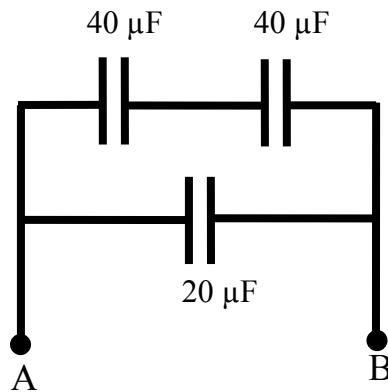


Homework 4 (due: March 7)

1. A switch that connects a battery to a $10\ \mu\text{F}$ capacitor is closed. Several seconds later you find that the capacitor plates are charged to $40\ \mu\text{C}$. What is the emf of the battery?
2. (a) A $10\ \mu\text{F}$ capacitor, a $20\ \mu\text{F}$ capacitor, and a $40\ \mu\text{F}$ capacitor are connected in parallel. What is their equivalent capacitance?
(b) A $10\ \mu\text{F}$ capacitor, a $20\ \mu\text{F}$ capacitor, and a $40\ \mu\text{F}$ capacitor are connected in series. What is their equivalent capacitance?
3. To what potential should you charge a $5.0\ \mu\text{F}$ capacitor to store $20.0\ \text{J}$ of energy?
4. The potential at the center of a 4.0-cm -diameter copper sphere is $100\ \text{V}$, relative to $V=0\ \text{V}$ at infinity. How much excess charge is on the sphere?
5. Two $1.0\ \text{cm} \times 1.0\ \text{cm}$ square electrodes, spaced $0.2\ \text{mm}$ apart, are connected to a $30\ \text{V}$ battery.
(a) What is the capacitance?
(b) What is the charge on each electrode?
6. What is the equivalent capacitance between points A and B?



7. What is the equivalent capacitance between points A and B?

