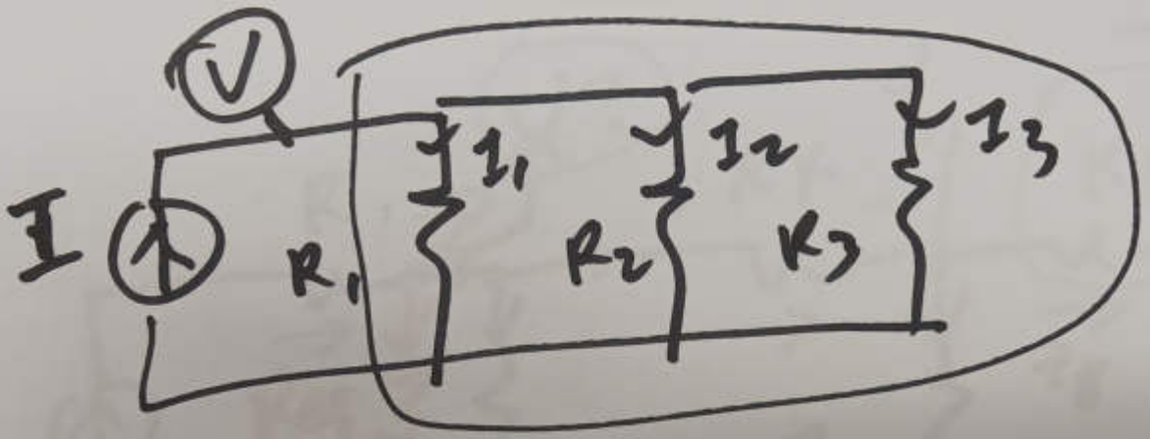


$$Req = R_1 \| R_2 = \frac{R_1 \cdot R_2}{R_1 + R_2}$$

$$I \cdot Req = V = R_1 \cdot I_1 = R_2 \cdot I_2$$

$$I \cdot \frac{R_1 \cdot R_2}{R_1 + R_2} = R_1 \cdot I_1$$

$$I_1 = I \cdot \frac{R_2}{R_1 + R_2}$$



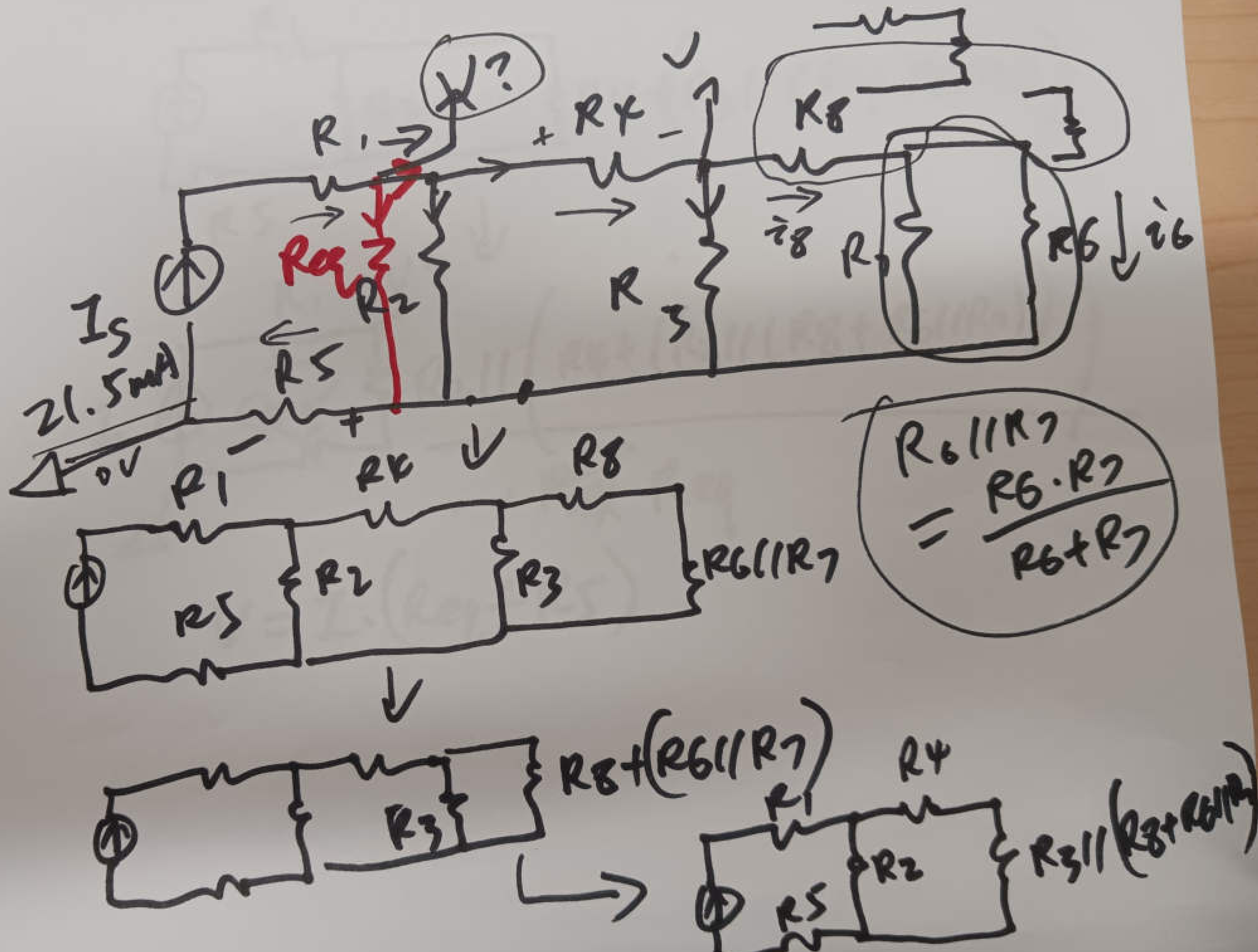
$$I \cdot Req = V = I_1 \cdot R_1 = I_2 \cdot R_2 = I_3 \cdot R_3$$

