

quiz2**Multiple Choice**

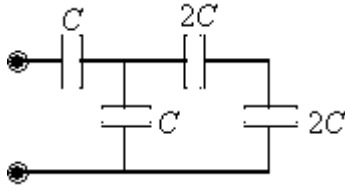
Identify the letter of the choice that best completes the statement or answers the question.

- _____ 1. If an electron is accelerated from rest through a potential difference of 1 200 V, find its approximate velocity at the end of this process. ($e = 1.6 \times 10^{-19}$ C; $m_e = 9.1 \times 10^{-31}$ kg)
- 1.0×10^7 m/s
 - 2.1×10^7 m/s
 - 4.8×10^7 m/s
 - 1.4×10^7 m/s
 - 2.5×10^7 m/s
- _____ 2. Two point charges of values $+3.4$ and $+6.6 \mu\text{C}$ are separated by 0.10 m. What is the electrical potential at the point midway between the two point charges? ($k_e = 8.99 \times 10^9$ N·m²/C²)
- $+3.6 \times 10^6$ V
 - $+0.90 \times 10^6$ V
 - -0.90×10^6 V
 - -3.6×10^6 V
 - $+1.8 \times 10^6$ V
- _____ 3. Two protons, each of charge 1.60×10^{-19} C, are 2.00×10^{-5} m apart. What is the change in potential energy if they are brought 1.00×10^{-5} m closer together? ($k_e = 8.99 \times 10^9$ N·m²/C²)
- 3.20×10^{-16} J
 - 1.60×10^{-11} J
 - 3.20×10^{-19} J
 - 1.60×10^{-14} J
 - 1.15×10^{-23} J
- _____ 4. There is a hollow, conducting, uncharged sphere with a negative charge inside the sphere. Consider the electrical potential at the inner and outer surfaces of the sphere. Which of the following is true?



- The potential on the outer surface is greater.
- The potential on the inner surface is greater.
- The potentials on both surfaces are zero.
- The potentials on both surfaces are equal but not zero.
- More information is needed.

- _____ 5. If $C = 18 \mu\text{F}$, determine the equivalent capacitance for the combination shown.



- a. $18 \mu\text{F}$
 b. $10 \mu\text{F}$
 c. $16 \mu\text{F}$
 d. $12 \mu\text{F}$
 e. $14 \mu\text{F}$
- _____ 6. A pair of parallel plates, forming a capacitor, are connected to a battery. While the capacitor is still connected to the battery maintaining a constant voltage, the plates are pulled apart to double their original distance. What is the ratio of the final energy stored to the original energy stored?
- a. $1/4$
 b. $1/8$
 c. $1/2$
 d. 2
 e. 1
- _____ 7. A parallel-plate capacitor has dimensions $4.0 \text{ cm} \times 5.0 \text{ cm}$. The plates are separated by a 1.0-mm thickness of paper (dielectric constant $\kappa = 3.7$). What is the charge that can be stored on this capacitor, when connected to a 1.5-V battery? ($\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{N}\cdot\text{m}^2$)
- a. $4.8 \times 10^{-11} \text{ C}$
 b. $4.0 \times 10^{-10} \text{ C}$
 c. $4.8 \times 10^{-12} \text{ C}$
 d. $2.0 \times 10^{-12} \text{ C}$
 e. $9.8 \times 10^{-11} \text{ C}$
- _____ 8. Three particles are located on the vertices of an equilateral triangle of sidelength 5.7cm ; two of these particles have charges -1 nC and the remaining one has charge $+2\text{nC}$. Find the value of the potential at the center of the triangle, i.e. at the interior point equidistant to the three vertices.
- a. 0 V
 b. 1600 V
 c. 1100 V
 d. 550 V

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Answer Section**MULTIPLE CHOICE**

1. ANS: B DIF: 2 TOP: 16.1 Potential Difference and Electric Potential
2. ANS: E DIF: 2
TOP: 16.2 Electric Potential and Potential Energy Due to Point Charges, 16.3 Potentials and Charged Conductors, 16.4 Equipotential Surfaces
3. ANS: E DIF: 2
TOP: 16.2 Electric Potential and Potential Energy Due to Point Charges, 16.3 Potentials and Charged Conductors, 16.4 Equipotential Surfaces
4. ANS: D DIF: 2 TOP: 16.6 Capacitance
5. ANS: D DIF: 2
TOP: 16.7 The Parallel-Plate Capacitor, 16.8 Combinations of Capacitors
6. ANS: C DIF: 2 TOP: 16.10 Capacitors with Dielectrics
7. ANS: E DIF: 3 TOP: 16.10 Capacitors with Dielectrics
8. ANS: A