PRINCIPLES OF EE2

Individual Project Guidelines

The following guidelines should be followed for the individual project papers submitted to the course of Principles of EE2.

- **Basic Info**: Individual project papers should have your full name, student ID, IU-email, and the name of the assignment (e.g., Individual project). Fill in those information at the position prepared in advanced at the bottom of the project template before starting to work on it. The page number must be put on the bottom of every page.

- **Professional Presentation**: All papers should be written so that they are neat and easy to read. The work you submit reflects on your character as a professional. Sloppy work, sloppy drawings, etc. which make it difficult to read and grade may result in up to a 50% penalty regardless of the correctness of your answers.
  - ✓ You are required to submit TYPE-written solutions in Microsoft Word format. The template is provided. Before submitting your work, convert it to PDF format and name it as EE2_IP(Your project's number)_(Your name)_ID.pdf. Ex: EE2_IP#1_NguyenVanA_EEEEIU11001

- **Provide Solutions NOT Answers**: Your homework paper should provide *solutions* to the problems, not just an answer. This means you need to show your work at each step of the process in solving the problem. Written comments about what you are doing in each step are appropriate. Someone else should be able to read your solution and follow your procedure. Try to put yourself in the grader's position and make sure you have shown enough that it is clear how you got to the final answer. No partial credit will be given unless there is adequate effort to show your work.
  - ✓ Typically for calculation problem, you should show the relevant equations, show any necessary derivation/reduction of the equations until you reach the final form, then show the equation with the values substituted for the variables, and then finally show your answer.

- **Formatting Answers**: All answers should be clearly visible and in appropriate engineering units. Highlighting your answer by boxing it to indicate where your final answer is. An answer without units is an incorrect answer (unless, of course, it is a unitless result). Try to avoid the use of scientific notation in your final answer if an appropriate engineering unit is available. For example, 5×10^{-8} V should be written as 50 nV. Only use scientific notation if the problem specifies a unit for which your answer is several orders of magnitude away, e.g., 4×10^{-5} m can be written as 4×10^{-3} cm if the answer was requested in cm, otherwise you should write it as 40 μm.

PRINCIPLES OF EE2

INDIVIDUAL PROJECT #29

Deadline: 01/05/2020

Problem 1 (25pts): Assume that the switch in the circuit of below figure has been in position **a** for a long time and at the moment $t = 0$, it is moved to position **b**. $V_1 = 150V$, $I_2 = 400V$, $R_1 = 40k\Omega$, $R_2 = 34k\Omega$, $R_3 = R_4 = 32k\Omega$, $C_1 = 50nF$. Find:

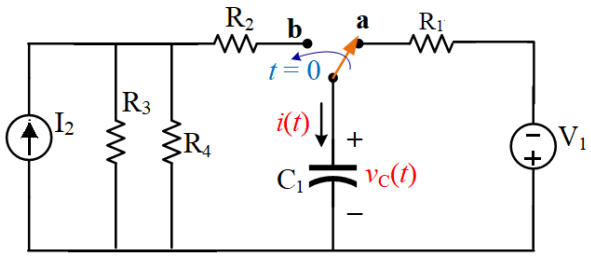

Figure 1: Figure for Problem 1

a) Find $v_C(0^+)$ and $v_C(\infty)$
b) The time constant τ for $t \geq 0$
c) The current i for $t \geq 0$
d) The voltage v_C for $t \geq 0$

Problem 2 (25pts): Given the circuit shown in below figure. Calculate $v(t)$ for $t > 0$

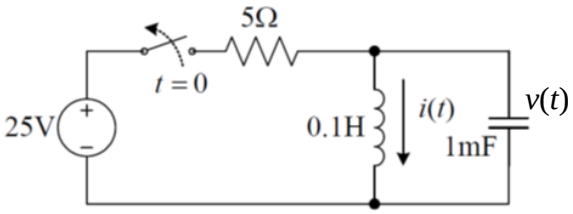

Figure 2: Figure for Problem 2

Problem 3 (25pts): For the following Laplace function $F(s)$, find the inverse Laplace transform $f(t)$:

$$F(s) = \frac{6s^2 + 8s + 3}{s(s^2 + 2s + 5)}$$

Problem 4 (25pts): The transfer function of a system is

$$H(s) = \frac{s + 3}{s^2 + 4s + 5}$$

Find its output when:

a) The input is a unit step function

b) The input is $6te^{-2t}u(t)$