$$Req = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$

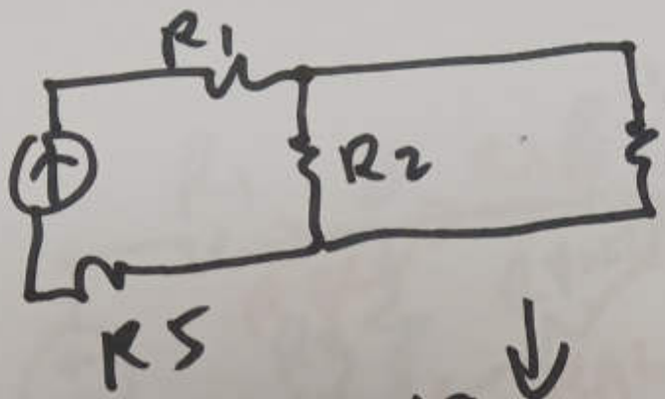
$$I \cdot \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}} = I_1 \cdot R_1$$

$$I_1 = I \cdot \frac{1}{\left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right) \cdot R_1}$$

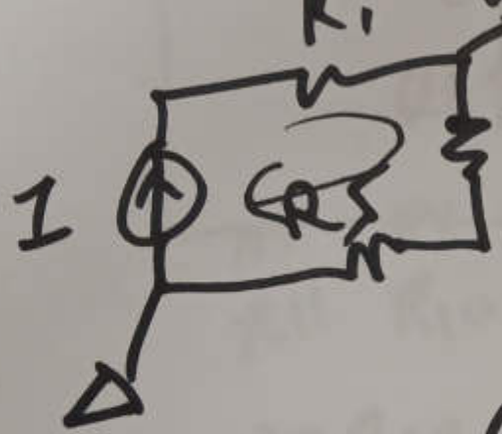
(2) (3)



X?
R1
R4
R8
Req
R2
R3
R
R6
i8
i6
Is
21.5mA
R5
0V
R6||R7
R1
R4
R8
R2
R3
R6||R7
R5
R6||R7
= R6·R7 / R6+R7
R3
R8+(R6||R7)
R4
R1
R2
R3||(R8+(R6||R7))
R5



