American International University- Bangladesh (AIUB)
Faculty of Engineering

Course Name:	Introduction to Electrical Circuits	**Course Code:**	COE 2101
Semester:	Fall 2021-22	**Total Marks:**	**10**
Faculty:	Prof. Dr. Mohammad Abdul Mannan	**Term**	Mid

ASSIGNMENT 02 [MID-TERM]

Submission Date: October 16, 2021

Instruction Related to Used Variables Based on Student ID:
Note that this assignment uses the variables m_1, m_2, m_3, m_4, and m_5, which are the five digits of middle of your student ID. For example, if your student ID is: 09-15985-3, then you must consider:
$$m_1=1; \qquad m_2=5; \qquad m_3=9; \qquad m_4=8; \qquad m_5=5$$

Write in the following Table the variables value according to your ID:

m_1	m_2	m_3	m_4	m_5

General Instruction:
1. Solve the problem to white sheets by your handwritten.
2. Write your **Name**, **Student ID**, **Section, Page Number** and value of m_5 on the top of first page.
3. In top of other pages write the **Page Number**.
4. Take picture of your solution for each page individually.
5. **Insert the picture in a word file**.
6. Make word file into PDF format file.
7. Submit it in VUES.
8. **For each day delay 1 marks will be reduced**.
9. **Picture format file submission will not be considered**

Problem 01: For the network of Figure 01:   [5 Marks]
(a) Find the Thévenin equivalent circuit for the network external to the load resistor R_L.
(b) Find the value of R_L for maximum power to R_L.
(c) Determine the maximum power to R_L for each network.

Hints: According to your ID, write $m_5 =$ _____ then calculate:

$E = 20(1+0.25m_5) =$ _____ V

$I_1 = 4(1+0.25m_5) =$ _____ A
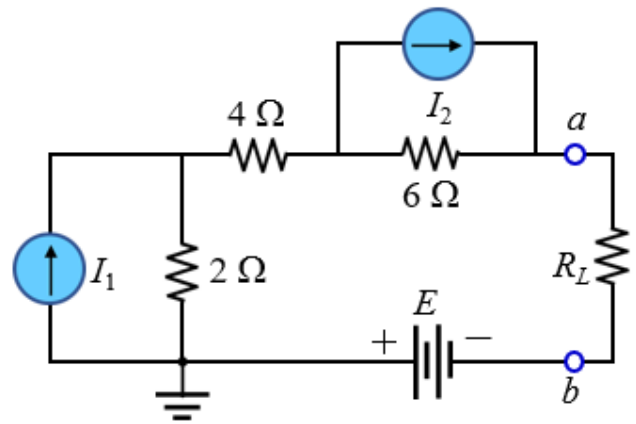
$I_2 = 2(1+0.25m_5) =$ _____ A

Figure 01: Problem 01

Problem 02: For the R-C circuit in Figure 02, composed of standard values: [2.5 Marks]
(a) Find the mathematical expression for the voltage across the capacitor (v_C) and the current (i_C) after the switch is thrown into position 1.
(b) Determine the mathematical expression for the voltage (v_C) and the current (i_C) for the discharge phase if switch is thrown into position 2 at six time constant.
(c) Plot the waveforms of (v_C) and (i_C) for a period of time extending from 0 to twelve time constant from when the switch was thrown into position 1.
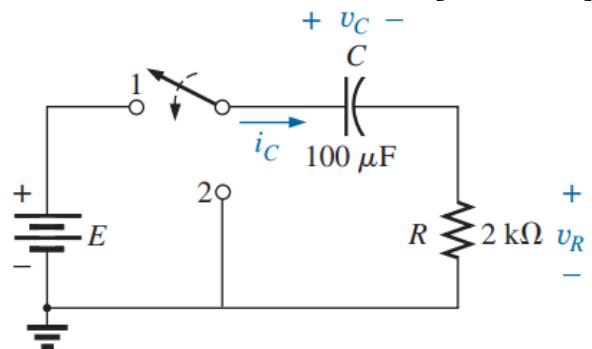
Hints: According to your ID, write $m_4 =$ _____ then calculate:

$E = 40(1+0.5m_4) =$ _____ V

Figure 02: Problem 02

Problem 03: For the R-C circuit in Figure 03, composed of standard values: [2.5 Marks]

(a) Determine the mathematical expressions for the current (i_L) and the voltage (v_L) when the switch is closed.
(b) Repeat part (a) if the switch is opened after a period of five time constants has passed.
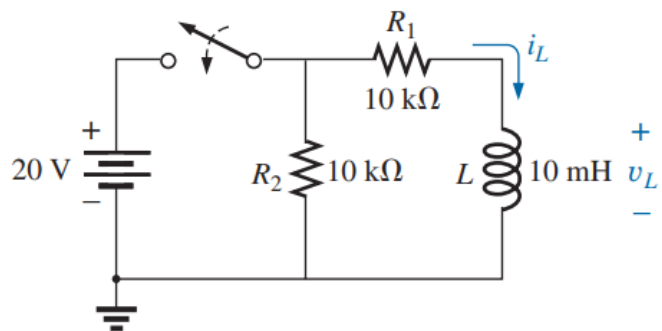(c) Sketch the waveforms of parts (a) and (b) on the same set of axes.

Figure 03: Problem 03

Good Luck