

Assignment -2

Basic Electronics (BE): ECE113

Winter-2023

Release: 3-Apr-2023 (4:00 PM)

Submission: 10-Apr-2023 (4:00 PM)

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 40. 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.

Question -1: In the circuit shown below power dissipation in 1 ohm resistance is 576 W, when voltage is acting alone & power dissipation in 1 ohm resistance is 1 W, when current source is acting alone. Find total power dissipation in 1 ohm resistance. **(5 Points)**

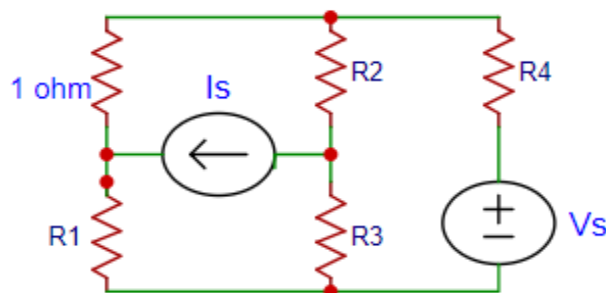


Figure 1

Question -2: In the given following circuit, find out the value of all the node voltage by using nodal analysis. **(5 Points)**

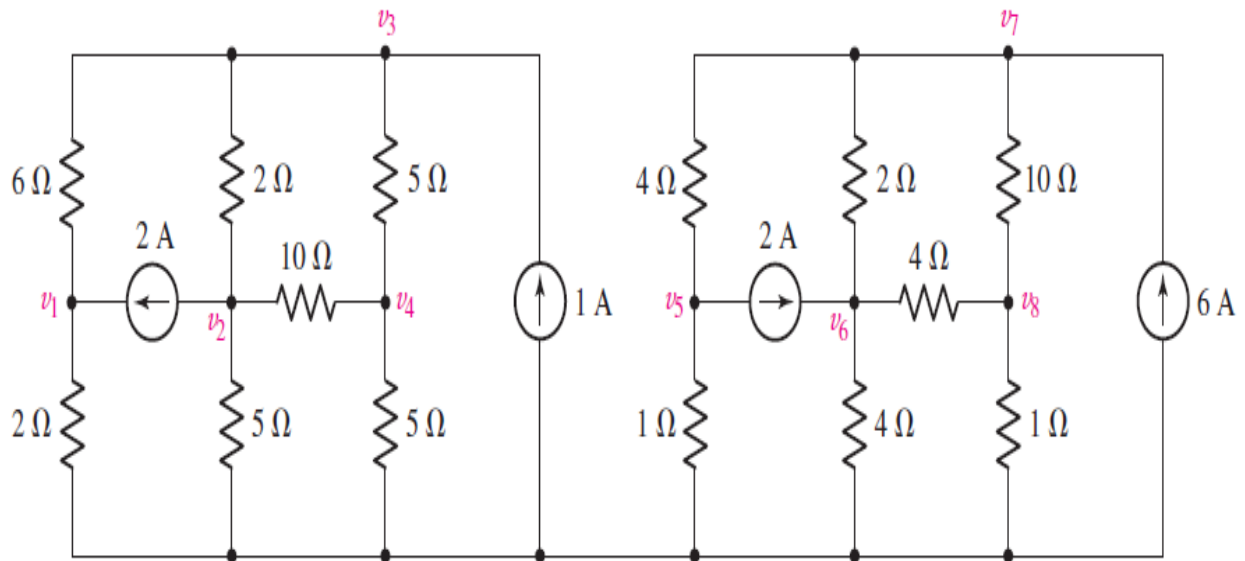


Figure 2

Question -3: In the given following circuit, assuming both the voltage sources are in phase. Then find out the value of resistor R for which maximum power is transferred from Network-1 to Network-2. **(5 Points)**

