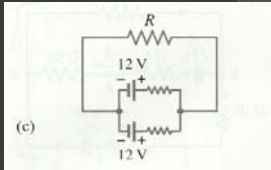


EMF in Parallel, Capacitors in Circuits, RC Circuits

7 – ELECTRIC CIRCUITS

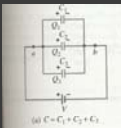
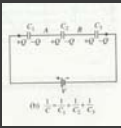
EMF in Parallel

- Used to provide more I
- V's are equal in parallel so each cell has to produce only a fraction of the total current
- The loss due to internal resistance is less



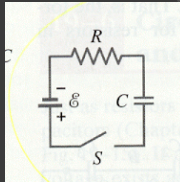
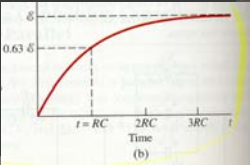
Capacitors in Circuits

- In series R's are additive.
- In parallel R's are reciprocal and additive
- In series C's are reciprocal and additive.
- In parallel, C's are additive.
- $Q_1 = C_1V$ and $Q_2 = C_2V$ etc..
- The total charge that must leave the battery is $Q = Q_1 + Q_2...$
- So $Q = C_{eq}V$
- What is really happening by adding capacitors in parallel is that we are increasing the effective area of the plates so that total or equivalent capacitance increases.

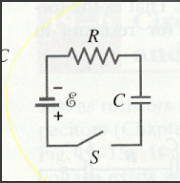
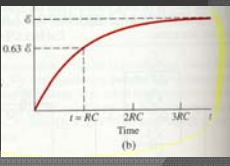
RC Circuits

- Circuits that contain a capacitor and a resistor.
- Close the switch S. Electrons will flow out of the negative terminal and accumulate [a negative charge] over time on the upper plate of the capacitor.

RC Circuits

- Electrons will also flow into the + terminal of the battery leaving a + charge on the other [lower] plate of the capacitor.
- As charge accumulates on the capacitor, the potential difference, V, across it increases and the I is reduced until eventually the V across the capacitor equals the emf of the battery.
- Now there is no potential difference across the R and no further current flow!

RC Circuits

- What if we discharge the charged capacitor?
 - No battery needed.
- When the switch is closed, charge begins to flow through resistor R from one side of the capacitor toward the other side, until it is fully discharged.
- Note this curve follows one of exponential decay.

