1. Electric field strength is the force per unit:

   ☐ volume

   ☐ mass

   ☐ positive charge

   ☐ area

2. Two plates 0.050 m apart have 200 V between them. What is the field strength?

   _____ V/m

3. Coulomb's law gives the force between two point charges as:

   ☐ $\dfrac{Q_1 Q_2}{4\pi\varepsilon_0 r^2}$

   ☐ $4\pi\varepsilon_0 Q_1 Q_2 r^2$

   ☐ $\dfrac{Q_1 Q_2}{r}$

   ☐ $\dfrac{Q_1 Q_2}{4\pi\varepsilon_0 r}$

4. The field strength at distance $r$ from a point charge $Q$ is:

   ☐ $\dfrac{Q}{4\pi\varepsilon_0 r^2}$

   ☐ $\dfrac{Qq}{4\pi\varepsilon_0 r^2}$

   ☐ $\dfrac{Q}{r}$

   ☐ $\dfrac{Q}{4\pi\varepsilon_0 r}$

5. Electric potential at a point is the work per unit charge to bring a positive charge from:

   ☐ infinity

   ☐ one metre away

   ☐ the nearest charge

   ☐ the ground

6. A charge of 2.0 C feels a force of 6.0 N. What is the field strength?

   _____ N/C



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   ☐ along the plates

   ☐ in circles

   ☐ from the + plate to the − plate

   ☐ from the − plate to the + plate

8. Two charges of the same sign repel each other.

   ☐ True ☐ False

9. The field is 100 $\dfrac{\text{N}}{\text{C}}$ at distance $r$ from a charge. What is it at $2r$?

   _____ N/C

10. The two-mark definition of electric potential needs which elements? Select **all** that apply.

    ☐ in bringing a small test charge from infinity to the point

    ☐ work done per unit positive charge

    ☐ the potential is zero at infinity

    ☐ the charge must be stationary

    *Tick every correct option.*

1. **positive charge**

   $E = \dfrac{F}{q}$ – the force on each coulomb of a small positive test charge.

2. **4000 V/m**

   $E = \dfrac{V}{d} = \dfrac{200}{0.050} = 4000\ \dfrac{\text{V}}{\text{m}}$.

3. $\dfrac{Q_1 Q_2}{4\pi\varepsilon_0 r^2}$

   Proportional to each charge, inversely proportional to the distance squared.

4. $\dfrac{Q}{4\pi\varepsilon_0 r^2}$

   From $E = F/q$ with Coulomb's force, the test charge cancels, leaving $E = \dfrac{Q}{4\pi\varepsilon_0 r^2}$.

5. **infinity**

   Like gravitational potential, it is measured from infinity, where the potential is taken as zero.

6. **3 N/C**

   $E = \dfrac{F}{q} = \dfrac{6.0}{2.0} = 3.0\ \dfrac{\text{N}}{\text{C}}$.

7. **from the + plate to the − plate**

   The field runs from high potential (+) toward low potential (−).

8. **True**

   Like charges repel; opposite charges attract – both along the line joining them.

9. **25 N/C**

   Inverse-square: $\dfrac{100}{2^2} = 25\ \dfrac{\text{N}}{\text{C}}$.

10. **in bringing a small test charge from infinity to the point; work done per unit positive charge; the potential is zero at infinity**

    Per unit positive charge, and from infinity. The zero at infinity is what makes the definition well posed; stationarity is not part of it.



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