Name : Solution Section:_____ CWRU e-mail:_____

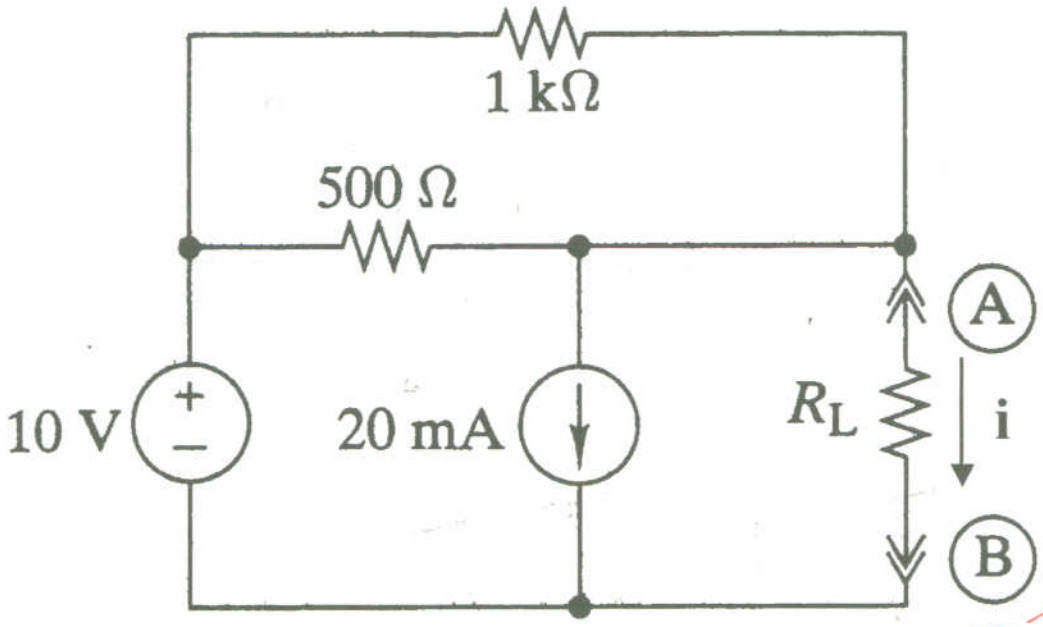
**CASE WESTERN RESERVE UNIVERSITY**
Case School of Engineering
Department of Electrical Engineering and Computer Science
**ENGR 210. Introduction to Circuits and Instruments (4)**

**Quiz No. 5** **2/20/04**

**PUT ANSWERS IN THE SPACE PROVIDED AND SHOW YOUR WORK IF APPROPRIATE. BE SURE TO STATE ANY ASSUMPTIONS**

**LINEARITY - SUPERPOSITION**

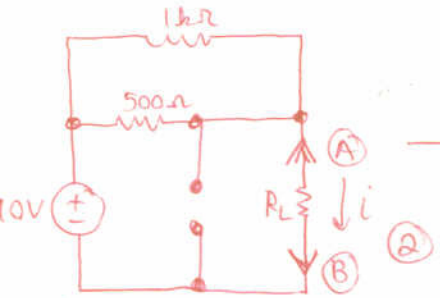
1. (10 points) Assume $R_L$=500Ω. Using superposition determine



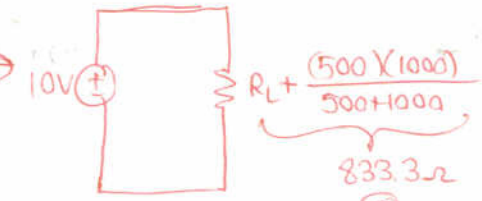

(a) the current $i_1$ through $R_L$ from the 10 volts source. $i_{1=}$ 0.012A (5) — correctly redrawn circuit (2), equations (2), answer (1)

(b) the current $i_2$ through $R_L$ from the 20 milliampere source. $i_{2=}$ −0.008A (5) — same as above

