

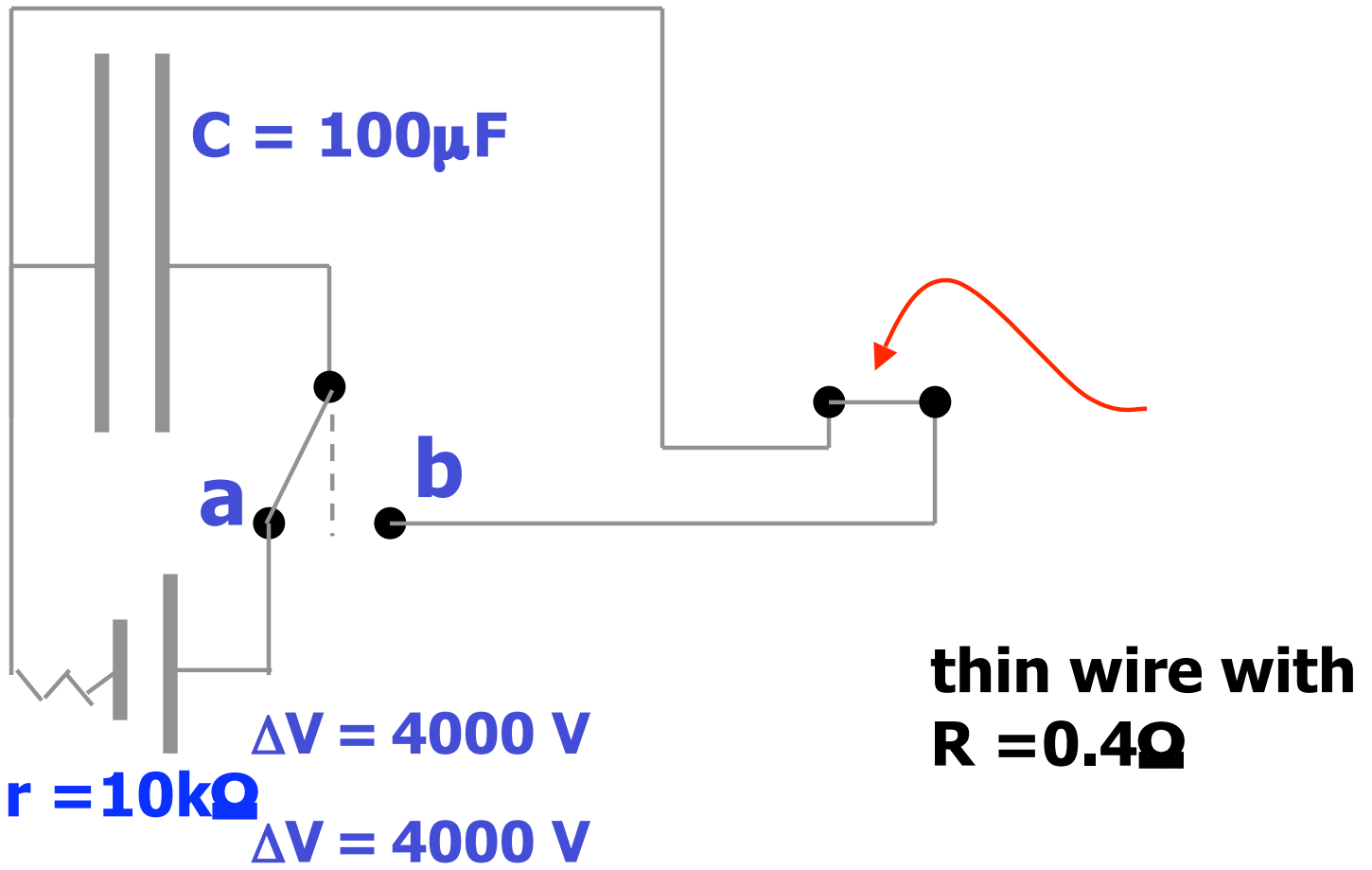
Problem 3 (25 points)

In one of the lecture demos, a large capacitor was charged using a power supply with an output voltage of 4000V and internal resistance of 10kOhm. Assume that at times $t < 0$ the capacitor is completely uncharged. Then the switch is moved to position a to charge the capacitor.

(a) Sketch how the charge Q on the capacitor will change as a function of time for $t < 0$.

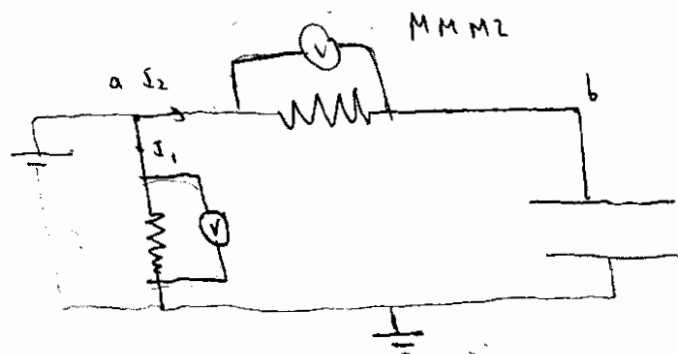
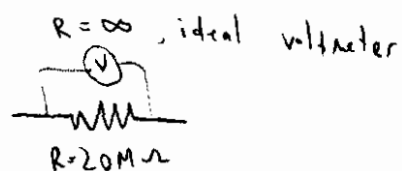
(b) At which time t will the power delivered by the power supply be maximal? Explain in one or two sentences.

(c) What is the maximum power provided by the power supply?



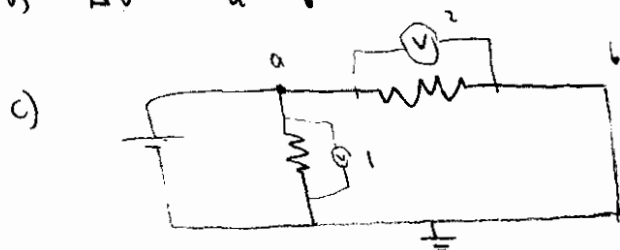
3.

I will draw the multimeters as :

Ground. Shows any choice of $V = 0$ before : $I_2 = 0$ (circuit is open) , $V_a = V_b$

a) $V = 400V$

b) $\Delta V = V_a - V_b = 0$



$V_b = 0$

d) $\Delta V = V_a - V_b = 380V$

e) The HVPS produces more current so there is a higher potential drop caused by the internal resistance of the HVPS

f) $V = E \cdot d = \frac{F}{m} d$

$$\left. \begin{array}{l} F \rightarrow F \\ m \rightarrow m \\ d \rightarrow 2d \end{array} \right\} V \rightarrow 2V$$

MMM1 would read 800V