



QUESTION WORKBOOK

Potential dividers

Electricity · Year 12

AQA 3.5.1.5 · CIE 10.3 · OCR A 4.3.3

9 questions · 26 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 Explain why two resistors in series share the supply potential difference between them. [2]

A2 A 12 V supply is connected across a 4.0 k Ω resistor in series with an 8.0 k Ω resistor. Calculate the potential difference across the 8.0 k Ω resistor. [2]

A3 State the potential divider equation for the output taken across R_2 . [2]

SECTION B · Standard

B1 A 10 V supply is connected across a 2.0 k Ω resistor (R_1) in series with a 3.0 k Ω resistor (R_2). Calculate the output potential difference taken across R_2 . [3]

- B2** A potential divider has a $4.0\text{ k}\Omega$ resistor as R_1 and a 9.0 V supply. Calculate the value of R_2 needed to give an output of 3.0 V across it. [3]

- B3** A thermistor is connected in series with a fixed $4.0\text{ k}\Omega$ resistor across a 6.0 V supply, with the output taken across the fixed resistor. When warm, the thermistor's resistance is $2.0\text{ k}\Omega$. Calculate the output pd, and state how it changes as the thermistor cools. [4]

- B4** Describe how a potentiometer (a potential divider with a sliding contact) can provide a continuously variable output voltage. [3]

SECTION C · Stretch

- C1** A light-dependent resistor (LDR) is placed in series with a fixed $2.0\text{ k}\Omega$ resistor across a 6.0 V supply, with the output taken across the fixed resistor. The LDR's resistance is $10\text{ k}\Omega$ in the dark and $1.0\text{ k}\Omega$ in bright light. Calculate the output in each case. [4]

- C2** Explain one advantage of using a potential divider rather than a variable resistor (rheostat) to control the voltage supplied to a component. [3]