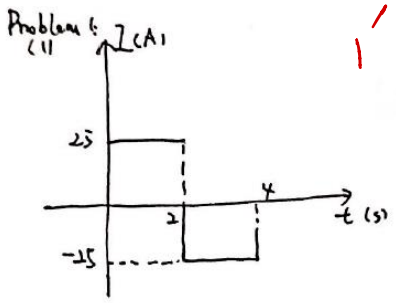
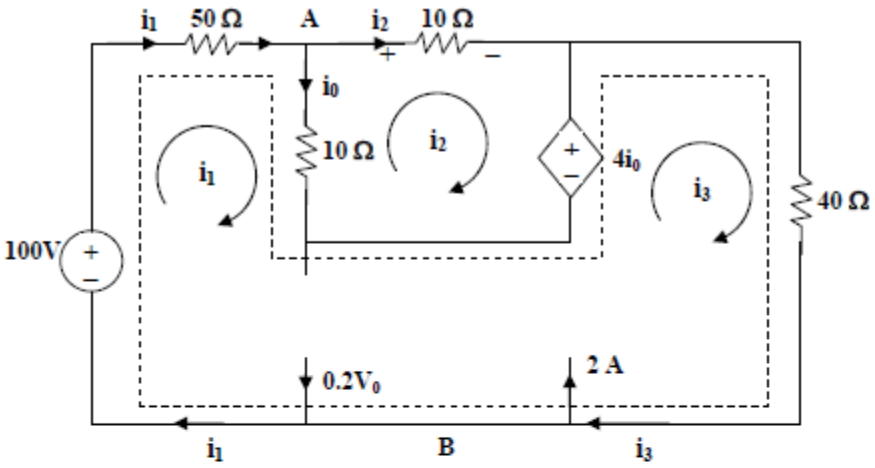
1.



1′ (2) $W = \int_0^4 p\,dt = 500\text{J}$. 0.5′

Since $P = UI = 125\text{ W}$. 0.5′

2.



For mesh 2, $20i_2 - 10i_1 + 4i_0 = 0$ (1) 1′

But at node A, $i_o = i_1 - i_2$ so that (1) becomes $i_1 = (16/6)i_2$ (2) 0.5′

For the supermesh, $-100 + 50i_1 + 10(i_1 - i_2) - 4i_0 + 40i_3 = 0$ 1′

or $50 = 28i_1 - 3i_2 + 20i_3$ (3)

At node B, $i_3 + 0.2v_0 = 2 + i_1$ (4) 0.5′

But, $v_0 = 10i_2$ so that (4) becomes $i_3 = 2 + (2/3)i_2$ (5) 0.5′

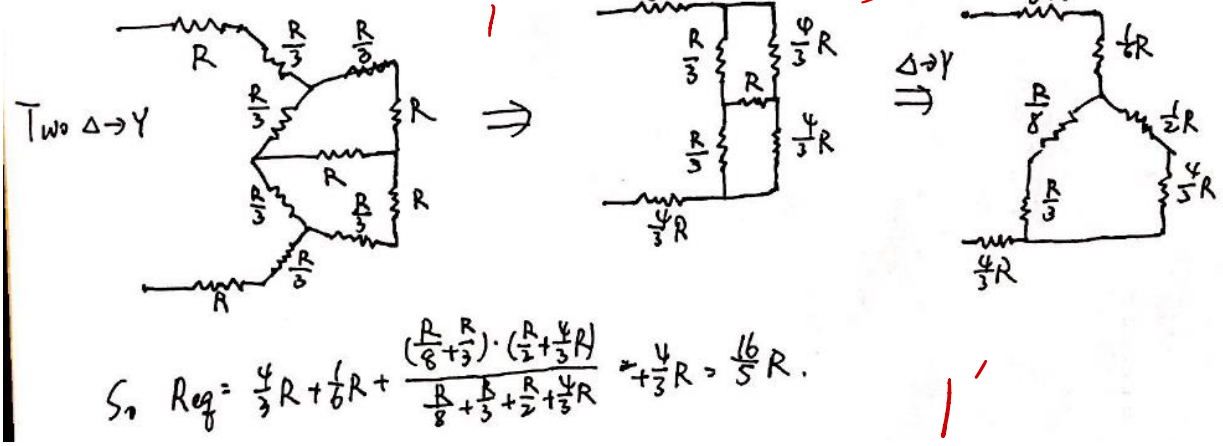
Solving (1) to (5), $i_2 = 0.11764$, 0.5′

$v_0 = 10i_2 = \underline{\textbf{1.1764 volts}}$, $i_0 = i_1 - i_2 = (5/3)i_2 = \underline{\textbf{196.07 mA}}$ 0.5′

3.

Problem 3.

By Y-delta transformation.



1′ 0.5′ 1′

So $R_{eq} = \frac{4}{3}R + \frac{1}{6}R + \frac{(\frac{R}{8}+\frac{R}{3})\cdot(\frac{R}{2}+\frac{4}{3}R)}{\frac{R}{8}+\frac{R}{3}+\frac{R}{2}+\frac{4}{3}R} = \frac{4}{3}R + \frac{16}{5}R.$

1′