A capacitor C "has a charge Q". The actual charges on its plates are:
A. $Q, Q$
B. $Q/2, Q/2$
C. $Q, -Q$
D. $Q/2, -Q/2$
E. $Q, 0$

To charge a 1-F capacitor with 2 C requires a potential difference of:
\[ V = \frac{Q}{C} = \frac{2C}{1F} = 2V \]

The plate areas and plate separations of five parallel plate capacitors are:
- capacitor 1: area $A_0$, separation $d_0$
- capacitor 2: area $2A_0$, separation $2d_0$
- capacitor 3: area $2A_0$, separation $d_0/2$
- capacitor 4: area $A_0/2$, separation $2d_0$
- capacitor 5: area $A_0$, separation $d_0/2$

Rank these according to their capacitances, least to greatest:
A. 1, 2, 3, 4, 5
B. 5, 4, 3, 2, 1
C. 5, 3 and 4 tie, then 1, 2
D. 4, 1 and 2 tie, then 5, 3
E. 3, 5, 1 and 2 tie, 1, 4

If the plate separation of an isolated charged parallel-plate capacitor is doubled:
A. the electric field is doubled
B. the potential difference is halved
C. the charge on each plate is halved
D. the surface charge density on each plate is doubled
E. none of the above

Capacitors A and B are identical. Capacitor A is charged so it stores 4 J of energy and capacitor B is uncharged. The capacitors are then connected in parallel. The total stored energy in the capacitors is now:
A. 16 J
B. 8 J
C. 4 J
D. 2 J
E. 1 J
Each of the four capacitors shown is 500 $\mu$F. The voltmeter reads 1000 V. The magnitude of the charge, in coulombs, on each capacitor plate is:

\[ Q = CV = (500 \times 10^{-6} \text{ F})(1000 \text{ V}) = 0.5 \text{ C} \]

A. 0.2  
B. 0.5  
C. 20  
D. 50  
E. none of these

An air-filled parallel-plate capacitor has a capacitance of 1 pF. The plate separation is then doubled and a wax dielectric is inserted, completely filling the space between the plates. As a result, the capacitance becomes 2 pF. The dielectric constant of the wax is:

A. 0.25  
B. 0.5  
C. 2.0  
D. 4.0  
E. 8.0

\[ C = \frac{A_0}{2d_o} \]

\[ C_0 = \varepsilon_0 \frac{A_0}{d_o} \]

\[ \frac{C}{C_0} = \frac{\varepsilon_0 \frac{A_0}{2d_o}}{\varepsilon_0 \frac{A_0}{d_o}} = \frac{k}{2} \Rightarrow k = 2 \frac{C}{C_0} = 2 \cdot \frac{2 \text{ pF}}{1 \text{ pF}} = 4 \]