

112-1 ELECTRICAL ENGINEERING FUNDAMENTAL I

Name:

Quiz 1

2023.9.19

1. (15%) Find the charge q flowing through a device if the current i is:

(a) $i(t) = 5 \text{ (A)}, q(0) = 0$ $q(t) =$

(b) $i(t) = (2t + 1) \text{ (}\mu\text{A)}, q(0) = 1 \text{ (mC)}$ $q(t) =$

(c) $i(t) = 10 \cdot \cos(10t + \pi/6) \text{ (}\mu\text{A)}, q(0) = 1 \text{ (}\mu\text{C)}$ $q(t) =$

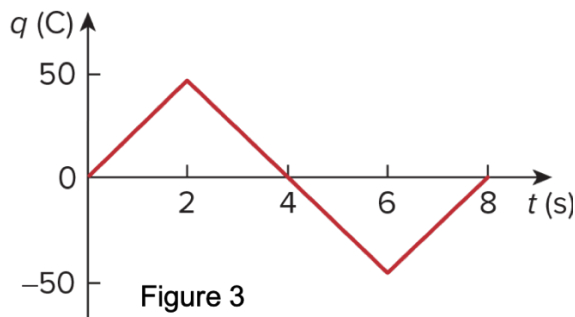
2. (15%) Find the current i flowing through a device if the charge q is:

(d) $q(t) = (3t + 8) \text{ (mC)}$ $i(t) =$

(e) $q(t) = (e^{-3t} - 5e^{-5t}) \text{ (nC)}$ $i(t) =$

(f) $q(t) = 8 \cdot \sin(60\pi t) \text{ (pC)}$ $i(t) =$

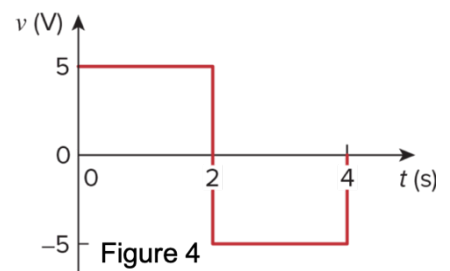
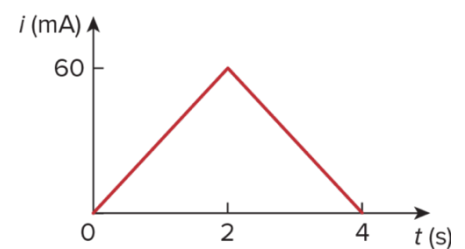
3. (10%) The charge q flowing in a wire is plotted in Fig. 3. **Sketch** the corresponding current $i(t)$.



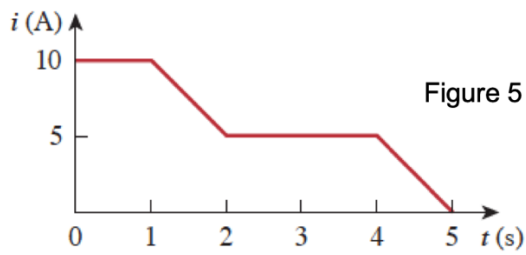
4. (25%) Figure 3 shows the current through and the voltage across an element.

(a) (15%) Derive the current $i(t)$, voltage $v(t)$, and power delivered to the element $p(t)$ as a function of time t in the interval of $0 < t < 4 \text{ (s)}$

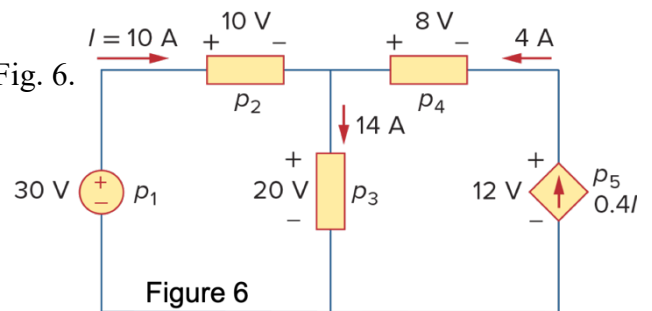
(b) (10%) Sketch the power $p(t)$ delivered to the element for $t > 0$.



5. (15%) The current through an element is shown in Fig. 5. Determine the total charge that passed through the element at: (a) $t = 1$ s ; (b) $t = 3$ s ; (c) $t = 5$ s.



6. (20%) Find the power absorbed by each of the elements in Fig. 6.



7. (20%) Find V_o and the power absorbed by each element in the circuit of Fig. 7.

