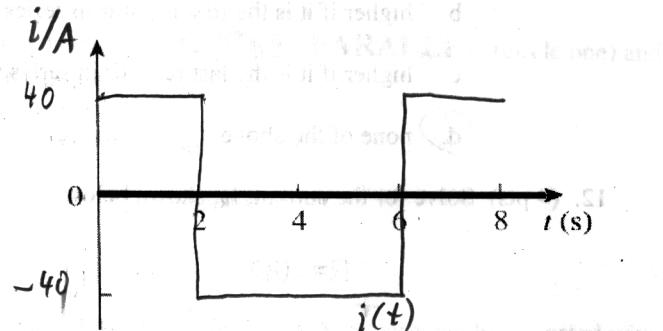
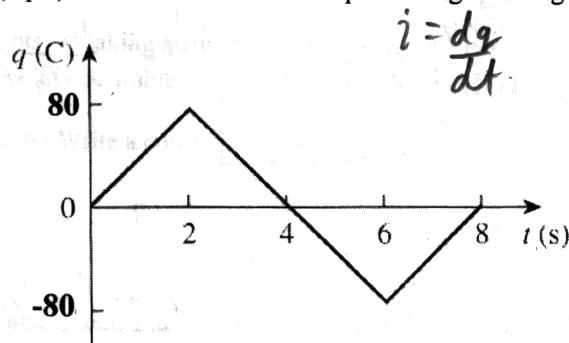


**II. PART 2****Solve Problems**

15. (4 pts) The left sketch below depicts charge flowing through a wire. Sketch & label current on the right graph.



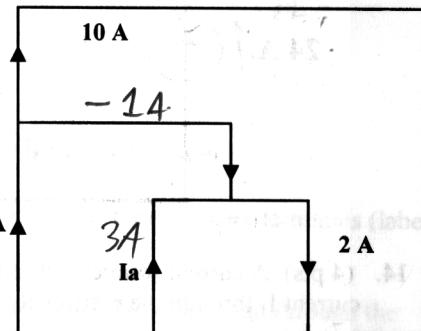
16. (8 pts) A component draws current of  $i(t) = 2t - 1$  amperes at a voltage of  $v(t) = 3.5t$  volts. Find the energy absorbed by the component during the timeframe of  $t=0$  to  $t=5$  seconds.

$$\begin{aligned} P(t) &= v(t) i(t) \\ &= (3.5 \text{ V } t)(2 \frac{\text{A}}{\text{s}} t - 1 \text{ A}) \\ &= 7 \frac{\text{W}}{\text{s}^2} t^2 - 3.5 \frac{\text{W}}{\text{s}} t \\ w(t) &= \int_{t=0}^{5\text{s}} \left( 7 \frac{\text{W}}{\text{s}^2} t^2 - 3.5 \frac{\text{W}}{\text{s}} t \right) dt \end{aligned}$$

$$\begin{aligned} &= \left( \frac{7}{3} \frac{\text{W}}{\text{s}^2} t^3 - \frac{3.5}{2} \frac{\text{W}}{\text{s}} t^2 \right) \Big|_0^{5\text{s}} \\ &= 247.9 \text{ J} \end{aligned}$$

17. (8 pts) Use KCL to find current  $I_a$ .

$$I_a = \underline{3 \text{ A}}$$



18. (9 pts) Find  $V_1$  and  $V_2$ . If  $R_2$  is  $200 \Omega$ , find the power dissipated in  $R_2$ .

$$V_1 = 14 \text{ V} \quad \text{because} \quad V_{S_3} + V_{S_2} + V_S - 2V_1 = 0$$

$$V_2 = 22 \text{ V} \quad \text{because} \quad V_{S_3} + V_{S_2} - V_2 = 0$$

$$\begin{aligned} P_{R_2} &= \frac{V_2^2}{R_2} \\ &= \frac{(22 \text{ V})^2}{200 \Omega} \\ &= 2.42 \text{ W} \end{aligned}$$