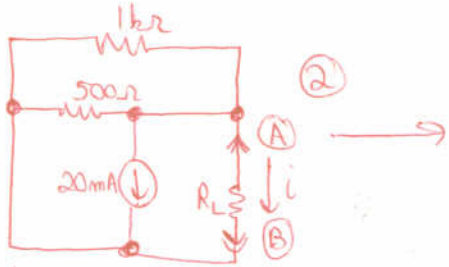
$R_L$=500Ω  V = IR



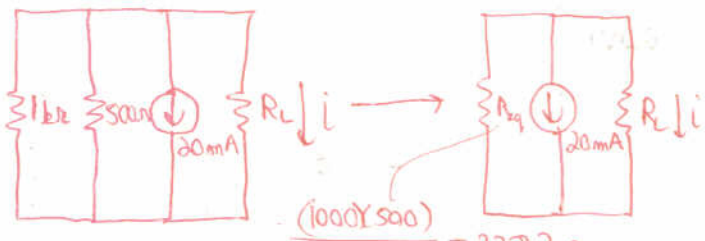

turn off current source → open




$i_1 = 0.012A$ (1)




turn off voltage source → short




current divider

$= \frac{333.3}{(333.3)(500)} \cdot 20mA$

$= -0.008A$

(1)

$i_2 = -0.008A$ (1)

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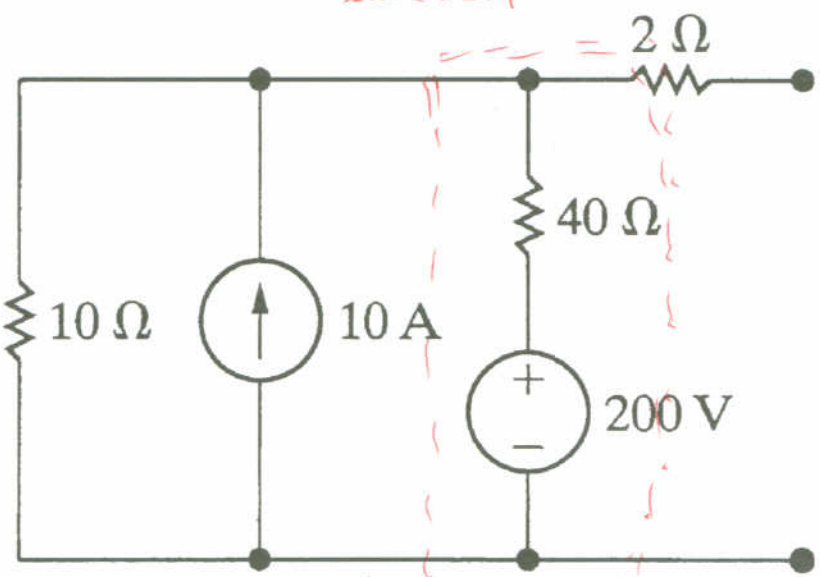
2. (10 points) What is the Thevenin equivalent of the circuit shown below.

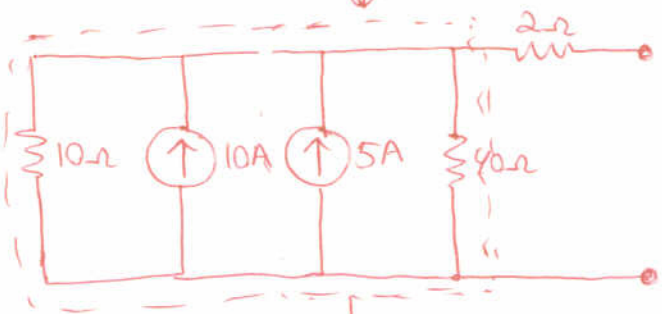
$V_T$= 120V (5) $R_T$= 10Ω (5)

1 point for redrawn circuits
3 points for correct equivalent circuit
1 point for answer

(5) same as $R_T$



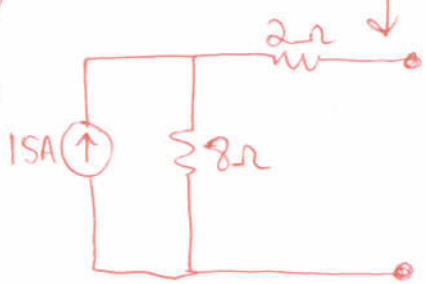

V = IR




$\frac{200V}{40\Omega} = 5A$

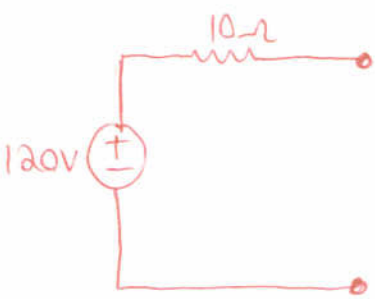
(3)

(1)




10A + 5A = 15A

$\frac{(40)(10)}{(40+10)} = 8\Omega$




(15A)(8Ω) = 120V

8Ω + 2Ω = 10Ω

$V_T = 120V$

$R_T = 10\Omega$ (1)