



QUESTION WORKBOOK

Alternating currents

Magnetic fields · Year 13

AQA 3.7.5.5 · CIE 21.1 · OCR A 6.3.3

10 questions · 30 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 Define the root-mean-square (rms) value of an alternating current. [2]

A2 An alternating voltage has a peak value of 10 V. Calculate its rms value. [2]

A3 An alternating voltage has a peak value of 15 V. State its peak-to-peak value. [2]

SECTION B · Standard

B1 The UK mains has an rms voltage of 230 V. Calculate the peak voltage. [3]

B2 An alternating current has a peak value of 4.0 A. Calculate its rms value. [3]

B3 An alternating supply of rms voltage 12 V is connected across a $6.0\ \Omega$ resistor. Calculate (a) the rms current, (b) the mean power dissipated and (c) the peak power. [4]

B4 An oscilloscope shows an alternating voltage with a peak of 4.0 V. Calculate the rms voltage. [3]

SECTION C · Stretch

- C1** On an oscilloscope, one full cycle of a signal spans 4.0 divisions with the time base at 5.0 ms per division, and its amplitude is 3.0 divisions with the gain at 2.0 V per division. Calculate the period, the frequency and the rms voltage. [4]

- C2** A $100\ \Omega$ resistor is connected to the 230 V rms mains. Calculate the mean power dissipated in it, and state why the same DC voltage would give the same power. [4]

- C3** Explain why rms values, rather than peak values, are normally quoted for alternating voltages and currents. [3]