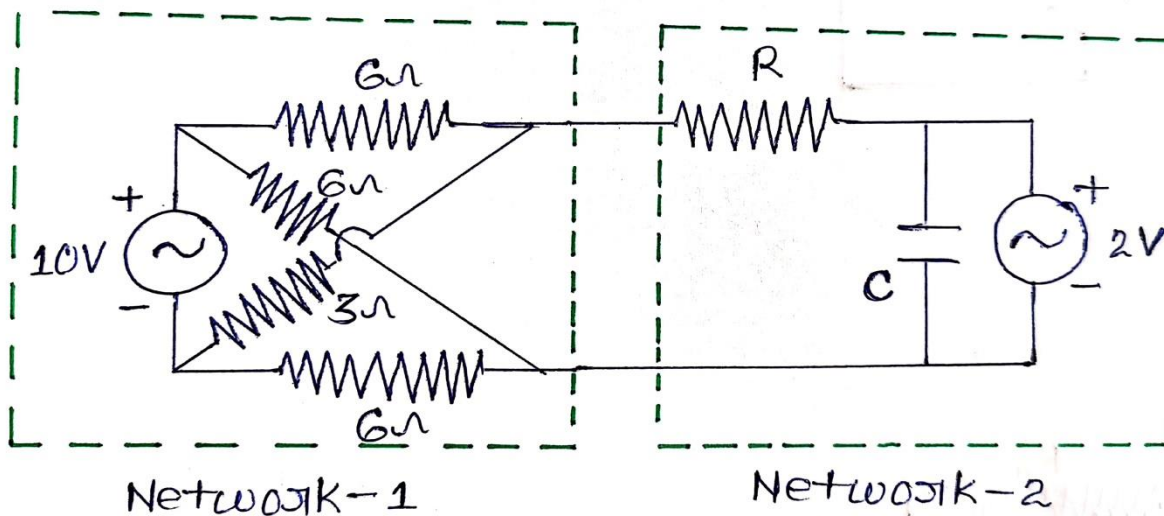


Figure 3

Question -4: A current $i(t)$ is passed through a capacitor, where current $i(t)$ is defined as $i(t) = [d/d(t)]x(t)$. Find out the charge acquired by the capacitor after 2 second. **(5 Points)**

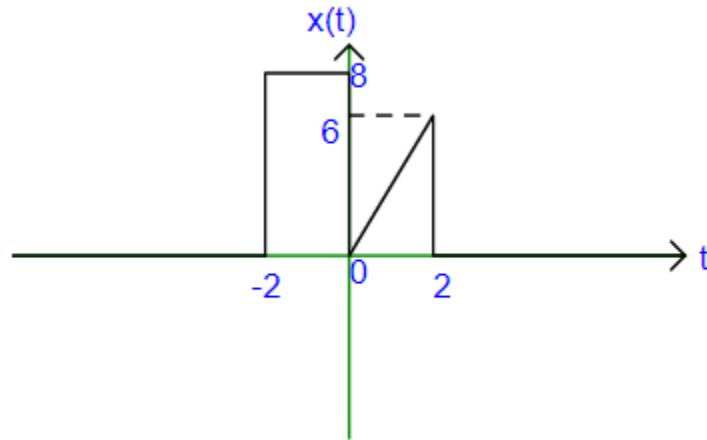


Figure 4

Question -5: Find current (I) in 1 ohm resistance using Norton theorem in the given following circuit. **(5 Points)**

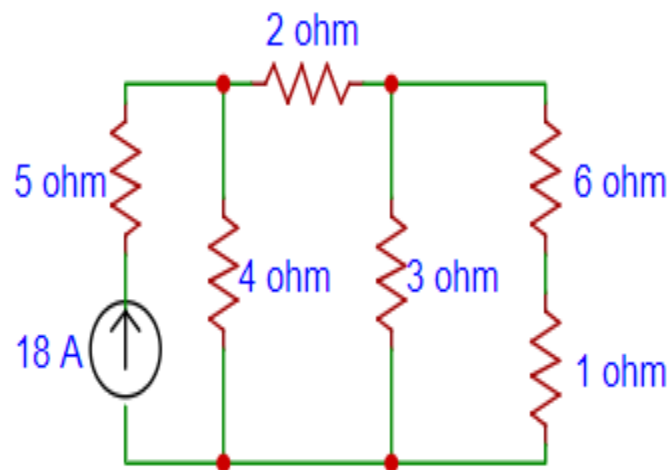


Figure 5

Question -6: Make use of source transformations to first convert all three sources in the given below circuit to voltage sources, then simplify the circuit as much as possible and calculate the voltage V_x which appears across the 4 ohm resistor. Be sure to draw and label your simplified circuit. **(5 Points)**

