

Esercitazione 2

Corrente Continua



$$E_1 = 18V$$

$$E_2 = 12V$$

$$E_3 = 21V$$

$$P = ?$$

$$R_1 = 7\Omega$$

$$R_2 = 3\Omega$$

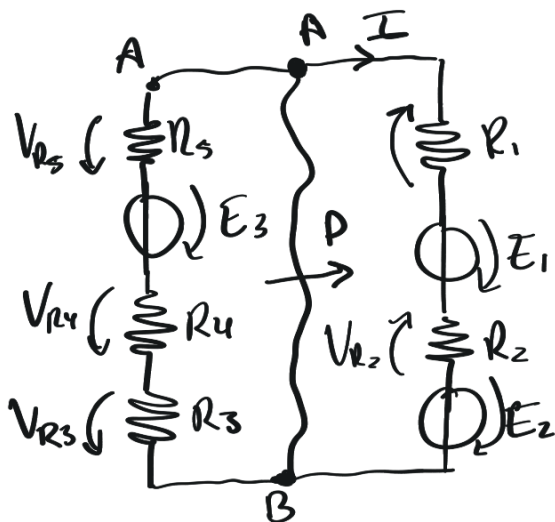
$$R_3 = 5\Omega$$

$$R_4 = 5\Omega$$

$$R_5 = 6\Omega$$

Porta elettrica

↳ Potenza scambiata
attraverso la porta AB



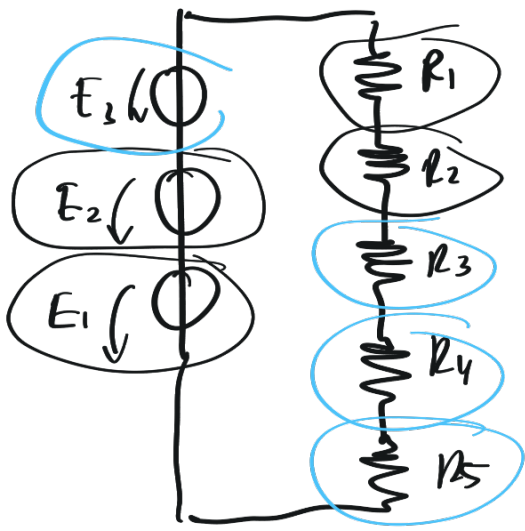
LKT:

$$-V_{R5} + E_1 - V_{R2} + E_2 - V_{R3} - V_{R4} - E_3 - V_{R5} = 0$$

$$-R_1 I + E_1 - R_2 I + E_2 - R_3 I - R_4 I - E_3 - R_5 I = 0$$

↳ Maglia elettrica

$$I = \frac{E_1 + E_2 - E_3}{R_1 + R_2 + R_3 + R_4 + R_5} = 0,35 A$$



In serie per calcolare
la corrente l'ordine non importa,
invece per la potenza
ci importa

A

B

$$P = \underbrace{-E_1 I - E_2 I}_{\text{Potenza generata}} + \underbrace{R_1 I^2 + R_2 I^2}_{\text{Potenza assorbita}}$$

$$= -(E_1 + E_2) I + (R_1 + R_2) I^2$$

$$= -9,275 \text{ W}$$

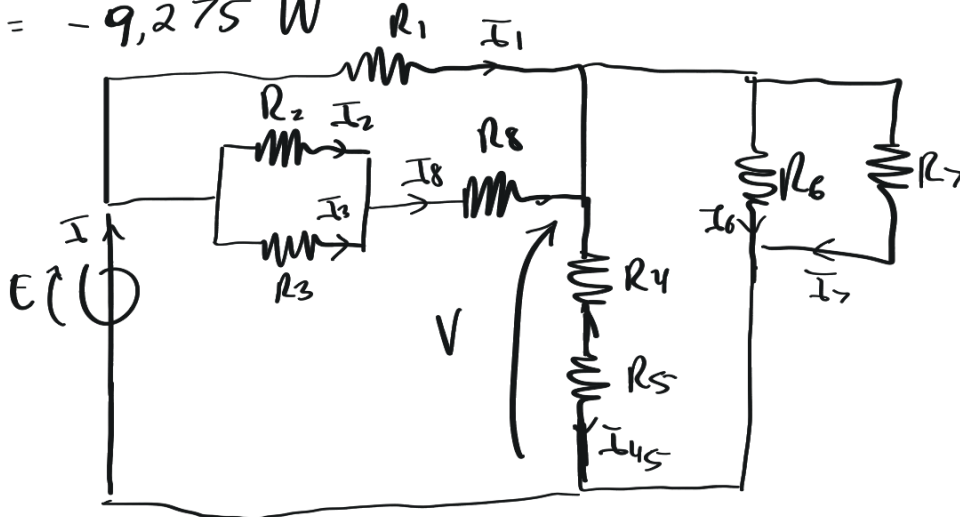
È l'opposto
dell'altro

Ma solo per i calcoli:

$$P = -E_3 I - (R_3 + R_4 + R_5) I^2$$

$$= -9,275 \text{ W}$$

2)

