



QUESTION WORKBOOK

Transformers

Magnetic fields · Year 13

AQA 3.7.5.6 · OCR A 6.3.3

10 questions · 30 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 Explain how a transformer transfers energy from the primary coil to the secondary coil. [2]

A2 A transformer has 1000 primary turns and 100 secondary turns. With 230 V across the primary, calculate the secondary voltage. [2]

A3 A transformer has fewer turns on the secondary than the primary. State whether it is a step-up or step-down transformer. [2]

SECTION B · Standard

B1 A transformer steps 240 V down to 12 V. If the primary has 2000 turns, calculate the number of secondary turns. [3]

- B2** An ideal transformer has 230 V across the primary drawing 2.0 A, and a secondary voltage of 23 V. Calculate the power transferred and the secondary current. [4]

- B3** A transformer has an input power of 500 W and a useful output power of 450 W. Calculate its efficiency. [3]

- B4** An ideal step-up transformer raises 230 V to 1150 V. If the secondary current is 0.40 A, calculate the primary current. [3]

SECTION C · Stretch

- C1** A power of 100 kW is transmitted along a cable of resistance $5.0\ \Omega$. Calculate the power lost in the cable when the transmission voltage is (a) 10 kV and (b) 100 kV.

[4]

- C2** A transformer is 96% efficient. Its primary takes 5.0 A at 230 V and its secondary output is at 46 V. Calculate the input power, the output power and the secondary current.

[4]

- C3** Explain why electrical energy is transmitted across the National Grid at very high voltage.

[3]