



QUESTION WORKBOOK

Electric potential

Electric fields · Year 13

AQA 3.7.3.3 · CIE 18.5 · OCR A 6.2.4

10 questions · 30 marks

PRINT EDITION

SECTION A · Warm-up

A1 Define the absolute electric potential at a point, stating where its zero is taken.

[2]

A2 Calculate the electric potential 0.10 m from a point charge of $5.0 \times 10^{-9} \text{ C}$ ($k = 8.99 \times 10^9 \text{ N m}^2 \text{ C}^{-2}$). [2]

A3 Describe the shape of the equipotential surfaces around an isolated point charge, and their relationship to the field lines. [2]

SECTION B · Standard

B1 Calculate the electric potential 0.20 m from a point charge of $-3.0 \times 10^{-9} \text{ C}$. [3]

- B2** A $+2.0 \times 10^{-9}$ C charge is moved from 0.30 m to 0.10 m from a fixed point charge of 5.0×10^{-9} C. Calculate the potential difference moved through and the work done. [4]

- B3** The electric potential changes by 200 V over a distance of 0.050 m in a uniform field. Calculate the field strength, using $E = \Delta V / \Delta r$. [3]

- B4** Two point charges of $+4.0 \mu\text{C}$ are each 0.20 m from a point P. Calculate the total electric potential at P (potentials add as scalars). [3]

SECTION C · Stretch

- C1** A $+5.0 \mu\text{C}$ charge is placed at a point where the electric potential is 2000 V . Calculate its electric potential energy, and state the work needed to bring it there from infinity. [4]

- C2** A $+6.0 \mu\text{C}$ charge and a $-6.0 \mu\text{C}$ charge are each 0.30 m from a point P. Calculate the total electric potential at P, and explain your result. [4]

- C3** Explain how the electric field strength can be found from a graph of electric potential against distance. [3]