Name: _____ Date: _____

1. The units of capacitance are equivalent to:
   A) J/C
   B) V/C
   C) J^2/C
   D) C/J
   E) C^2/J

2. The capacitance of a parallel-plate capacitor with plate area A and plate separation d is given by:
   A) $\varepsilon_0 d/A$
   B) $d/(\varepsilon_0 A)$
   C) $\varepsilon_0 A/d$
   D) $\varepsilon_0 Ad$
   E) $A/(\varepsilon_0 d)$

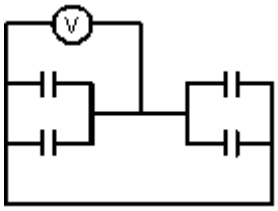
3. If the charge on a parallel-plate capacitor is doubled:
   A) the capacitance is halved
   B) the capacitance is doubled
   C) the electric field is halved
   D) the electric field is doubled
   E) the surface charge density is not changed on either plate

4. The capacitance of a cylindrical capacitor can be increased by:
   A) decreasing both the radius of the inner cylinder and the length
   B) increasing both the radius inner cylinder and the length
   C) increasing the radius outer cylindrical shell and decreasing the length
   D) decreasing the radius inner cylinder and increasing the radius of the outer cylindrical shell
   E) only by decreasing the length

5. A 2-μF and a 1-μF capacitor are connected in parallel and a potential difference is applied across the combination. The 2-μF capacitor has:
   A) twice the charge of the 1-μF capacitor
   B) half the charge of the 1-μF capacitor
   C) twice the potential difference of the 1-μF capacitor
   D) half the potential difference of the 1-μF capacitor
   E) none of the above

6. Let Q denote charge, V denote potential difference and U denote stored energy. Of these quantities, capacitors in series must have the same:
   A) Q only
   B) V only
   C) U only
   D) Q and U only
   E) V and U only

7. Each of the four capacitors shown is 500 μF. The voltmeter reads 1000V. The magnitude of the charge, in coulombs, on each capacitor plate is:

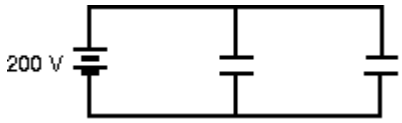


   A) 0.2
   B) 0.5
   C) 20
   D) 50
   E) none of these

8. A 2-μF and a 1-μF capacitor are connected in series and charged from a battery. They store charges P and Q, respectively. When disconnected and charged separately using the same battery, they have charges R and S, respectively. Then:
   A) $R > S > Q = P$
   B) $P > Q > R = S$
   C) $R > P = Q > S$
   D) $R = P > S = Q$
   E) $R > P > S = Q$

9. A charged capacitor stores 10 C at 40 V. Its stored energy is:
   A) 400 J
   B) 4 J
   C) 0.2 J
   D) 2.5 J
   E) 200 J

10. To store a total of 0.040 J of energy in the two identical capacitors shown, each should have a capacitance of:



A) 0.10 μF
B) 0.50 μF
C) 10.0 μF
D) 1.0 μF
E) 2.0 μF

11. A dielectric slab is slowly inserted between the plates of a parallel plate capacitor, while the potential difference between the plates is held constant by a battery. As it is being inserted:
    A) the capacitance, the potential difference between the plates, and the charge on the positive plate all increase
    B) the capacitance, the potential difference between the plates, the charge on the positive plate all decrease
    C) the potential difference between the plates increases, the charge on the positive plate decreases, and the capacitance remains the same
    D) the capacitance and the charge on the positive plate decrease but the potential difference between the plates remains the same
    E) the capacitance and the charge on the plate increase but the potential difference between the plates remains the same

12. A battery is used to charge a parallel-plate capacitor, after which it is disconnected. Then the plates are pulled apart to twice their original separation. This process will double the:
    A) capacitance
    B) surface charge density on each plate
    C) stored energy
    D) electric field between the two places
    E) charge on each plate

Answer Key

1. E
2. C
3. D
4. B
5. A
6. A
7. B
8. A
9. E
10. D
11. E
12. C