

EECS70A / CSE 70A Network Analysis I
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Homework # 1 solution

Chapter 1, Solution 1.

- (a) $q = 6.482 \times 10^{17} \times [-1.602 \times 10^{-19} \text{ C}] = \underline{\underline{-0.10384 \text{ C}}}$
 (b) $q = 1.24 \times 10^{18} \times [-1.602 \times 10^{-19} \text{ C}] = \underline{\underline{-0.19865 \text{ C}}}$
 (c) $q = 2.46 \times 10^{19} \times [-1.602 \times 10^{-19} \text{ C}] = \underline{\underline{-3.941 \text{ C}}}$
 (d) $q = 1.628 \times 10^{20} \times [-1.602 \times 10^{-19} \text{ C}] = \underline{\underline{-26.08 \text{ C}}}$

Chapter 1, Solution 6.

- (a) At $t = 1 \text{ ms}$, $i = \frac{dq}{dt} = \frac{80}{2} = \underline{\underline{40 \text{ A}}}$
 (b) At $t = 6 \text{ ms}$, $i = \frac{dq}{dt} = \underline{\underline{0 \text{ A}}}$
 (c) At $t = 10 \text{ ms}$, $i = \frac{dq}{dt} = \frac{80}{4} = \underline{\underline{-20 \text{ A}}}$

Chapter 1, Solution 8.

$$q = \int i dt = \frac{10 \times 1}{2} + 10 \times 1 = \underline{\underline{15 \mu\text{C}}}$$

Chapter 1, Solution 9.

- (a) $q = \int i dt = \int_0^1 10 dt = \underline{\underline{10 \text{ C}}}$
 (b) $q = \int_0^3 i dt = 10 \times 1 + \left(10 - \frac{5 \times 1}{2}\right) + 5 \times 1$
 $= 15 + 7.5 + 5 = \underline{\underline{22.5 \text{ C}}}$
 (c) $q = \int_0^5 i dt = 10 + 10 + 10 = \underline{\underline{30 \text{ C}}}$

Chapter 1, Solution 22.

$$q = it = 30 \times 10^3 \times 2 \times 10^{-3} = \underline{\underline{60 \text{ C}}}$$

Chapter 1, Solution 24.

$$W = pt = 40 \times 24 \text{ Wh} = 0.96 \text{ kWh}$$

$$C = 8.5 \text{ cents} \times 0.96 = \underline{\underline{\mathbf{8.16 \text{ cents}}}}$$