InkPhysics

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

NAVY SCREEN EDITION

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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 5.0×10^{-9} C ($k = 8.99 \times 10^{9}$ N m^2 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 -3.0×10^{-9} 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 μC 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 μC 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 μC charge and a −6.0 μC 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]