

9. Electric Potential

Starter Quiz · 课前小测

AP Physics C: Electricity and Magnetism

Name: _____ Score: _____

1. The potential energy of two point charges is proportional to:

- ☐ $1/r^2$
- ☐ $1/r$
- ☐ r
- ☐ r^2

2. Electric potential V is:

- ☐ energy per unit charge
- ☐ force per unit charge
- ☐ charge per unit volume
- ☐ power per second

3. A charge is released in a field (only the electric force acts). As it speeds up, its potential energy:

- ☐ rises
- ☐ falls
- ☐ stays constant
- ☐ becomes infinite

4. Two opposite charges have a potential energy that is:

- ☐ positive
- ☐ negative
- ☐ zero
- ☐ infinite

5. Potentials from several charges add as simple scalars — no vectors needed.

- ☐ True
- ☐ False

6. A 2 C charge falls through $\Delta V = 5$ V. How much kinetic energy (in J) does it gain?

_____ J

7. Find U (in J) for a +1 nC and +1 nC charge 1 m apart. Use $k = 9 \times 10^9$.

_____ J

8. Two charges give +50 V and -20 V at a point. Find the total V (in V).

_____ V

9. The energy an electron gains crossing 1 V is one _____.

10. The work done by the electric field equals the decrease in potential energy, $W = -\Delta U$.

- ☐ True
- ☐ False

AP Physics C: Electricity and Magnetism

1. $1/r$

$U = kq_1q_2/r$ — energy goes as $1/r$ (force goes as $1/r^2$).

2. **energy per unit charge**

$V = U/q$ — potential energy per unit charge, in volts.

3. **falls**

$\Delta KE + \Delta U = 0$: as KE rises, U falls.

4. **negative**

Opposite charges attract, so $U = kq_1q_2/r < 0$ — a bound pair.

5. **True**

V is a scalar: $V = \sum kQ_i/r_i$, just add the numbers.

6. **10 J**

$KE = q \Delta V = 2 \times 5 = 10$ J.

7. **9e-09 J**

$U = \frac{(9 \times 10^9)(10^{-9})(10^{-9})}{1} = 9 \times 10^{-9}$ J.

8. **30 V**

Scalars add: $50 + (-20) = 30$ V.

9. **electron-volt**

That energy is $1 \text{ eV} = 1.6 \times 10^{-19}$ J.

10. **True**

A drop in U releases energy as work: $W = -\Delta U$.