SYEN 2315 Circuits and Systems
Midterm 1

Closed Book
Calculators are not allowed

Problem 1

The voltage $v$ across a device and the current $i$ through it are

$v(t) = 5 \cos 2t$ V, \quad $i(t) = 10 \left(1 - e^{-0.5t}\right)$ A

Calculate:

(a) the total charge in the device at $t = 1$ s
(b) the power consumed by the device at $t = 1$ s.
Problem 2

Calculate the equivalent resistance $R_{ab}$ at terminals $a-b$ for the following circuit.

![Circuit Diagram]

(a)
**Problem 3**

Find $V_x$ in the following circuit
Problem 4

Using nodal analysis, find $v_o$ in the following circuit.