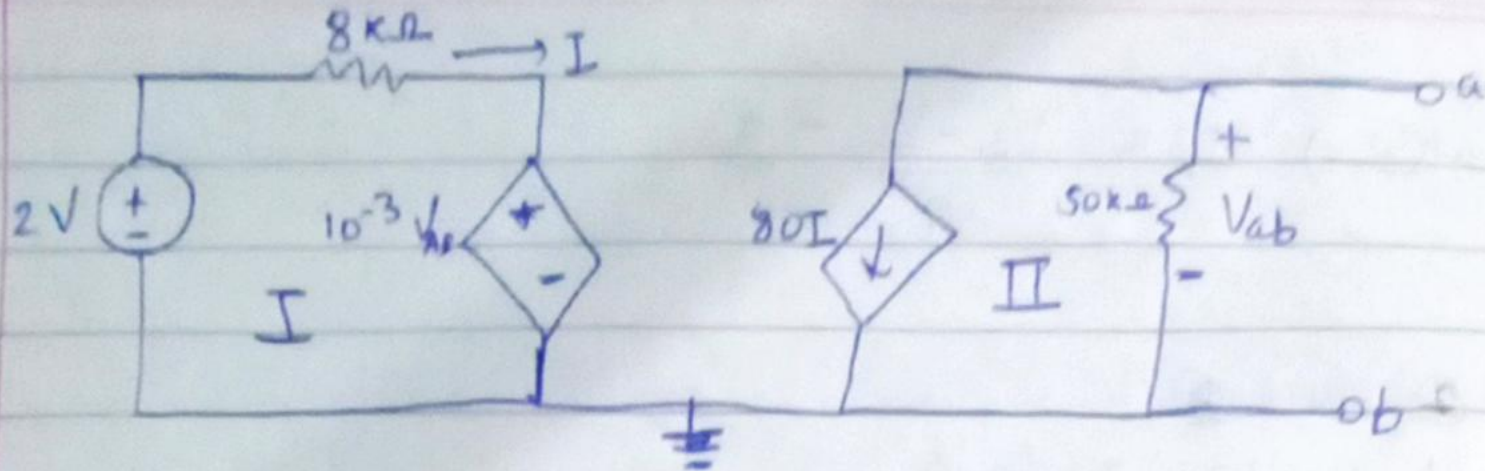


Q5



$$(i) \text{ In } \textcircled{I}, I = \frac{2 - 0.001V_{AB}}{8000}$$

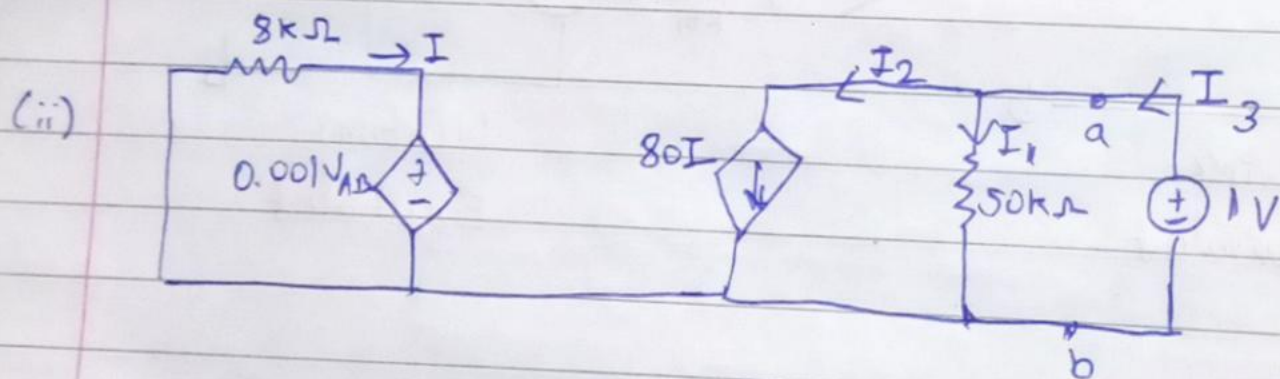
$$\text{In } \textcircled{II}, V_{AB} = -80I \times 50000$$

$$= -\frac{10}{80} \times 50000 \times \frac{(2 - 0.001V_{AB})}{8000}$$

$$V_{AB} = -1000 + 0.5V_{AB}$$

$$\Rightarrow 0.5V_{AB} = -1000$$

$$\Rightarrow V_{AB} = -2000V \rightarrow V_{TH}$$



$$\Rightarrow I = \frac{-0.001V_{AB}}{8000} = \frac{-0.001(1)}{8000}$$

$$I = -0.125 \times 10^{-6} A$$

$$\Rightarrow I_2 = 80 \times I = -1 \times 10^{-5} A$$

$$I_1 = \frac{1}{8 \times 10^4} = 2 \times 10^{-5} A$$

$$R_{AB} = \frac{V_{AB}}{I_3}$$

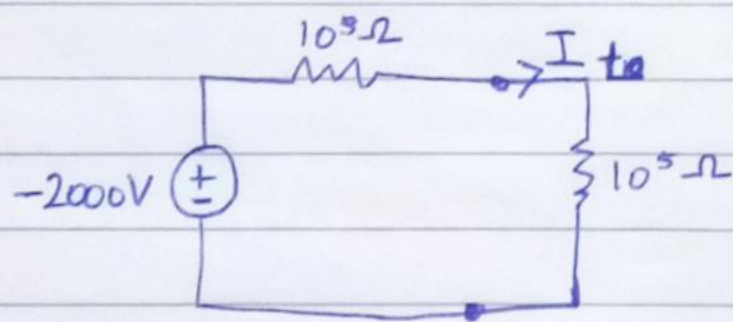
$$= \frac{1}{1 \times 10^{-5}}$$

$$I_3 = I_2 + I_1$$

$$= 1 \times 10^{-5}$$

$$\Rightarrow \boxed{R_{AB} = 10^5 \Omega} \rightarrow R_{TH} = R_L$$

For maximum power transfer: $\boxed{R_L = 10^5 \Omega}$



$$I_L = - \frac{2000}{2 \times 10^3} = -1 \times 10^{-2} A$$

$$P = I_L^2 R_L = 10^{-4} \times 10^5 = 1 W$$

$$\therefore \boxed{P_{Max} = 1 W}$$