

tutorial #3 [electric circuits].q1

1) Alessandro Volta connects his car's $E = 12 \text{ V}$ battery to two same parallel $R = 2 \text{ } \Omega$ coils immersed in the water. The wires that he connects the battery has $r = 0.5 \text{ } \Omega$ resistance. He wants to make some tea so he need $m = 0.3 \text{ kg}$ water. The water is initially in temperature $T_i = 20^\circ$.

- a) Find the equivalence resistance of the whole circuit, r in series with two parallel R 's.
- b) Find the current passing through the battery.
- c) Find the power being supplied by the battery.
- d) The equivalence of two parallel R 's is $R/2$. Calculate the power that is delivered to the coils.
- e) Find the amount of energy needed to get water to boiling point.
- f) Using last two parts, how long it takes to boil the water?