CME2203 Lab 3 Pre-lab

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Student Number: 2021510010
Section: 2
Subject: Superposition Principle

(updated: 09/11/2022)

Pre-lab Procedure

➔ Each student must prepare the pre-lab and upload it **INDIVIDUALLY**!
➔ Upload as a **.PDF** file.
➔ Draw the schematic for the circuit in Figure 1 using LTSpice. Remember to put a **text label** in the following format:

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CME2203, LAB3
Name Surname, Student No
Section

1. Upload a **PDF** file including your circuit design and simulation results visible (see example in Figure 1)

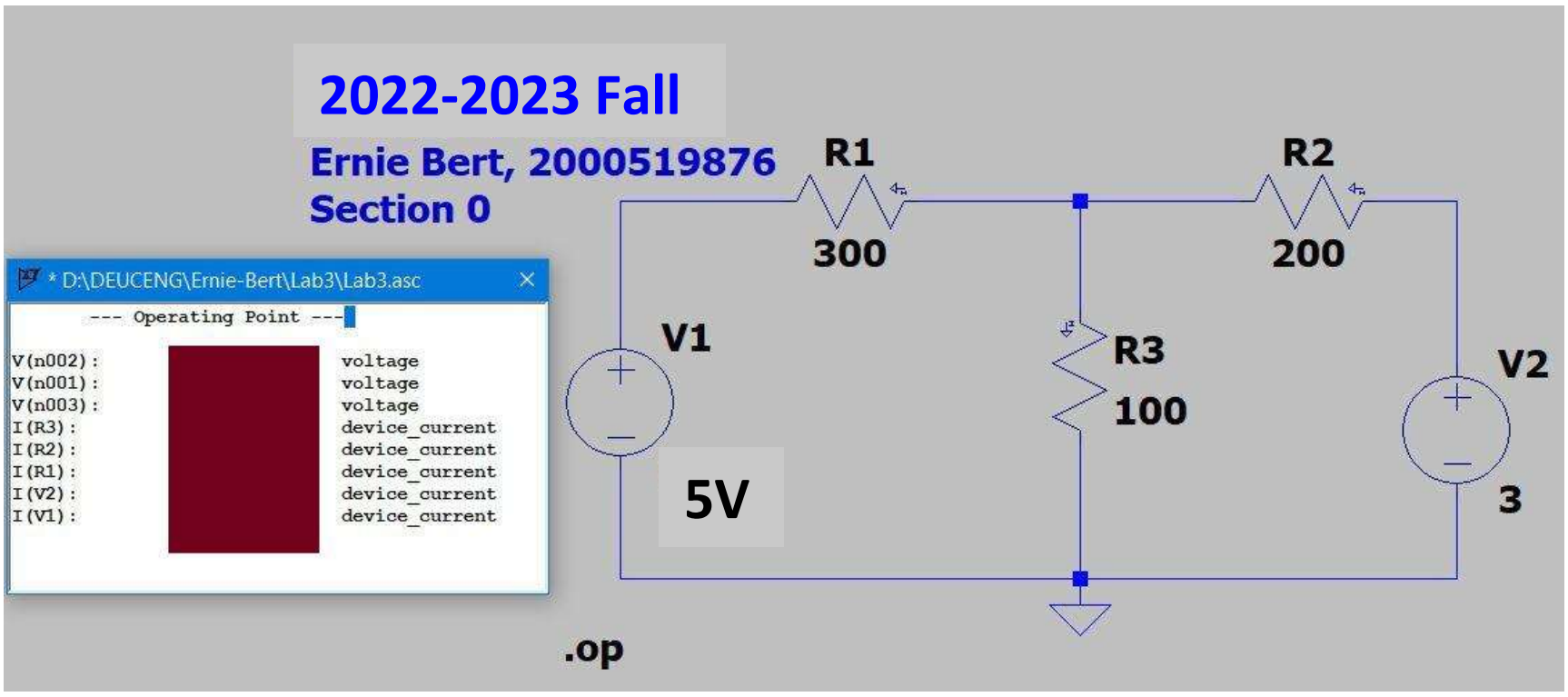


Figure 1 – Circuit Design in LtSpice

2. Note the simulation results and make the theoretical calculations using the superposition principle. You can use the tables given below. Compare the values and check if they are consistent.