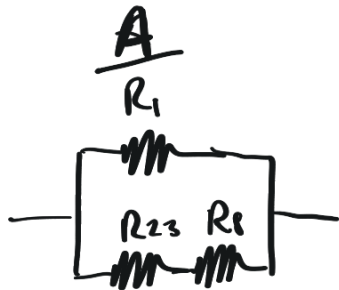
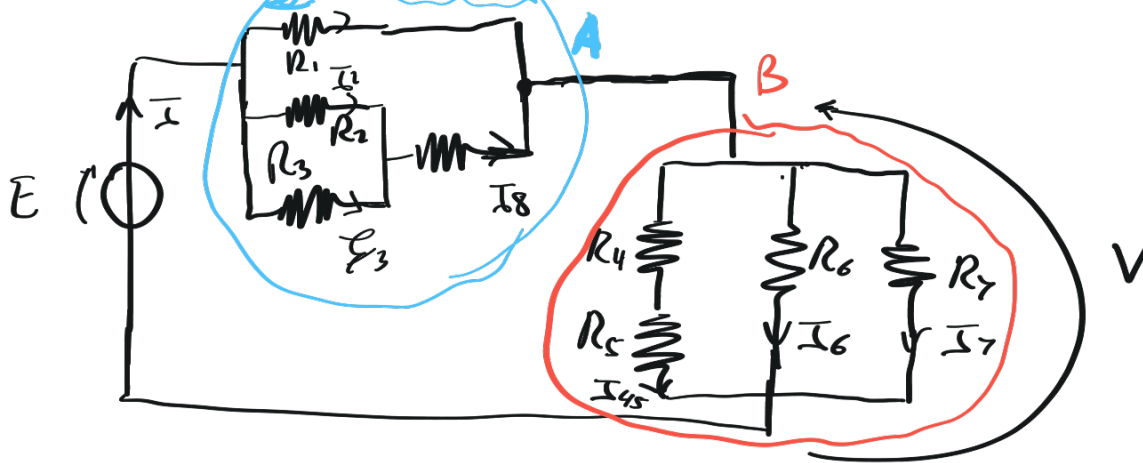


$$E = 10 \text{ V}$$

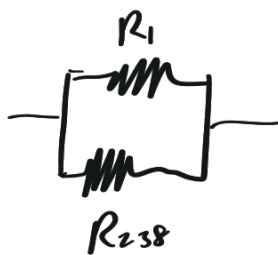
$$R_{1-8} = 1 \text{ W}$$

$$V = ?$$

$$P_{R_{1-8}} = ?$$

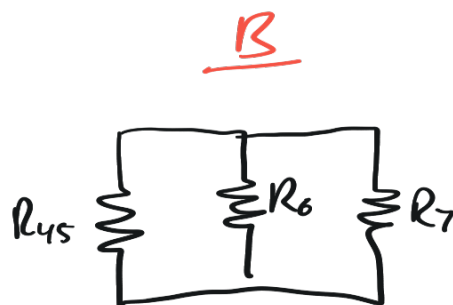
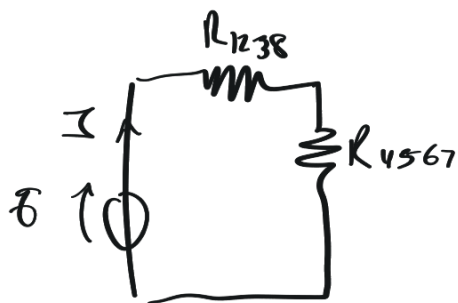


$$R_{23} = \frac{R_2 R_3}{R_2 + R_3} = \frac{1}{2} \Omega$$



$$R_{238} = R_{23} + R_8 = 1,5 \Omega$$

$$R_{1238} = \frac{R_1 R_{238}}{R_1 + R_{238}} = 0,6 \Omega$$



$$R_{45} = R_4 + R_5 = 2 \Omega$$

$$R_{67} = \frac{R_6 R_7}{R_6 + R_7} = 0,8$$

$$R_{4567} = 0,4 \Omega$$

Altro metodo:

