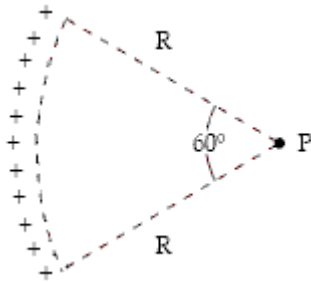


Physics 210 – Multiple Choice Problems for week 5

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

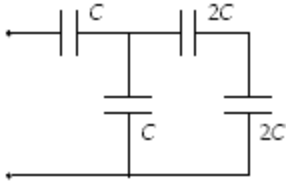
- _____ 1. Charge of uniform density (3.5 nC/m) is distributed along the circular arc shown. Determine the electric potential (relative to zero at infinity) at point P.



- a. 61 V
b. 42 V
c. 52 V
d. 33 V
e. 22 V
- _____ 2. A charge of 4.0 nC is distributed uniformly along the x axis from $x = +4 \text{ m}$ to $x = +6 \text{ m}$. Which of the following integrals is correct for the electric potential (relative to zero at infinity) at the origin?
- a. $\int_4^6 \frac{18dx}{4-x}$
b. $\int_4^6 \frac{36dx}{x}$
c. $\int_4^6 \frac{18dx}{x}$
d. $\int_4^6 \frac{36dx}{6-x}$
e. $\int_4^6 \frac{36dx}{4+x}$
- _____ 3. A solid conducting sphere (radius = 5.0 cm) has a charge of 0.25 nC distributed uniformly on its surface. If point A is located at the center of the sphere and point B is 15 cm from the center, what is the magnitude of the electric potential difference between these two points?
- a. 23 V
b. 30 V
c. 15 V
d. 45 V
e. 60 V

- _____ 4. Charge of uniform density 50 nC/m^3 is distributed throughout the inside of a long nonconducting cylindrical rod (radius = 5.0 cm). Determine the magnitude of the potential difference of point A (2.0 cm from the axis of the rod) and point B (4.0 cm from the axis).
- 2.7 V
 - 2.0 V
 - 2.4 V
 - 1.7 V
 - 3.4 V
- _____ 5. A nonconducting sphere of radius 10 cm is charged uniformly with a density of 100 nC/m^3 . What is the magnitude of the potential difference between the center and a point 4.0 cm away?
- 12 V
 - 6.8 V
 - 3.0 V
 - 4.7 V
 - 2.2 V
- _____ 6. Equipotentials are lines along which
- the electric field is constant in magnitude and direction.
 - the electric charge is constant in magnitude and direction.
 - maximum work against electrical forces is required to move a charge at constant speed.
 - a charge may be moved at constant speed without work against electrical forces.
 - charges move by themselves.
- _____ 7. When a negative charge is released and moves along an electric field line, it moves to a position of
- lower potential and lower potential energy.
 - lower potential and higher potential energy.
 - higher potential and lower potential energy.
 - higher potential and higher potential energy.
 - decreasing magnitude of the electric field.
- _____ 8. A charge is placed on a spherical conductor of radius r_1 . This sphere is then connected to a distant sphere of radius r_2 (not equal to r_1) by a conducting wire. After the charges on the spheres are in equilibrium,
- the electric fields at the surfaces of the two spheres are equal.
 - the amount of charge on each sphere is $q/2$.
 - both spheres are at the same potential.
 - the potentials are in the ratio $\frac{V_2}{V_1} = \frac{q_2}{q_1}$.
 - the potentials are in the ratio $\frac{V_2}{V_1} = \frac{r_2}{r_1}$.

- _____ 9. Two charges lie on the x axis, $+2q$ at the origin, and $-3q$ at $x = 5.0$ m. The point on the x axis where the electric potential has a zero value (when the value at infinity is also zero) is
- 1.0 m.
 - 2.0 m.
 - 2.5 m.
 - 3.0 m.
 - 4.0 m.
- _____ 10. Determine the equivalent capacitance of the combination shown when $C = 45 \mu\text{F}$.



- $36 \mu\text{F}$
 - $32 \mu\text{F}$
 - $34 \mu\text{F}$
 - $30 \mu\text{F}$
 - $38 \mu\text{F}$
- _____ 11. A parallel plate capacitor of capacitance C_0 has plates of area A with separation d between them. When it is connected to a battery of voltage V_0 , it has charge of magnitude Q_0 on its plates. It is then disconnected from the battery and the plates are pulled apart to a separation $2d$ without discharging them. After the plates are $2d$ apart, the magnitude of the charge on the plates and the potential difference between them are
- $\frac{1}{2}Q_0, \frac{1}{2}V_0$
 - $Q_0, \frac{1}{2}V_0$
 - Q_0, V_0
 - $Q_0, 2V_0$
 - $2Q_0, 2V_0$

MULTIPLE CHOICE

- | | |
|------------|--------|
| 1. ANS: D | PTS: 1 |
| 2. ANS: C | PTS: 1 |
| 3. ANS: B | PTS: 1 |
| 4. ANS: D | PTS: 1 |
| 5. ANS: C | PTS: 1 |
| 6. ANS: D | PTS: 1 |
| 7. ANS: C | PTS: 1 |
| 8. ANS: C | PTS: 1 |
| 9. ANS: B | PTS: 1 |
| 10. ANS: D | PTS: 1 |
| 11. ANS: D | PTS: 1 |