

Answers

$$1.4 \quad i = \frac{dq}{dt} \quad i = 3.2 \text{ A}, \quad t = 20 \text{ s}$$

$$q = 3.2 \times 20 = \boxed{64 \text{ C}}$$

$$1.5 \quad Q = \int_{t_0}^t i(t) dt = \int_0^{10} \frac{1}{2} t dt = \frac{1}{4} t^2 \Big|_0^{10} = \frac{1}{4} 10^2 - 0 = \boxed{25 \text{ C}}$$

$$1.6 \quad (a) \quad i = \frac{dq}{dt} = \frac{80}{2} = \boxed{40 \text{ A}}$$

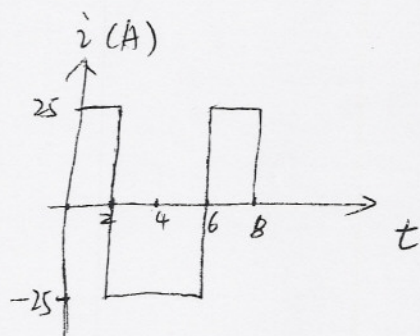
$$(b) \quad i = \frac{dq}{dt} = \boxed{0 \text{ A}}$$

$$(c) \quad i = \frac{dq}{dt} = -\frac{80}{4} = \boxed{-20 \text{ A}}$$

$$1.7 \quad 0 \sim 2 \text{ s} \quad i = \frac{dq}{dt} = \frac{50}{2} = 25 \text{ A}$$

$$2 \sim 6 \text{ s} \quad i = \frac{dq}{dt} = \frac{-50}{2} = -25 \text{ A}$$

$$6 \sim 8 \text{ s} \quad i = \frac{dq}{dt} = \frac{50}{2} = 25 \text{ A}$$



$$1.10 \quad i = 8 \text{ kA}, \quad \Delta t = 15 \mu\text{s}, \quad \Delta q = i \Delta t = 8 \times 10^3 \times 15 \times 10^{-6} = \boxed{120 \text{ mC}}$$

$$1.11 \quad \Delta q = 85 \times 10^{-3} \times 12 \times 3600 = \boxed{3.672 \text{ kC}}$$

$$V = \frac{\Delta W}{\Delta q} \rightarrow \Delta W = V \Delta q = 1.2 \times 3672 = \boxed{4.406 \text{ kJ}}$$

1.17 Law of conservation of energy.  $\Sigma p = 0$

$$P_1 + P_2 + P_3 + P_4 + P_5 = 0$$

$$-205 + 60 + 45 + P_3 + 30 = 0 \quad P_3 = 70 \text{ W}$$

$$1.19 \quad I + 1 \text{ A} = 4 \text{ A}, \quad \boxed{I = 3 \text{ A}}$$

$$1.20 \quad -6(30) + 6(12) + 2(28) + 1(28) + 3V_0 - 3(10) = 0$$
$$3V_0 = 54 \quad \boxed{V_0 = 18V}$$

$$1.32 \quad t = \frac{Q}{I} = \frac{15}{20 \times 10^{-6}} = \boxed{0.75 \times 10^6 (S)}$$

$$1.35 \quad \frac{5}{60} (5 + 4 + 3 + 8 + 2 \times 4) = \boxed{2.333 \text{ MWh}}$$

$$1.37 \quad W = Pt = (V^2/R) t = 12 \times 40 \times 3600 = \boxed{1.728 \text{ MJ}}$$

$$1.39 \quad p = 600 \text{ W}, \quad t = 4 \text{ h}$$

$$pt = 2.4 \text{ kWh}, \quad \text{cost} = 2.4 \times 10 = \boxed{24 \text{ ¢}}$$