$$V = \frac{R_{4567}}{R_{1238} + R_{5678}} E = 4V$$

Partitore
di tensione

$$I = \frac{E}{R_{1-8}} = 10A$$

$$V = R_{4567} \cdot I = 4V$$

$$P_{R1-8} = ?$$

$$P_{R6} = \frac{V^2}{R_6} = 16W$$

$$P_{R7} = \frac{V^2}{R_7} = 16W$$

$$I_{45} = \frac{V}{R_{45}} = \frac{V}{R_4 + R_5} = 2V$$

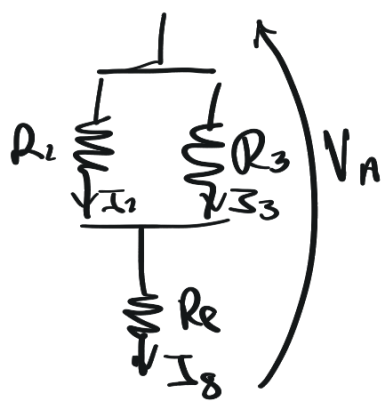
$$P_{R4} = R_4 I_{45}^2 = 4W \quad P_{R5} = R_5 I_{45}^2 = 4W$$

$$P_{R5} = \frac{V_{R5}^2}{R_5} = \frac{\left(V \frac{R_5}{R_4 + R_5} \right)^2}{R_5}$$

$$= \frac{V^2 R_5}{R_{45}} = \underbrace{\left(P_{45} \right)}_{\rightarrow \frac{V^2}{R_{45}}} \frac{R_5}{R_{45}}$$

$$V_n = E - V = 6V$$

$$P_{R1} = \frac{V_n^2}{R_1} = 36W$$



$$R_{238} = 1,5 \Omega$$

$$I_8 = \frac{V_A}{R_{238}} = 4A$$

$$P_8 = \frac{V_A^2}{R_{238}} = 24W$$

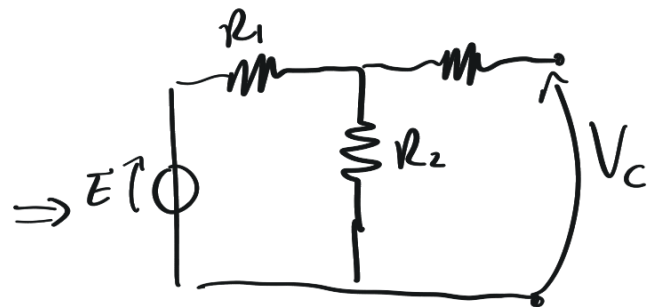
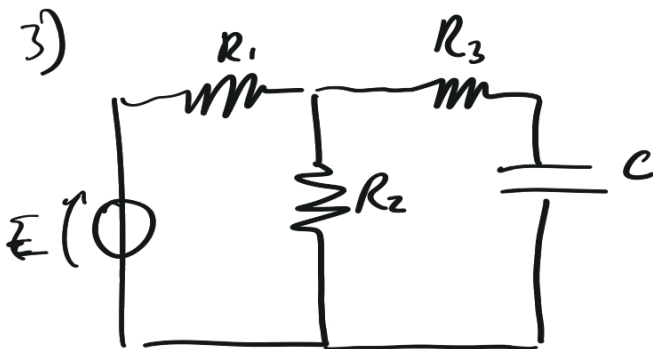
$$I_2 = \frac{R_3}{R_2 + R_3} \cdot I_8$$

$$P_{R2} = R_2 I_2^2 = 4W$$

$$P_{R3} = R_3 I_3^2 = 4W$$

$$I_2 = 4A = I_3$$

$$P_E = 100W$$



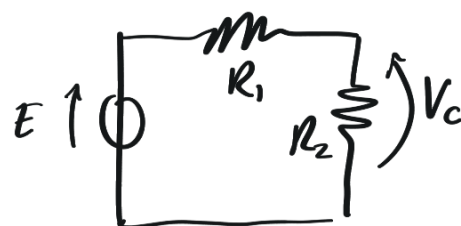
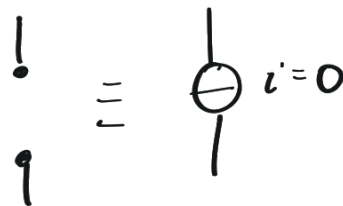
$$E = 6V$$

