

1. What is the electric field for a parallel-plate capacitor?

- A) $\sigma/2\epsilon_0$
- B) σ/ϵ_0
- C) $2\sigma/\epsilon_0$
- D) $-\sigma/2\epsilon_0$
- E) $-\sigma/\epsilon_0$

2. What is the ratio of Q to V for any capacitor?

- A) C
- B) E
- C) K
- D) ϵ_0
- E) d

3. A coaxial cable of length l consists of a solid conducting cylinder of radius a , which carries a linear charge density of $+\lambda$, concentric with an outer cylindrical shell of radius b , which carries a linear charge density of $-\lambda$. What is the capacitance of a coaxial cable?

- A) $\epsilon_0 \ln(b/a)$
- B) $\lambda \epsilon_0 \ln(b/a)$
- C) $2\pi \epsilon_0 \ln(b/a)$
- D) $\lambda \epsilon_0 / \ln(b/a)$
- E) $2\pi \epsilon_0 / \ln(b/a)$

4. A spherical conducting shell of radius a , carrying a charge of $+Q$, is concentric with an outer spherical shell of radius b carrying a charge of $-Q$. What is the capacitance of this capacitor?

- A) Zero
- B) $a/4\pi\epsilon_0$
- C) $a/2\pi\epsilon_0$
- D) $2\pi\epsilon_0 a$
- E) $4\pi\epsilon_0 a / (\frac{1}{a} - \frac{1}{b})$

5. All of the following are true about spherical capacitors **EXCEPT**

- A) The electric field outside the outer sphere is zero
- B) The electric field between the two spheres is determined only by the charge on the outer sphere
- C) The electric field points radially towards the center of the spheres
- D) The potential difference between the two spheres is the negative integral of the electric field
- E) The capacitance is equal to the charge divided by the potential difference

6. All of the following are true about cylindrical capacitors **EXCEPT**

- A) The electric field outside the cylinder is zero
- B) The electric field between the two cylinders is determined by only the charge on the inner cylinder
- C) The electric field will point radially toward the central axis of the cylinders
- D) The potential difference between the two cylinders is the negative derivative of the electric field
- E) The capacitance is equal to the charge divided by the potential difference

7. A spherical capacitor has an inner radius R_1 and an outer radius R_2 . A cylindrical capacitor also has an inner radius R_1 and an outer radius R_2 . What is the relationship between the capacitances of these capacitors?

- A) The spherical capacitor has a greater capacitance than the cylindrical capacitor.
- B) The spherical capacitor has the same capacitance as the cylindrical capacitor.
- C) The spherical capacitor has a smaller capacitance than the cylindrical capacitor.
- D) Both capacitors must have a capacitance of zero.
- E) The answer cannot be determined from this information.

8. Two concentric metal spheres are used to make a capacitor. The inner sphere has radius R_1 and the outer sphere has radius R_2 . If the separation of the plates, d , is very small compared to the radii of the spheres, then what is the capacitance?

- A) $4\pi\epsilon_0 R_1^2$
 - B) $4\pi\epsilon_0 R_2^2$
 - C) $4\pi\epsilon_0 R_1^2/d$
 - D) $4\pi\epsilon_0 R_2^2/d$
 - E) $\pi\epsilon_0(R_1 + R_2)^2/d$
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Answer Key
Energy in Capacitors MC Questions [Mar 28, 2011]

1. B
 2. A
 3. C
 4. E
 5. B
 6. B
 7. E
 8. E
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Name _____

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- 1. _____
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