$R_4 + (R_3 \,||\, (R_8 + R_6 \,||\, (R_7)))$



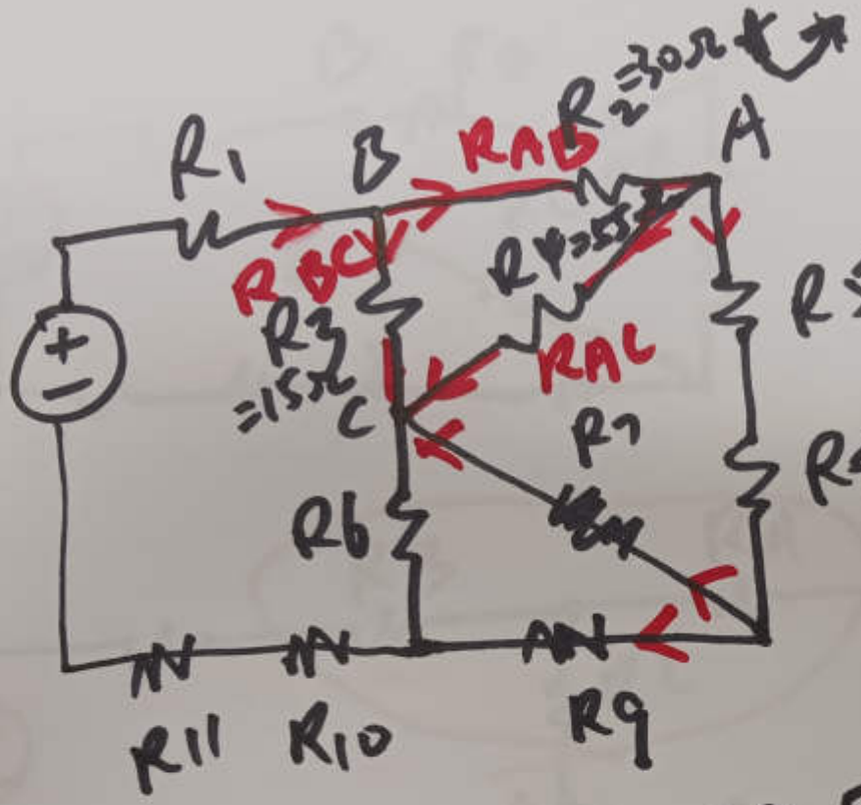
$R_2 \,||\, \left(R_4 + (R_3 \,||\, (R_8 + R_6 \,||\, (R_7))) \right)$

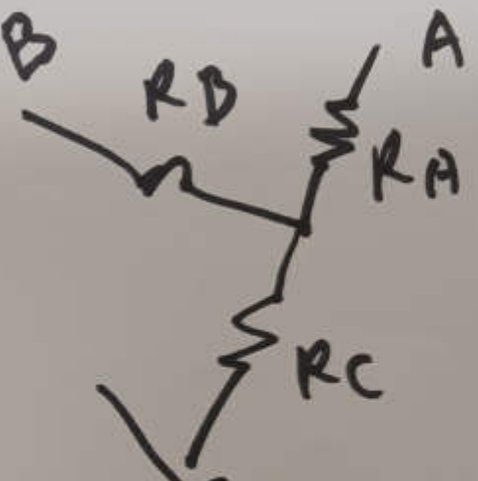
$\therefore R_{eq}$

$V = I \cdot (R_{eq} + R_5)$

(5)