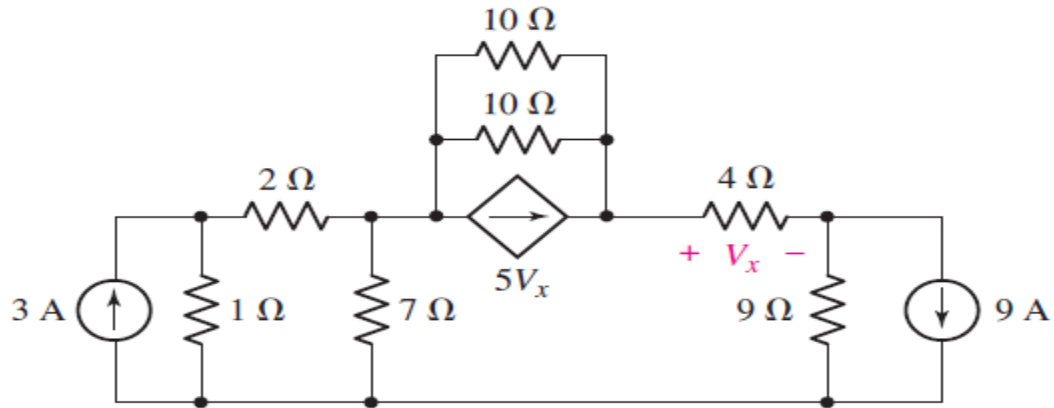


Figure 6

Question -7: (a) Making use of repeated source transformations, reduce the circuit of Figure-7 such that it contains a single voltage source, the 17 ohm resistor, and one other resistor. (b) Calculate the power dissipated by the 17 ohm resistor. **(5 Points)**

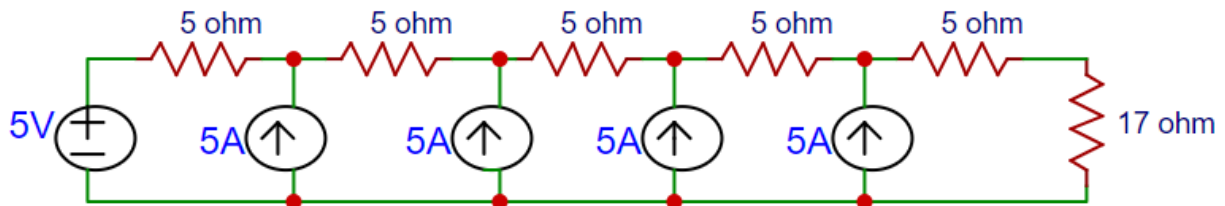


Figure 7

Question -8: Determine the Norton equivalents of the circuit shown in Figure-8, as seen by an unspecified element connected between terminals A and B. **(5 Points)**

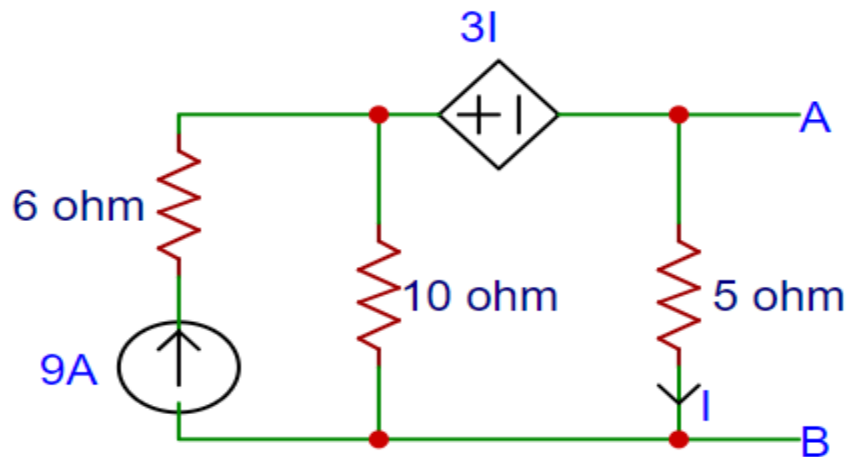


Figure 8