RC Circuit Problems

adapted from <u>www.physics-prep.com/index.php/practice-problems-rc-circuits-2</u>

- 1. A pair of 2.0 nF capacitors, in parallel, is in series with another pair of 1.0 nF capacitors, in parallel. What is the equivalent capacitance of this configuration?
- 2. A $0.32 \,\mu\text{F}$ capacitor is charged to a potential difference of 500 V. How many electrons are needed the capacitor to achieve this charge?
- 3. Consider the following RC circuit.



The switch is closed and the capacitors are allowed to fully charge.

- (a) What is voltage across each capacitor?
- (b) Calculate the charge stored on each capacitor.
- (c) Calculate the total energy stored in the capacitors.

The switch is open and the battery is replaced by a wire. The switch is then closed.

- (d) Calculate
 - (i) the initial current in the circuit.
 - (ii) the current after 3 time constants.
 - (iii) how long it will take for the current to reach 1% of the initial value.