Delta-to-Wye

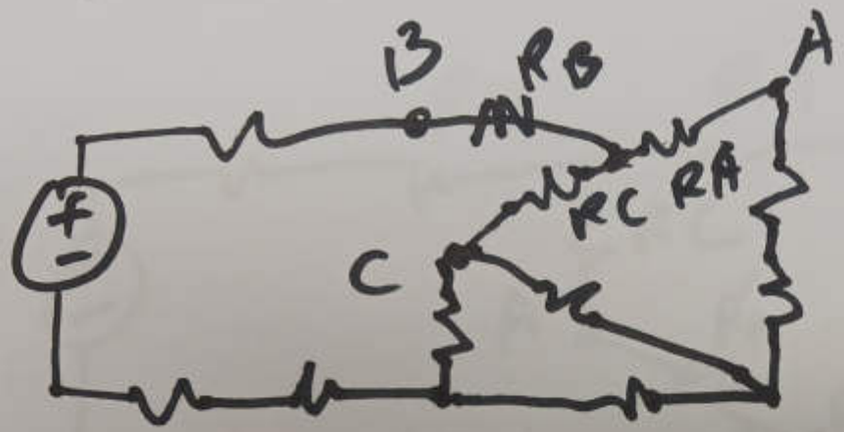


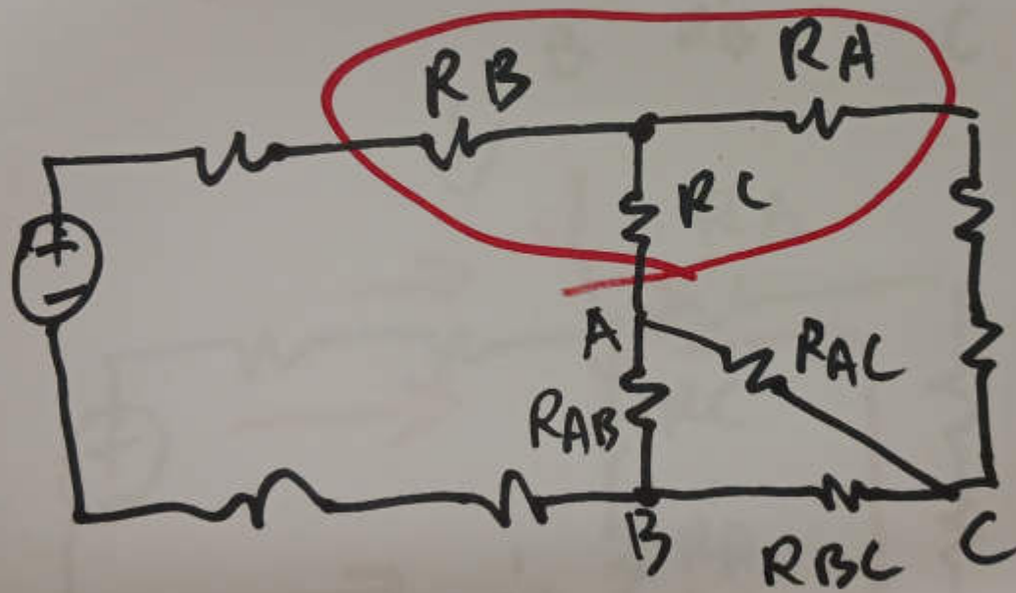


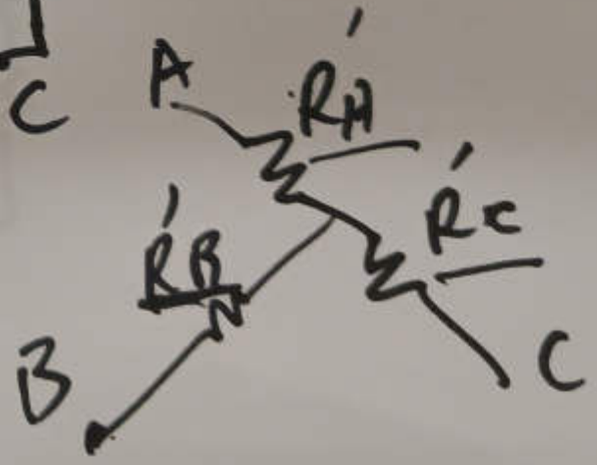
$$R_A = \frac{R_{AB} \cdot R_{AC}}{R_{AB} + R_{AC} + R_{BC}} = \frac{30.55}{100} = \frac{1650}{100} = 16.5\,\Omega$$

$$R_B = \frac{R_{AB} \cdot R_{BC}}{R_{AB} + R_{AC} + R_{BC}} = \frac{30.15}{100} = \frac{450}{100} = 4.5\,\Omega$$

