

12-16) Two square metal plates each 0.1 meter on a side are parallel to each other and separated by a distance of 10^{-2} meters. The region between the plates is filled with water of conductivity 10^{-3} (ohm-meter) $^{-1}$. If a potential difference of 150 volts is maintained between the plates, find the rate of change of temperature of the water. (Neglect end effects and heat losses to regions outside the water.)