$$C = 1 \mu F \quad U_C = ?$$

$$R_1 = 1 \Omega$$

$$R_2 = 2 \Omega$$

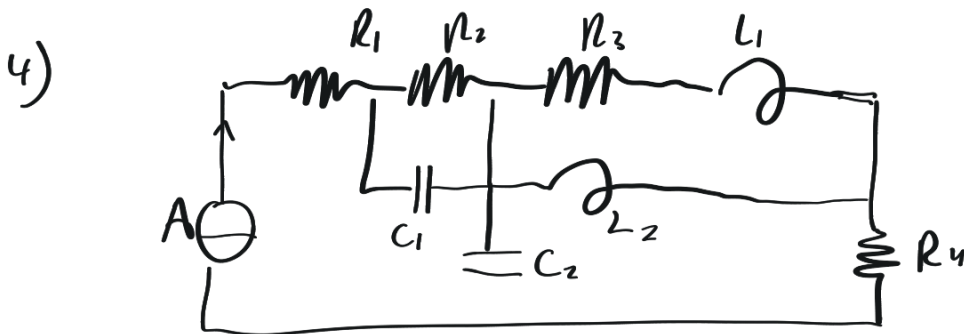
$$R_3 = 4 \Omega$$



$$V_C = \frac{R_2}{R_1 + R_2} E = 4V$$

$$R_1 + R_2$$

$$W_c = \frac{1}{2} C V^2 = \frac{1}{2} \cdot 1 \mu F \cdot 16 = 8 \mu J$$



$$A_1 = 10 A$$

$$R_1 = 10 \Omega$$

$$R_2 = 6 \Omega$$

$$R_3 = 5 \Omega$$

$$R_4 = 5 \Omega$$

$$C_1 = 8 \mu F$$

$$C_2 = 6,5 \mu F$$

$$L_1 = 4 mH$$

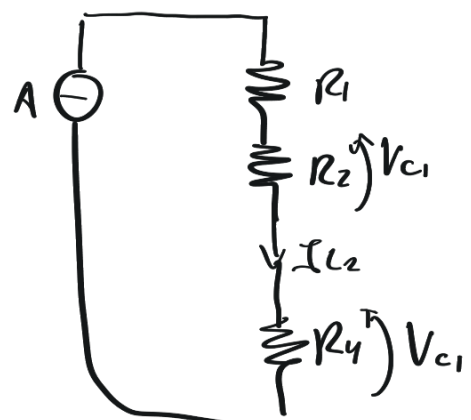
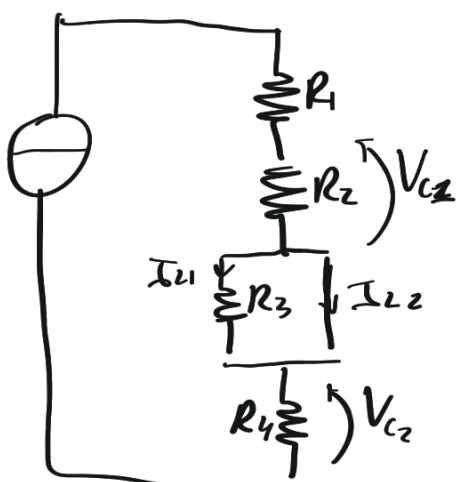
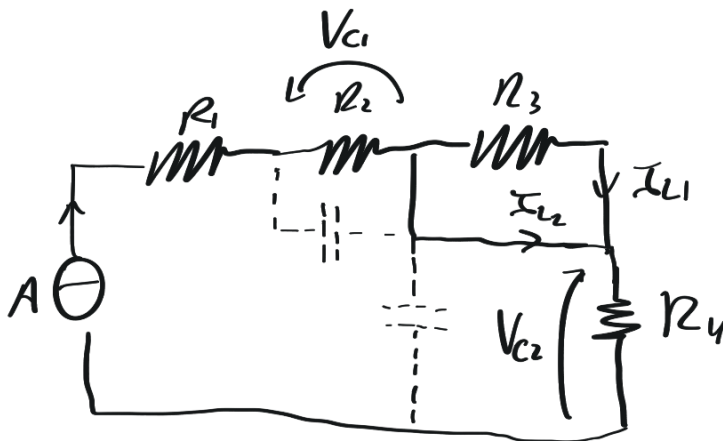
$$L_2 = 0,1 mH$$

