

Circuits 1

$$\textcircled{1} \quad \text{a) } Q = It \\ = (0.5)(1) \\ Q = \boxed{0.5 \text{ C}}$$

$$\text{b) } Q = It \\ = (0.5)(60) \\ Q = \boxed{30 \text{ C}}$$

$$\textcircled{2} \quad I = \frac{Q}{t} = \frac{1020}{330} = \boxed{3.09 \text{ A}}$$

$$\textcircled{3} \quad I = \frac{Q}{t} = \frac{833}{60} = \boxed{13.9 \text{ A}}$$

$$\textcircled{4} \quad t = \frac{Q}{I} = \frac{67}{0.8} = \boxed{83.75 \text{ s}}$$

$$\textcircled{5} \quad Q = 320\,000\,000 (1.6 \times 10^{-19}) = 5.12 \times 10^{-11} \text{ C}$$

$$I = \frac{Q}{t} = \frac{5.12 \times 10^{-11}}{10 \times 10^{-3}} = \boxed{5.12 \times 10^{-9} \text{ A}}$$

$$\textcircled{6} \quad V = \frac{W}{Q} = \frac{24}{4} = \boxed{6 \text{ V}}$$

$$\begin{aligned} \textcircled{7} \quad E &= VQ \\ &= (12)(28\,000) \\ E &= \boxed{336\,000 \text{ J}} \end{aligned}$$

$$\begin{aligned} \textcircled{8} \quad E &= VQ \\ &= (12)(1000) \\ E &= \boxed{12\,000 \text{ J}} \end{aligned}$$

$$\textcircled{9} \quad V = \frac{Q}{C} = \frac{16\,000}{125} = \boxed{128 \text{ V}}$$

$$\textcircled{10} \quad Q = \frac{E}{V} = \frac{3\,000\,000\,000}{48\,000\,000} = \boxed{62.5 \text{ C}}$$

$$\begin{aligned} \textcircled{11} \quad E &= VQ \\ &= (45000)(1.6 \times 10^{-19}) \\ E &= \boxed{7.2 \times 10^{-15} \text{ J}} \end{aligned}$$