Circuits Analysis 1

Quiz 1

Name: KEY

Date: _____

The current flowing through an electric component is given by the following function:

$$i(t) = \begin{cases} t, & 0 \le t < 2 \\ 2, & 2 \le t < 4 \\ 0, & t \ge 4 \end{cases} \qquad \text{in Amperes}$$

Calculate the total amount of charge that passes through the component in the time interval between t=1 and t=5

$$\Delta Q = \int_{1}^{5} i(t)\,dt$$

$$= \int_{1}^{2} t\,dt + \int_{2}^{4} 2\,dt + \int_{4}^{5} 0\,dt$$

$$= \left.\frac{t^2}{2}\right|_{1}^{2} + \left.2t\right|_{2}^{4} + 0$$

$$= \frac{4-1}{2} + 2(4-2) + 0$$

$$= \frac{3}{2} + 2(2) = \frac{11}{2} \text{ Coulomb}$$