

INKPHYSICS FLASHCARDS

Electric fields

Year 13 · 16 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions in mark-scheme wording, the equations that are not on the AQA data sheet, each lesson's check question, and the misconceptions that lose marks. The same cards run on the website with spaced-repetition scheduling, at inkphysics.co.uk/physics/flashcards.

DEFINITION

Define: Electric field strength.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

DEFINITION

Define: Coulomb's law.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

RECALL

State the field between parallel plates.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

RECALL

State the path of a charge entering a uniform field at right angles.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

RECALL

Explain how a charged sphere is treated in Coulomb's law.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

SPOT THE ERROR

Say what is wrong with this claim:

Field lines are the paths charges follow.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

DEFINITION

Define: Electric potential.

ELECTRIC POTENTIAL

RECALL

State the work done moving a charge along an equipotential.

ELECTRIC POTENTIAL

DEFINITION

The force between two point charges is proportional to the product of the charges and inversely proportional to the square of their separation.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

DEFINITION

The force per unit charge on a small positive test charge placed in the field: $E = F/Q$, in N C^{-1} or V m^{-1} .

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

RECALL

A parabola: constant velocity across the field and constant acceleration along it.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

RECALL

A uniform field of strength $E = V/d$, with parallel, equally spaced field lines.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

SPOT THE ERROR

Field lines show the direction of the force on a positive charge, not trajectories. A charge entering a uniform field at right angles follows a parabola, crossing the field lines.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

RECALL

A charged conducting sphere behaves as if all its charge were concentrated at its centre.

COULOMB'S LAW AND ELECTRIC FIELD STRENGTH

RECALL

Zero, because the potential difference is zero.

ELECTRIC POTENTIAL

DEFINITION

The work done per unit positive charge to move a small test charge from infinity to that point.

ELECTRIC POTENTIAL

RECALL

State the energy transferred moving charge Q through pd ΔV .

ELECTRIC POTENTIAL

RECALL

State how to find field strength from a potential-distance graph.

ELECTRIC POTENTIAL

RECALL

State the angle between field lines and equipotential surfaces.

ELECTRIC POTENTIAL

SPOT THE ERROR

Say what is wrong with this claim:

A volt is an amount of energy.

ELECTRIC POTENTIAL

RECALL

State the key difference between gravitational and electrostatic forces.

COMPARING ELECTRIC AND GRAVITATIONAL FIELDS

RECALL

Explain why the force ratio for two charged particles is independent of separation.

COMPARING ELECTRIC AND GRAVITATIONAL FIELDS

RECALL

State the sign of electric potential in a radial field.

COMPARING ELECTRIC AND GRAVITATIONAL FIELDS

SPOT THE ERROR

Say what is wrong with this claim:

Gravity is the strongest force.

COMPARING ELECTRIC AND GRAVITATIONAL FIELDS

RECALL

E equals the magnitude of the gradient of the graph of V against r , and the field points down the potential gradient, from high potential to low.

ELECTRIC POTENTIAL

RECALL

$$\Delta W = Q\Delta V.$$

ELECTRIC POTENTIAL

SPOT THE ERROR

A volt is not an amount of energy; it is one joule per coulomb. The energy transferred depends on the charge moved as well: $W = QV$.

ELECTRIC POTENTIAL

RECALL

They always cross at right angles.

ELECTRIC POTENTIAL

RECALL

Both forces follow an inverse-square law, so r^2 cancels in the ratio.

COMPARING ELECTRIC AND GRAVITATIONAL FIELDS

RECALL

Gravity only ever attracts, while the electrostatic force can attract or repel.

COMPARING ELECTRIC AND GRAVITATIONAL FIELDS

SPOT THE ERROR

Gravity is by far the weaker force: between two protons, electric repulsion exceeds gravitational attraction by about 10^{36} . Gravity dominates on large scales only because bulk matter is electrically neutral.

COMPARING ELECTRIC AND GRAVITATIONAL FIELDS

RECALL

Positive around a positive charge and negative around a negative charge, unlike gravitational potential, which is always negative.

COMPARING ELECTRIC AND GRAVITATIONAL FIELDS