

ECEN203 Tutorial 1: Terminology

Complete the following exercises. Answers are provided for your self-checking.

Q1. Convert the following quantities to scientific notation: (a) 52 mV, (b) 0.3 MV, (c) 136 nA, and (d) 0.05 Gbits/s.

(Answer: (a) 5.2×10^{-2} V, (b) 3×10^5 V, (c) 1.36×10^{-7} A and (d) 5×10^7 bits/s.)

Q2. Convert the following quantities to a prefix format such that the number preceding the prefix is between 1 and 999: (a) 8.32×10^7 Hz, (b) 1.67×10^{-8} m, (c) 9.79×10^{-16} g, (d) 4.48×10^{13} V, and (e) 762 bits/s.

(Answer: (a) 83.2 MHz, (b) 16.7 nm, (c) 979 ag, (d) 44.8 TV, and 762 bits/s.)

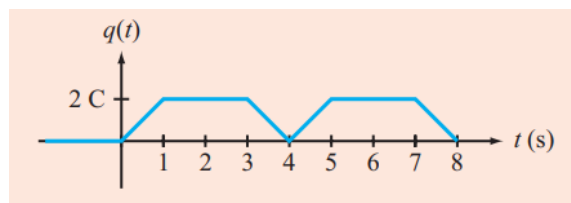
Q3. Simplify the following operations into a single number, expressed in prefix format: (a) $A = 10 \mu\text{V} + 2.3 \text{ mV}$, (b) $B = 4 \text{ THz} - 230 \text{ GHz}$, (c) $C = 3 \text{ mm} / 60 \mu\text{m}$.

(Answer: (a) $A = 2.31 \text{ mV}$, (b) $B = 3.77 \text{ THz}$, (c) $C = 50$.)

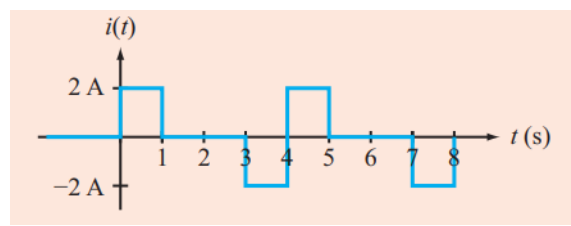
Q4. If the current flowing through a given resistor in a circuit is given by $i(t) = 5[1 - e^{-2t}]$ A for $t \geq 0$, determine the total amount of charge that passed through the resistor between $t = 0$ and $t = 0.2$ s.

(Answer: $\Delta Q(0, 0.2) = 0.18 \text{ C}$.)

Q5. If $q(t)$ has the waveform shown in the figure below, determine the corresponding current waveform.



(Answer:



Q6. If a positive current is flowing through a resistor from its terminal a to its terminal b, is v_{ab} positive or negative?

(Answer: $v_{ab} > 0$.)

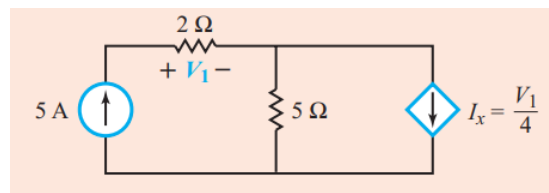
Q7. A certain device has a voltage difference of 5 V across it. If 2 A current is flowing through it from its (-) voltage terminal to its (+) terminal, is the device a power supplier or a power recipient, and how much energy does it supply or receive in 1 hour?

(Answer: $P = VI = 5(-2) = -10 \text{ W}$. Hence, the device is a power supplier. Since $p(t)$ = (not time-varying), $|W| = |P|\Delta t = 36 \text{ kJ}$.)

Q8. A car radio draws 0.5 A of dc current when connected to a 12 V battery. How long does it take for the radio to consume 1.44 kJ?

(Answer: 4 minutes.)

Q9. Find I_x from the diagram below.



(Answer: $I_x = 2.5\text{ A}$.)