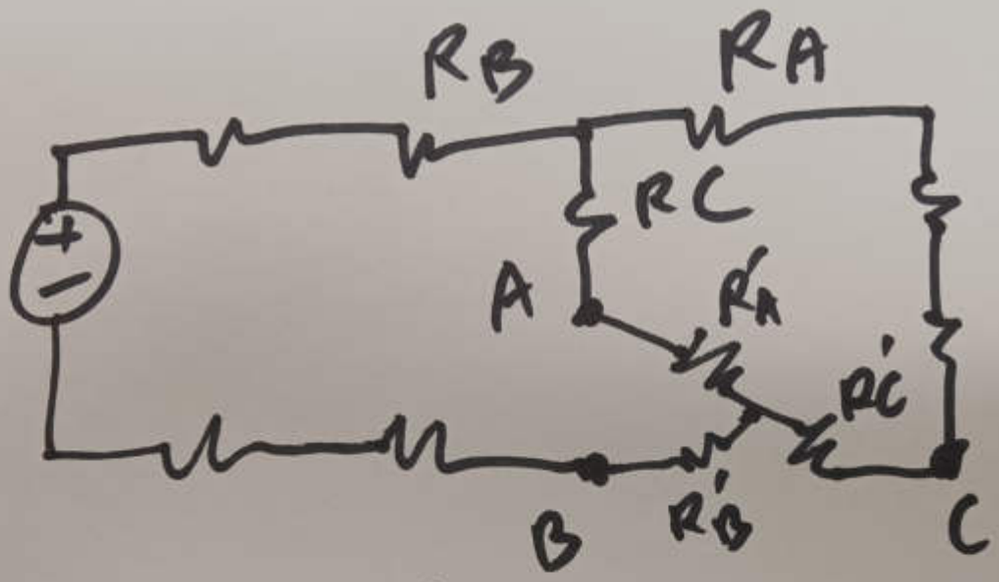
$$R_C = \frac{R_{AC} \cdot R_{BC}}{R_{AB} + R_{AC} + R_{BC}} = \frac{55.15}{100} = \frac{825}{100} = 8.25\,\Omega$$

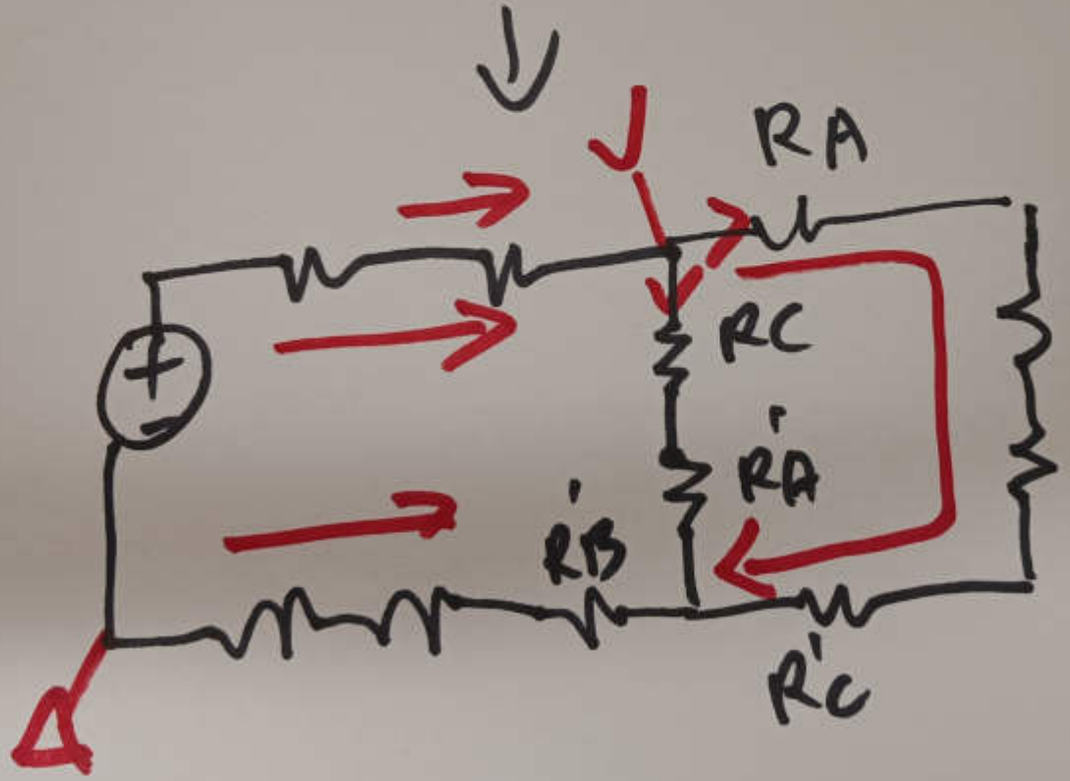






(1)





(18)