

Electricity

Cambridge International AS & A Level Physics

Unlike IGCSE, 9702 gives you a data sheet: it is page 2 of Papers 1, 2 and 4, with more formulae on page 3 of Paper 4. Everything marked GIVEN is printed for you; everything else you must recall. Compiled by GioPhysics from the published syllabus. This is an independent study aid, not a Cambridge document; the official syllabus is the authority.

9.1 Electric current

AS Charge and current

$$Q = It$$

Q — charge (C)

I — current (A)

t — time (s)

AS Current and drift velocity

$$I = Anvq$$

I — current (A)

A — cross-sectional area (m²)

n — number density of charge carriers (m⁻³)

v — drift speed (m s⁻¹)

q — charge on each carrier (C)

9.2 Potential difference and power

AS Potential difference

$$V = W / Q$$

V — potential difference (V)

W — work done (J)

Q — charge (C)

AS Electrical power

$$P = VI = I^2R = V^2/R$$

P — power (W)

V — potential difference (V)

I — current (A)

R — resistance (Ω)

9.3 Resistance and resistivity

AS Resistance

$$V = IR$$

$$R = V / I \quad \cdot \quad I = V / R$$

V — potential difference (V)

I — current (A)

R — resistance (Ω)

Resistivity

$$R = \rho L / A$$

R — resistance (Ω) ρ — resistivity ($\Omega \text{ m}$)

L — length (m)

A — cross-sectional area (m^2)