$$W_{C1} = ?$$

$$W_{C2} = ?$$

$$W_{L2} = ?$$

$$W_{L1} = ?$$



$$I_{L2} = A = 10 \text{ A}$$

$$I_{L1} = 0$$

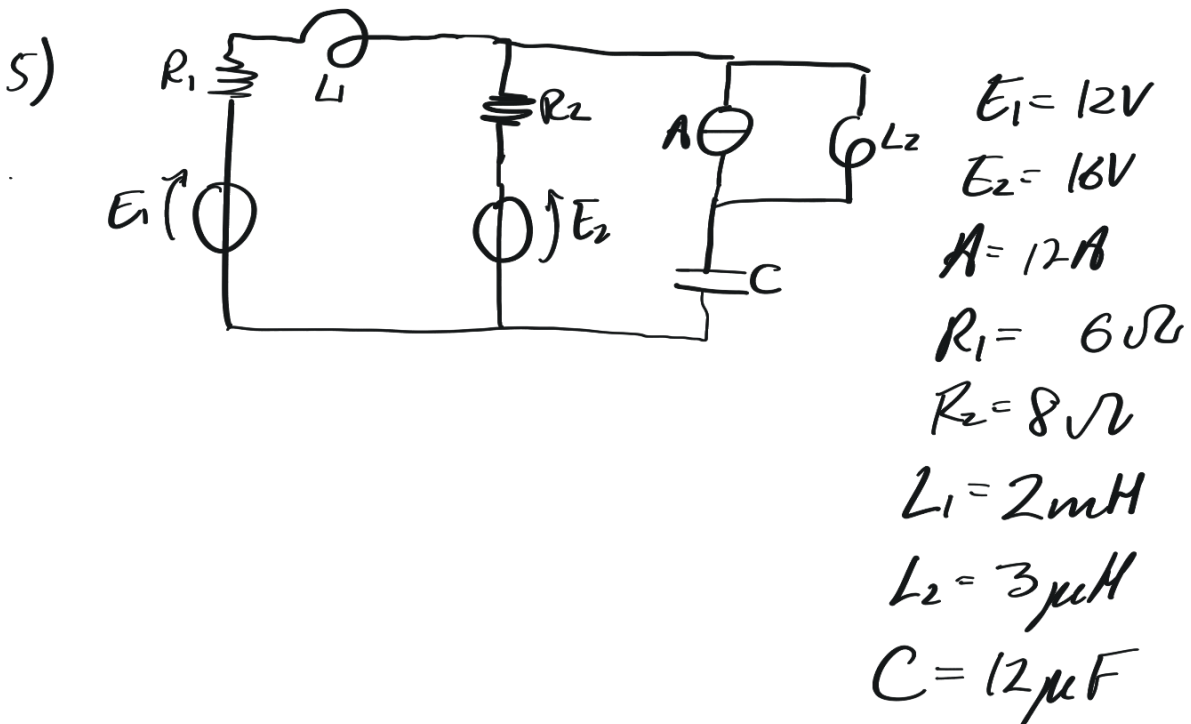
$$W_{L2} = \frac{1}{2} L_2 I^2 = 5 \text{ mJ}$$

$$V_{C1} = R_2 \cdot A = 60 \text{ V}$$

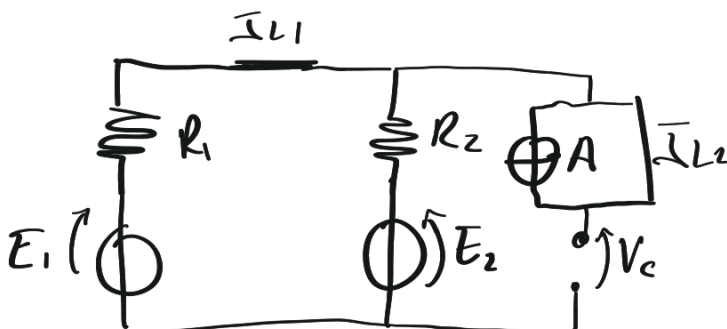
$$W_{C1} = \frac{1}{2} C_1 V^2 = 14,4 \mu\text{J}$$