Simulation Results from LTSpice

Circuit Element	I (mA)	V (V)
R1	I(R1) = -0.0109091	n1-n2= 3.27273
R2	I(R2) = 0.00636364	n2-n3= -1.27273
R3	I(R3) = 0.0172727	n2= 1.72727

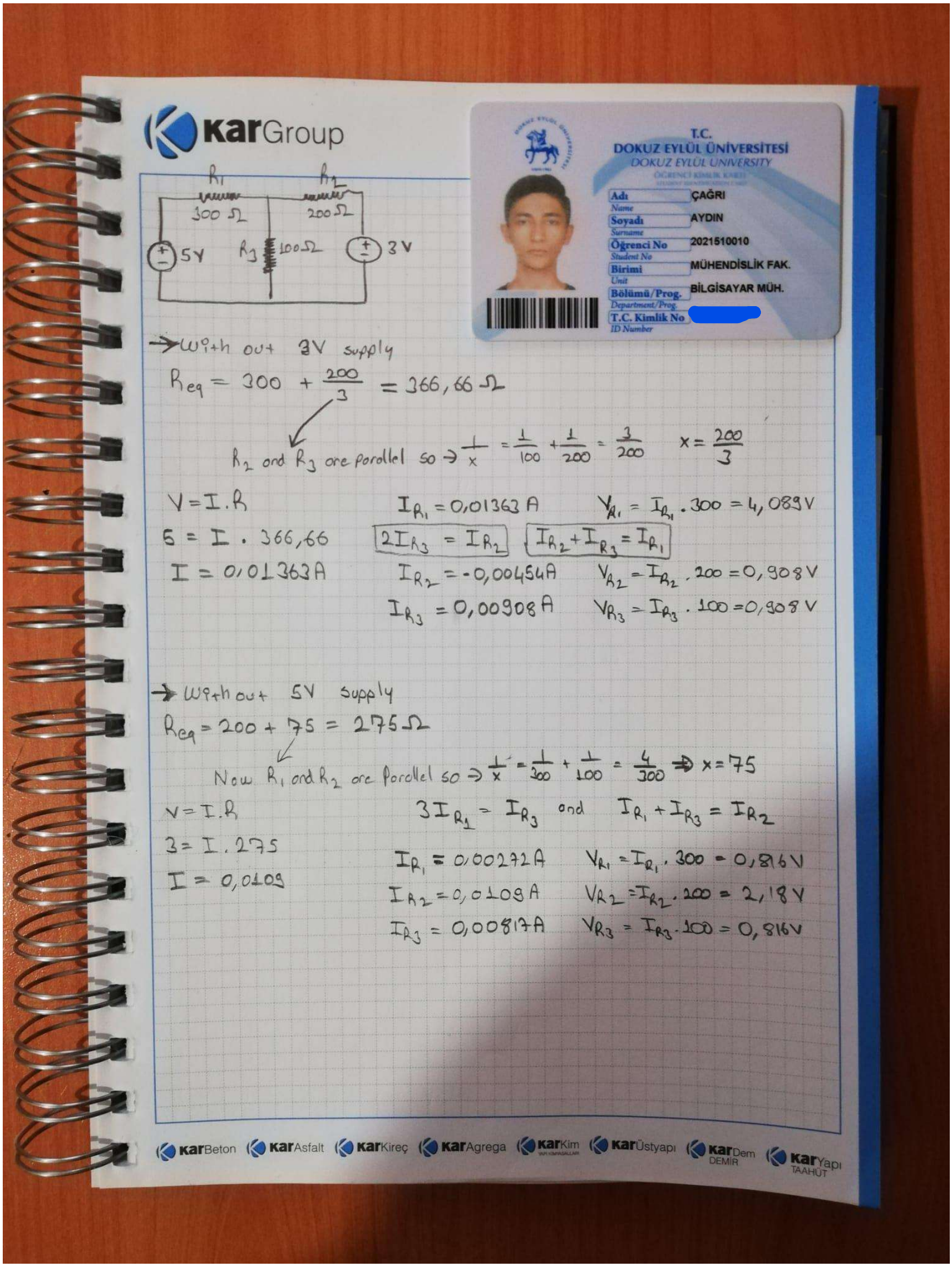
Fill the table below with your calculations. Add as many pages as necessary **to show your calculations to fill in the table below.**

