Electrostatic Potential and Capacitance

1. Which of the following statement is true?
(a) Electrostatic force is a conservative force.
(b) Potential at a point is the work done per unit charge in bringing a charge from any point to infinity.
(c) Electrostatic force is non-conservative
(d) Potential is the productof charge and work.

▼ **Answer**

Answer: a

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2. 1 volt is equivalent to
(a) $\frac{\text{newton}}{\text{second}}$ (b) $\frac{\text{newton}}{\text{coulomb}}$
(c) $\frac{\text{joule}}{\text{coulomb}}$ (d) $\frac{\text{joule}}{\text{second}}$

▼ **Answer**

Answer: c

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3. The work done in bringing a unit positive charge from infinite distance to a point at distance x from a positive charge Q is W. Then the potential at that point is
(a) $\frac{WQ}{x}$ (b) W
(c) $\frac{W}{x}$ (d) WQ

▼ **Answer**

Answer: b

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4. Consider a uniform electric field in the z-direction. The potential is a constant
(a) for any x for a given z
(b) for any y for a given z
(c) on the x-y plane for a given z
(d) all of these

▼ **Answer**

Answer: d

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5. Equipotential surfaces
(a) are closer in regions of large electric fields compared to regions of lower electric fields.
(b) will be more crowded near sharp edges of a conductor.
(c) will always be equally spaced.
(d) both (a) and (b) are correct.

▼ **Answer**

Answer: d

6. In a region of constant potential
(a) the electric field is uniform.
(b) the electric field is zero.
(c) there can be no charge inside the region.
(d) both (b) and (c) are correct.

▼ **Answer**

Answer: d

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7. A test charge is moved from lower potential point to a higher potential point. The potential energy of test charge will
(a) remain the same
(b) increase
(c) decrease
(d) become zero

▼ **Answer**

Answer: c

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8. An electric dipole of moment $\vec{p}$ is placed in a uniform electric field $\vec{E}$. Then
(i) the torque on the dipole is $\vec{p} \times \vec{\mathrm{E}}$
(ii) the potential energy of the system is $\vec{p}.\vec{\mathrm{E}}$
(iii) the resultant force on the dipole is zero. Choose the correct option.
(a) (i), (ii) and (iii) are correct
(b) (i) and (iii) are correct and (ii) is wrong
(c) only (i) is correct
(d) (i) and (ii) are correct and (iii) is wrong

▼ **Answer**

Answer: b

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9. If a conductor has a potential V ≠ 0 and there are no charges anywhere else outside, then
(a) there must be charges on the surface or in¬side itself.
(b) there cannot be any charge in the body of the conductor.
(c) there must be charges only on the surface.
(d) both (a) and (b) are correct.

▼ **Answer**

Answer: c

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10. Which of the following statements is false for a perfect conductor?
(a) The surface of the conductor is an equipoten-tial surface.
(b) The electric field just outside the surface of a conductor is perpendicular to the surface.
(c) The charge carried by a conductor is always uniformly distributed over the surface of the conductor.
(d) None of these.

▼ **Answer**

Answer: d

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11. Dielectric constant for a metal is
(a) zero
(b) infinite
(c) 1
(d) 10

▼ **Answer**

Answer: b

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12. When air is replaced by a dielectric medium of constant K, the maximum force of attraction between two charges separated by a distance
(a) increases K times
(b) remains unchanged
(c) decreases K times
(d) increases K^{-1} times

▼ **Answer**

Answer: c

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13. In a parallel plate capacitor, the capacity increases if
(a) area of the plate is decreased.
(b) distance between the plates increases.
(c) area of the plate is increased.
(d) dielectric constantly decreases.

▼ **Answer**

Answer: c

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14. A parallel plate air capacitor is charged to a potential difference of V volts. After disconnecting the charging battery the distance between the plates of the capacitor is increased using an insulating handle. As a result the potential difference between the plates
(a) increases
(b) decreases
(c) does not change
(d) becomes zero

▼ **Answer**

Answer: a

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15. Two identical capacitors are joined in parallel, charged to a potential V, separated and then connected in series, the positive plate of one is connected to the negative of the other. Which of the following is true?
(a) The charges on the free plated connected to-gether are destroyed.
(b) The energy stored in ths system increases.
(c) The potential difference between the free plates is 2V.
(d) The potential difference remains constant.

▼ **Answer**

Answer: c

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16. A capacitor has some dielectric between its plates, and the capacitor is connected to a dc source. The battery is now disconnected and then the dielectric is removed, then
(a) capacitance will increase.
(b) energy stored will decrease.
(c) electric field will increase.
(d) voltage will decrease.

▼ **Answer**

Answer: c

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17. Two spherical conductors each of capacity C are charged to potential V and -V. These are then connected by means of a fine wire. The loss of energy is
(a) zero
(b) $\frac{1}{2}CV^2$
(c) CV^2
(d) $2\ CV^2$

▼ **Answer**

Answer: c
