Han Yibei [illegible]

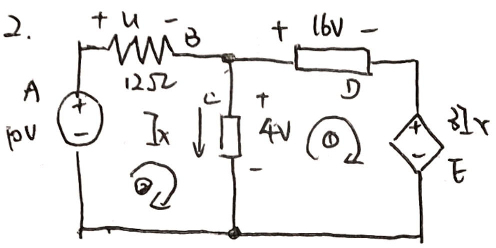
Problem 1. (1) $I(t) = q(t)dt = 20\pi\cos(2\pi t)\ \mu A$

$P(t) = u(t)\cdot I(t) = 2\sin(2\pi t)\cdot 20\pi\cos(2\pi t)\times 10^{-6}$

$= 2\pi\times 10^{-5}\sin(4\pi t)\ W$

(2) $E = \left|\int P(t)dt\right| = 2\pi\times 10^{-5}\left|\int_0^1 \sin(4\pi t)\right| = 2\pi\times 10^{-5}\left|\cos(4\pi t)\cdot\frac{1}{4\pi}\Big|_0^1\right| = 0J$

Problem 2.



(1) for loop I:

$-4V + 16V + 3I_x = 0.$

for loop 2:

$-10V + u + 4V = 0.$

$\Rightarrow \begin{cases} I_x = -4A \\ u = 6V \end{cases}$

(2) for A: $P_A = U_A\cdot I_A = U_A\cdot I_B = -U_A\cdot\frac{U_B}{R_B} = 10V\times\frac{6V}{12\Omega} = -5W$

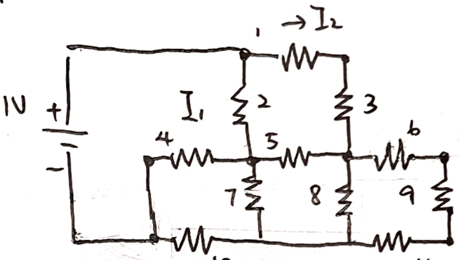
for B: $P_B = U_B\cdot I_B = U_B\cdot\frac{U_B}{R_B} = \frac{(6V)^2}{12\Omega} = -3W$

for C: $P_C = I_C\cdot U_C = -4A\cdot 4V = -16W$

for D: $P_D = -U_D\cdot I_D = -16V\times(-I_C + I_B)) =$

for E: $P_E = U_E\cdot I_E = U_E\cdot I_D =$

Problem 3.



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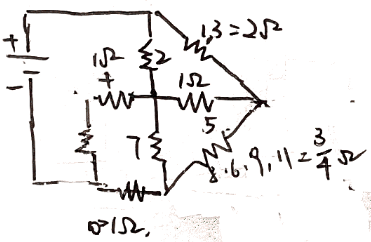

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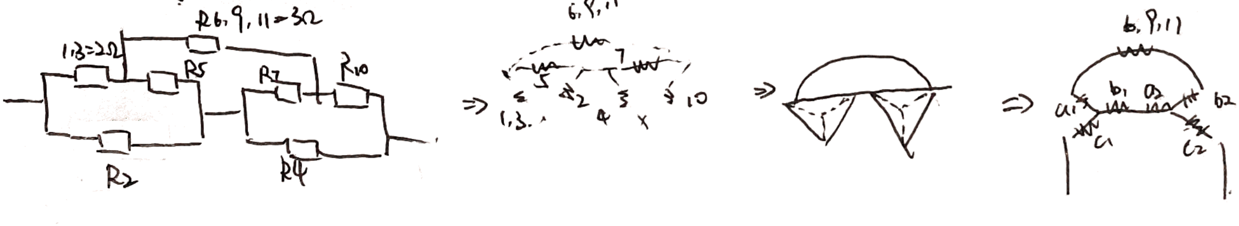

(1) nodes : 8   meshes : 3   branches : 12.

loops : 19.

(2). $R_{a1} = \frac{2\times 1}{2+1+1} = \frac{1}{2}\Omega.$ $R_{a2} = \frac{1\times 1}{1+1+1} = \frac{1}{3}\Omega$

$R_{b1} = \frac{1\times 1}{2+1+1} = \frac{1}{4}\Omega$ $R_{b2} = \frac{1\times 1}{1+1+1} = \frac{1}{3}\Omega$

$R_{c1} = \frac{2\times 1}{2+1+1} = \frac{1}{2}\Omega$ $R_{c2} = \frac{1\times 1}{1+1+1} = \frac{1}{3}\Omega.$

$a_1 \cap 6, 8, 11 \cap b_2 = \frac{1}{2} + \frac{3}{4} + \frac{1}{3}$ A $= \frac{19}{12}\Omega$

$b_1 \cap a_2 = \frac{7}{12}\Omega$ B

$A \cup B = \frac{133}{312}\Omega$

$\Rightarrow R = c_1 \cap (A\cup B) \cap c_2$

$= \frac{131}{104} = 1.26\Omega.$