		R1		R2		R3	
3V	5V	I1 (mA)	VR1 (V)	I2 (mA)	VR2 (V)	I3 (mA)	VR3 (V)
✓	-	2.72	0,816	10,9	2,18	8,17	0,816
-	✓	-13,63	4,089	-4,54	0,908	9,08	0,908
Total		-10,61	3,273	6,36	1,272	17,25	1,724

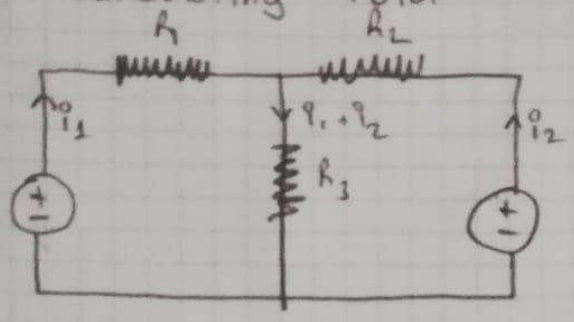
!!!No LATE submissions!!!Cheating will not be tolerated!!!

Good Luck...

Calculations Below:


kar Group
R1
300 Ω
R2
200 Ω
5V
R3
100Ω
3V
T.C.
DOKUZ EYLÜL ÜNİVERSİTESİ
DOKUZ EYLÜL UNIVERSITY
Adı
Name
ÇAĞRI
Soyadı
Surname
AYDIN
Öğrenci No
Student No
2021510010
Birimi
Unit
MÜHENDİSLİK FAK.
Bölümü/Prog.
Department/Prog.
BİLGİSAYAR MÜH.
T.C. Kimlik No
ID Number
→ With out 3V supply
$R_{eq} = 300 + \frac{200}{3} = 366,66\,\Omega$
R_2 and R_3 are parallel so → $\frac{1}{x} = \frac{1}{100} + \frac{1}{200} = \frac{3}{200}$ $x = \frac{200}{3}$
$V = I.R$
$5 = I \cdot 366,66$
$I = 0,01363\,A$
$I_{R_1} = 0,01363\,A$ $V_{R_1} = I_{R_1} \cdot 300 = 4,089\,V$
$2I_{R_3} = I_{R_2}$ $I_{R_2} + I_{R_3} = I_{R_1}$
$I_{R_2} = -0,00454A$ $V_{R_2} = I_{R_2} \cdot 200 = 0,908\,V$
$I_{R_3} = 0,00908\,A$ $V_{R_3} = I_{R_3} \cdot 100 = 0,908\,V$
→ Without 5V supply
$R_{eq} = 200 + 75 = 275\,\Omega$
Now R_1 and R_2 are parallel so ⇒ $\frac{1}{x} = \frac{1}{300} + \frac{1}{100} = \frac{4}{300}$ ⇒ $x = 75$
$V = I.R$
$3 = I \cdot 275$
$I = 0,0109$
$3I_{R_1} = I_{R_3}$ and $I_{R_1} + I_{R_3} = I_{R_2}$
$I_{R_1} = 0,00272\,A$ $V_{R_1} = I_{R_1} \cdot 300 = 0,816\,V$
$I_{R_2} = 0,0109\,A$ $V_{R_2} = I_{R_2} \cdot 200 = 2,18\,V$
$I_{R_3} = 0,00817\,A$ $V_{R_3} = I_{R_3} \cdot 100 = 0,816\,V$
kar Beton
kar Asfalt
kar Kireç
kar Agrega
kar Kim
kar Üstyapı
kar Dem DEMİR
kar Yapı TAAHÜT

