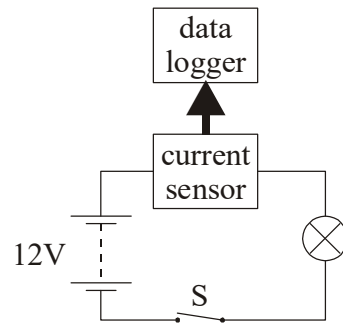
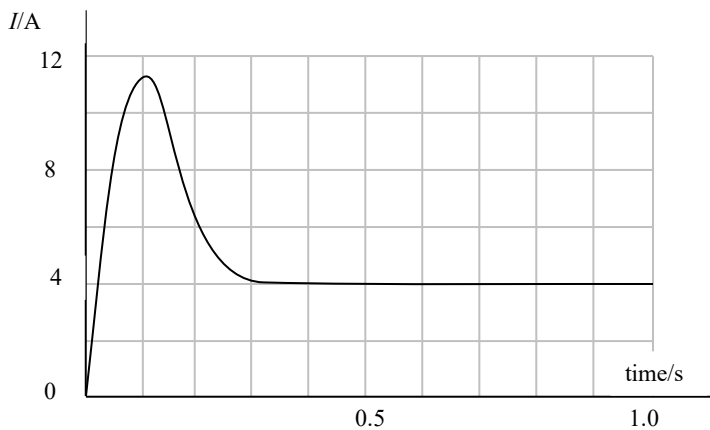


Resistance

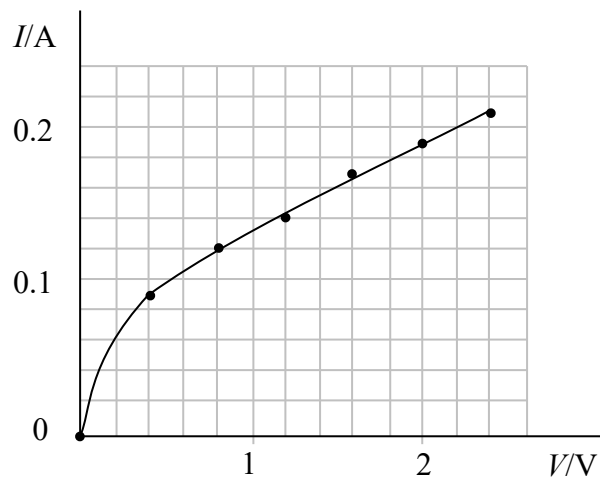
- Calculate the resistance of:
 - a 230V mains bulb which takes a current of 0.25A,
 - a torch bulb that draws 0.25 A from a 12V supply,
 - an immersion heater that draws 10 A from a 240V supply. (920Ω , 48Ω , 24Ω)

- Calculate:
 - the current through a $10\text{k}\Omega$ resistor connected to 240V,
 - the voltage across a $47\text{k}\Omega$ resistor carrying a current of $20\mu\text{A}$ (24mA , 0.94V)

- The current through a 12V lamp was monitored using a data logger from the moment switch S was closed. The resulting graph is shown below. The current settles to about 4A, but, for a short time after S is closed is many times greater. Explain why this is.

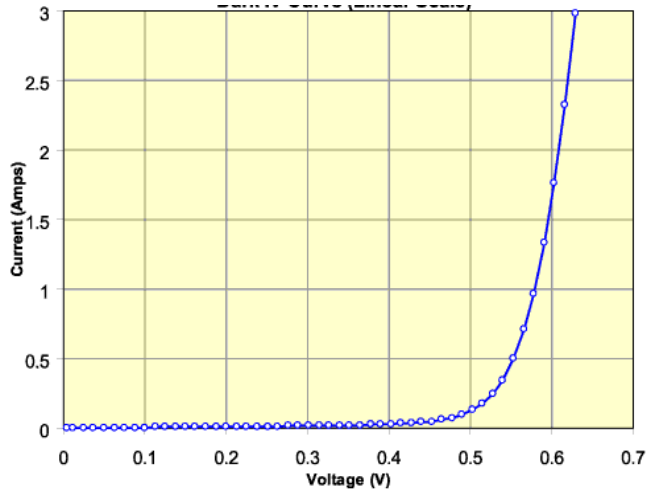


- The current through a lamp was measured for different values of voltage. The results are shown on the graph.



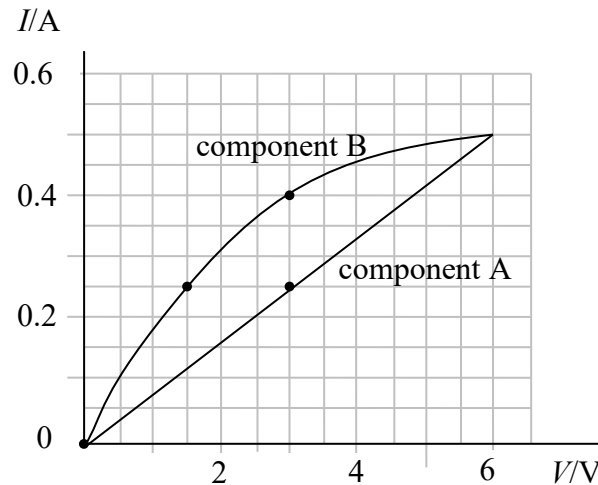
- What is the resistance of the lamp:
 - when connected to 1.0V?
 - when connected to 2.0V?
 - when a current of 0.20A flows through it? (7.6Ω , 10.5Ω , 11Ω)
- Add a line to the graph to show the result you would get with a constant, fixed resistor of 10Ω .
- The lamp and a 10Ω resistor are connected in series to a 1.5V power supply. Use the graph to find the current which flows from the supply. (0.10A)

5. The graph shows the I - V characteristic of a particular type of diode.



- (a) What is the voltage across the diode when a current of 1.5A flows? ($0.59V$)
- (b) What is the effective resistance of the diode:
- when a current of 1.5A flows?
 - when a current of 3.0A flows? (0.39Ω , 0.21Ω)

6. The I - V characteristics of two electrical components A and B are shown below.



- (a) What is the resistance of each component with a voltage of 3.0V across it? (12Ω , 7.5Ω)
- (b) Suggest what each component could be.

The two components are connected in series across a variable supply. A voltmeter measures the voltage across A.

- (c) The voltmeter reads 3.0V What is
- the current through A?
 - the voltage being provided by the supply? ($0.25A$; $4.5V$)
- (d) The supply voltage is increased to 6.0V. What is the current from the supply? ($0.32A$)