Assignment-2
Winter 2024
Basic Electronics (ECE113)

Instructions

- **Institute Plagiarism Policy Applicable.** This will be subjected to strict plagiarism check.
- This assignment should be attempted individually.
- A maximum point for this assignment is **20**. All questions are compulsory.
- **File Submission:** Only a *.pdf* file are acceptable, which you have to submit on Google Classroom. Use A4 size sheets only (ruled or blank) to solve your assignment and scan it to create a *.pdf* file. Attempt each question on a different sheet. Do not start a new question at the back of the previous one. Do not forget to mention Page Number (bottom canter) clearly on each sheet of the assignment. Submit a *.pdf* file named *A1_ RollNo.pdf* (e.g., *A1_PhD22100.pdf*), which containing the quality scan copy of your solved assignment.
- **Submission Policy:** Turn-in your submission as early as possible to avoid late submissions. In case of multiple submissions, the latest submission will be evaluated. Expect **No Extensions**. Late submissions will not be evaluated and hence will be awarded zero marks strictly.
- **Clarifications:** Symbols have their usual meaning. Assume the missing information & mention it in the report. Use Google Classroom for any queries. In order to keep it fair for all, no email queries will be entertained.
- There could be multiple ways to approach a question. Please justify your answers. Questions without justification will get zero marks.

[CO3] Q1: [10 Points] Two voltage sources are used to charge the inductor **8 H** alternately as indicated in the circuit shown in Figure-1. The switches S_1 and S_2 are mechanically coupled and connected as follows:

a) For time interval **$2nT \le t < (2n+1)T$**, where **n=0,1,2,3,…** switch S_1 is connected to position B_1 and switch S_2 is connected to position B_2

b) For time interval **$(2n+1)T \le t < (2n+2)T$**, where **n=0,1,2,3,…** switch S_1 is connected to position A_1 and switch S_2 is connected to position A_2

Assume that the inductor has zero initial current. Find the value of current across inductor $\boldsymbol{i_L(t)}$ for all time interval.

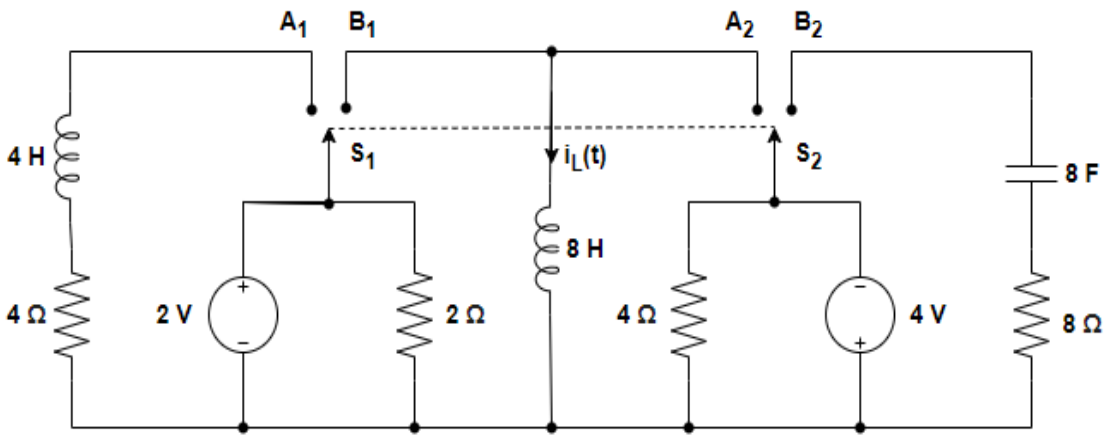

Figure 1

[CO3] Q2: [10 Points] In the given following circuit (Figure-2), the switch **S** was closed for a long time. The switch **S** is opened at time t=0. An electronic device $\boldsymbol{V-I}$ characteristic is given in Figure-3 with respect to its assigned terminal (Terminal-1 and Terminal-2). Do-

a) Find the capacitor voltage $\boldsymbol{Vc(t)}$ for $t \geq 0^{+}$

b) Find the steady state magnitude of the capacitor voltage $\boldsymbol{Vc}$ (in volts).

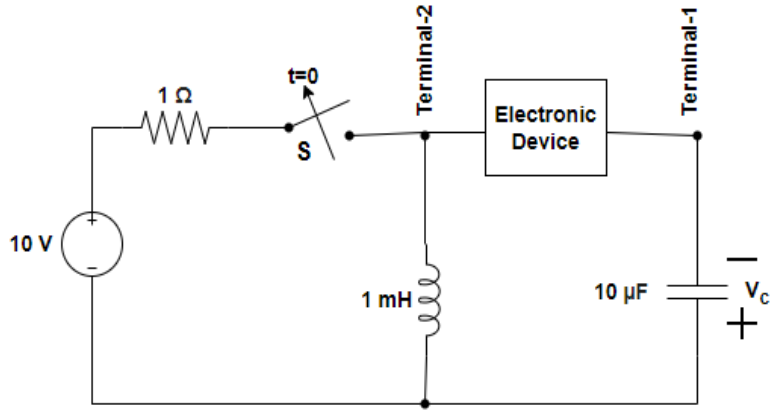

Figure 2

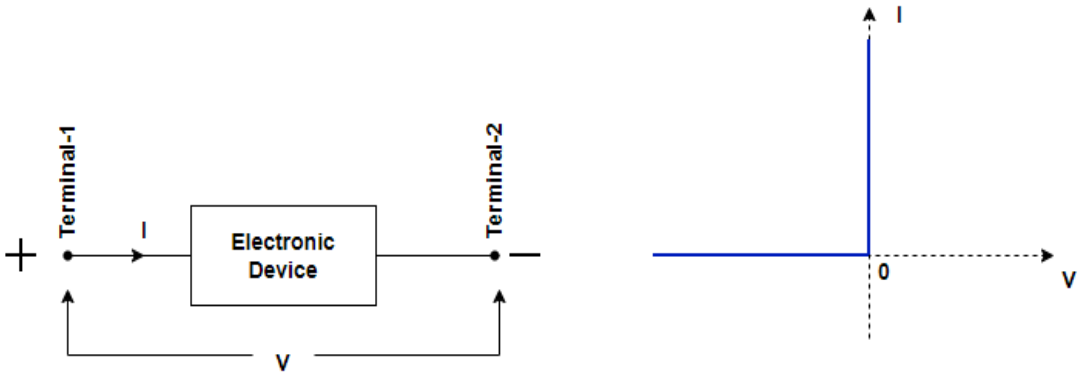

Figure 3

Note: At $t=0^{-}$, current through electronic device is 0 A.