→ Calculating Total



$I_{R_1} = i_1 + i_2 = 0{,}01363A - 0{,}00272A = \underline{0.01091A}$

$I_{R_2} = i_2 + i_1 = -0{,}00456A + 0{,}0109A = \underline{0.00636A}$

$I_{R_3} = i_1 + i_2 = 0{,}00908A + 0{,}00817A = \underline{0.01725A}$

$V_{R_1} = 0.01091A \cdot 300 = \underline{3.273V}$

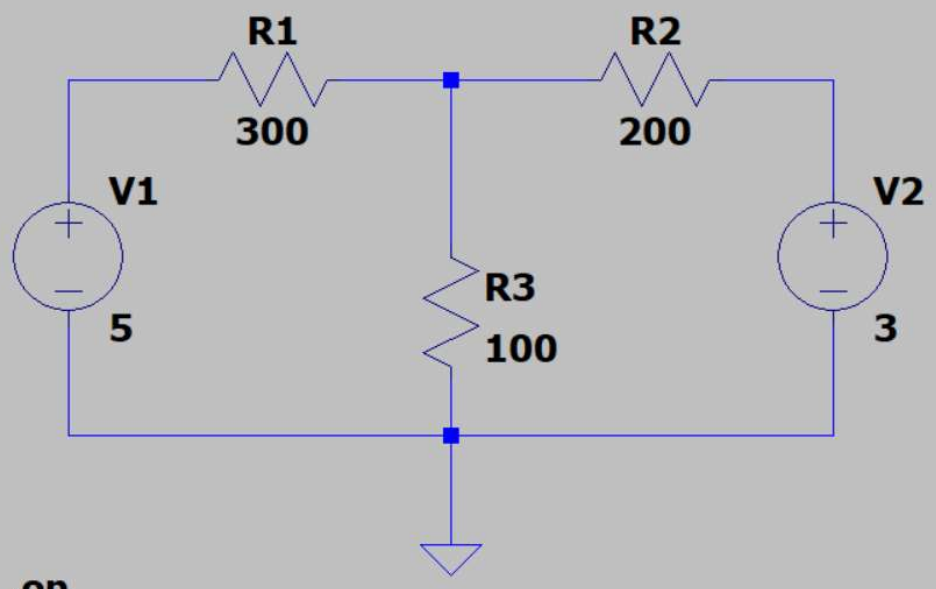
$V_{R_2} = 0.00636A \cdot 200 = \underline{1,272V}$

$V_{R_3} = 0.01725A \cdot 100 = \underline{1,724V}$

LTspice - [Pre-lab_3.asc]

File Edit Hierarchy View Simulate Tools Window Help

Pre-lab_3.asc



2022-23 FALL
CME2203, PreLAB3
Çağrı AYDIN, 2021510010
Section 2, Lab 4

* C:\Users\ASUS\AppData\Local\LTspice\CME2203\Lab4\2021510010_cagri_aydin\Pre-lab_3.asc

```
      --- Operating Point ---

V(n002):        1.72727         voltage
V(n001):        5               voltage
V(n003):        3               voltage
I(R1):          -0.0109091      device_current
I(R2):          0.00636364      device_current
I(R3):          0.0172727       device_current
I(V1):          -0.0109091      device_current
I(V2):          -0.00636364     device_current
```

Ready

Ara

10:42
13.11.2023