$$V_{C2} = R_4 \cdot A = 30 \text{ V}$$

$$W_{C2} = \frac{1}{2} C_2 V_{C2}^2 = 2,925 \text{ mJ}$$



$$W_{L1} = ?, W_{L2} = ?, W_C = ?$$



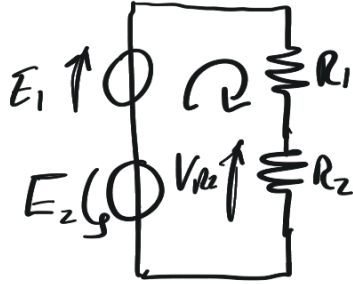
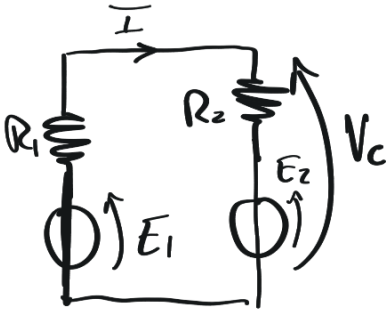
$$\int \equiv \bigcirc \uparrow V=0 \equiv \text{battery } R=0$$

$$\mathcal{I}_{L^2} = A = \Pi A$$

$$W_{L2} = \frac{1}{2} L_2 I^2 = 0,216 \text{ mJ}$$

$$V_{R_2} = \frac{E_1 - E_2}{R_1 + R_2} R_2$$

$$= -2,3V$$



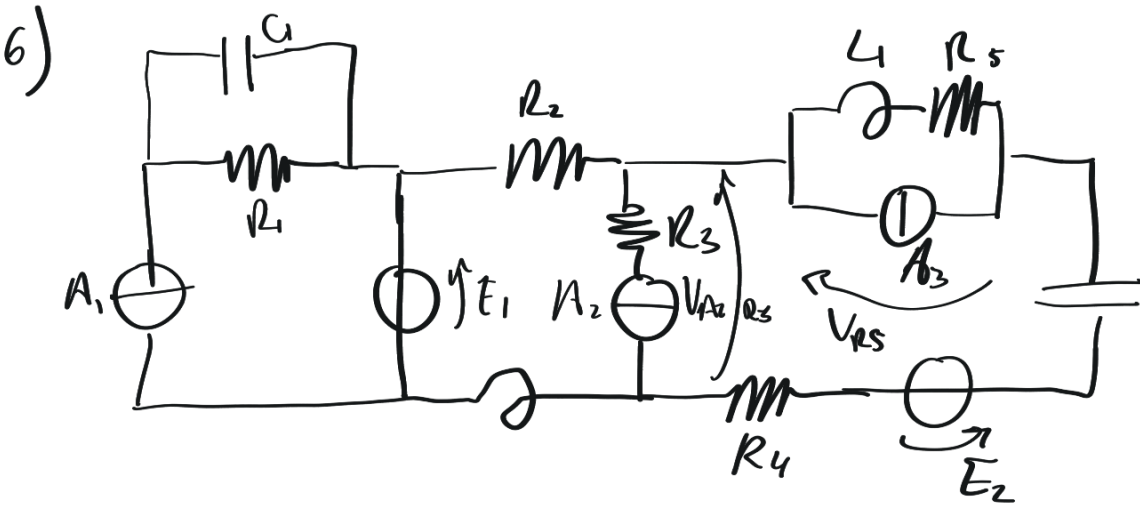
$$V_C = E_z + V_R = 13,7V$$

$$W_c = \frac{1}{2} C V_c^2$$

$$= 1,126 \text{ mJ}$$

$$I_{L1} = \frac{E_1 - E_2}{R_{L1} R_2} = -0,28 \text{ A}$$

$$W_{L1} = \frac{1}{2} L_1 \cdot \bar{I}_{L1}^2 = 80 \mu J$$



$$E_1 = 20 \text{ V}$$

$$E_2 = 15V$$

$$A_1 = 4A$$

$$A_2 = 2A$$

$$A_3 = 5A$$

$$R_1 = 2 \Omega$$

$$R_2 = 3 \Omega$$

$$R_3 = 6 \Omega$$

$$R_4 = 5\Omega$$

$$R_5 = 1 \sqrt{2}$$

$$L_1 = 2 \text{ mH}$$

$$L_2 = 3 \mu M$$

$$C_1 = 5 \mu F$$

$$C_2 = 20 \mu F$$



[illegible]

$$I_{L2} = A_2 = 2A$$

$$W_{L2} = \frac{1}{2} L_2 \bar{\delta u}^2 =$$

$$V_{R2} = R_2 \cdot I_2 = 6V$$

$$V_{R3} - V_{R5} - V_{C2} - E_2 + V_{R4} = 0$$

$$V_{C2} = V_{R2R3} - V_{R5} - E_2 + V_{R4} = 4V$$

$$I_4 = A_3 = SA$$

$$V_{RS} = -R_S \cdot A_3 \quad 5V$$