

Assignment-1

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 **30**. 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 center) 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.
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[CO1, CO2] **Q1: [10 Points]** Find equivalent resistance (R_{eq}) and the value of voltage source (V_a) for the given load, so that maximum power can be transferred from the source to the load (Figure-1).

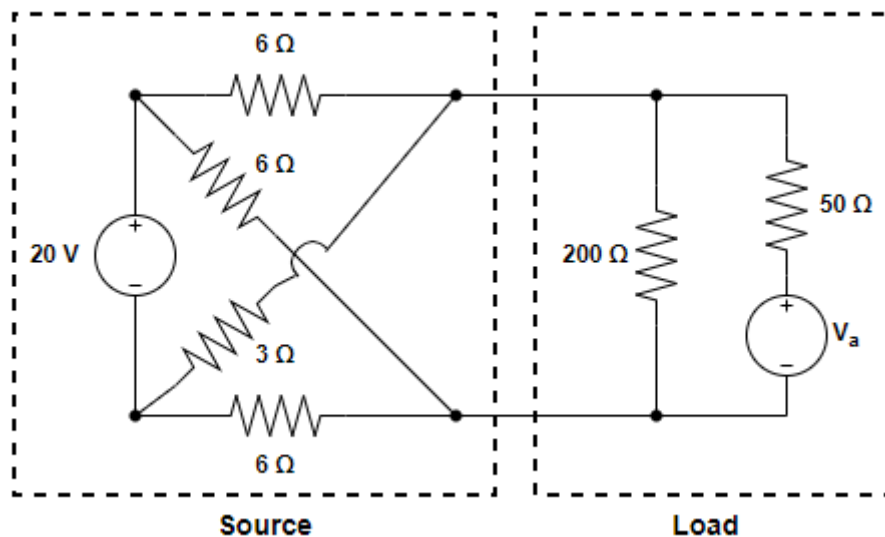


Figure 1

[CO1, CO2] **Q2: [10 Points]** Find the value of the current I , when $V_1 = 25$ volt, $V_2 = 15$ volt and $V_3 = 20$ volt (by using Table-1 & Figure-2).

V_1 (in volt)	V_2 (in volt)	V_3 (in volt)	I (in Ampere)
2	0	0	1
0	4	0	5
0	0	5	-6

Table 1

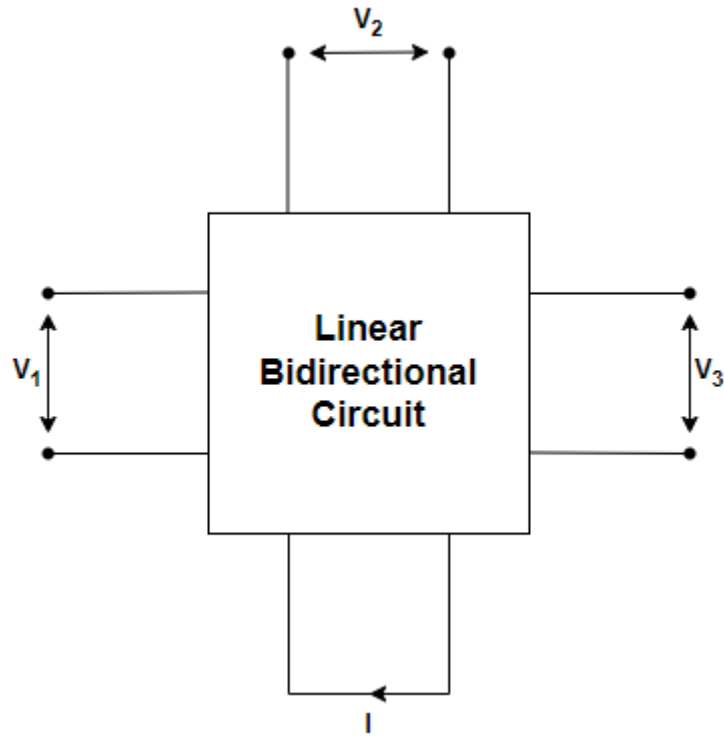


Figure 2

[CO1, CO2] Q3: [10 Points] A given Electronic Device (Figure-3) having following specification:

1. The voltage difference between input node & output node/ drop-out voltage must be at least **2 volt** [$(V_{\text{Input Node}} - V_{\text{Output Node}}) \geq 2 \text{ volt}$].
2. The reference node current/ quiescent current (I_o) is negligible.
3. The voltage across Output Node & Reference Node is constant, which is **5 volt**.

By using this Electronic Device, design a current source that will deliver a **0.25 A** current to **45 Ω** , **100 W** load. Explain with proper circuit diagram.

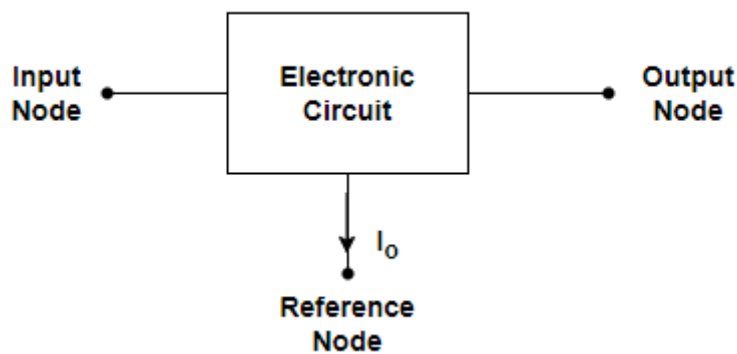


Figure 3