CMPE 306 HW1

1. $0.08076 per kilowatt/hr

a) total hour = 2 · 365 = 730 total hours

total watts = 3000 = 3 kilowatts

thus 0.08076 × 3 × 730 = $1,768.64

b) $p = vi$ $p = 3000$ watt $v = 120V$ i?

$$i = \frac{p}{v} = \frac{3000}{120} = 25A$$

2. 175 mA for 10 hr

$$q = \int_{t_0}^{t_i} i\,dt = \int_0^{10} 0.175\,dt$$

$$= 0.175t \Big|_0^{10} = 1.75C$$

$p = vi = 1.3 \cdot 0.175 = 0.2275W$

$$p = \frac{dw}{dt} \quad (w: \text{work}) = \int p\,dt = \int dw$$

$$\int_0^{10} p\,dt = w \rightarrow w = \int_0^{10} 0.2275\,dt$$

$$w = 0.2275t \Big|_0^{10} = 2.275J$$

3. $\Sigma p = 0$

$$p_1 + p_2 + p_3 + p_4 + p_5 = 0$$

$p_2 = 35W$

$p_4 = 10W$ $200 + 35 + p_3 + 10 - 20 = 0$

$p_5 = -20W$ $p_3 = -225W$

$p_1 = 50V \cdot 4A = 200W$

4. $P_1 = -30 \cdot 10A = -300W$
$P_2 = (+1) \cdot 10 \cdot 10 = 100W$
$P_3 = (+1) \cdot 14 \cdot 20 = 280W$
$P_4 = (-1) \cdot 8 \cdot 4 = -32W$
$P_5 = (-1) \cdot 12 \cdot 4 = -36W$

5. $-30V + 12V + V_0 = 0 \rightarrow \boxed{V_0 = 18V}$
$28V - 10V - V_0 = 0 \rightarrow \boxed{V_0 = 18V}$

6. Left loop → ↻ $-V_1 + 10V + 50V = 0$
$\boxed{V_1 = 60V}$

Right loop → ↻ $20V + V_2 - 50V = 0$
$\boxed{V_2 = 30V}$

outer loop → ↻ $10V + 20V + 30 - 60 = 0V$ ✓