

32 A wire is made from a metal of constant resistivity. There is a constant current in the wire.

Which statement about the potential difference across the wire is correct?

- A** It is directly proportional to the length of the wire.
- B** It is inversely proportional to the length of the wire.
- C** It is directly proportional to the diameter of the wire.
- D** It is inversely proportional to the diameter of the wire.

A-Level Physics: **s25 14**

31 The resistance of some electrical components may change with changing conditions.

Which component's resistance increases?

- A** a filament lamp as the potential difference (p.d.) across it increases
- B** a light-dependent resistor (LDR) as the intensity of the light incident on it increases
- C** a metallic conductor at constant temperature as the current through it increases
- D** a thermistor as its temperature increases

32 Gold is sometimes used to make very small connecting wires in electronic circuits.

A particular gold wire has length $2.50 \times 10^{-3} \text{ m}$ and cross-sectional area $6.25 \times 10^{-8} \text{ m}^2$. Gold has resistivity $2.3 \times 10^{-8} \Omega \text{ m}$.

What is the resistance of the wire?

- A** $3.6 \times 10^{-18} \Omega$
- B** $5.8 \times 10^{-13} \Omega$
- C** $9.2 \times 10^{-4} \Omega$
- D** $6.8 \times 10^{-3} \Omega$

A-Level Physics: **m25 12**

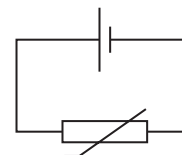
31 A copper wire is 6.4 m long and has a resistance of 0.92Ω .

The resistivity of copper is $1.8 \times 10^{-8} \Omega \text{ m}$.

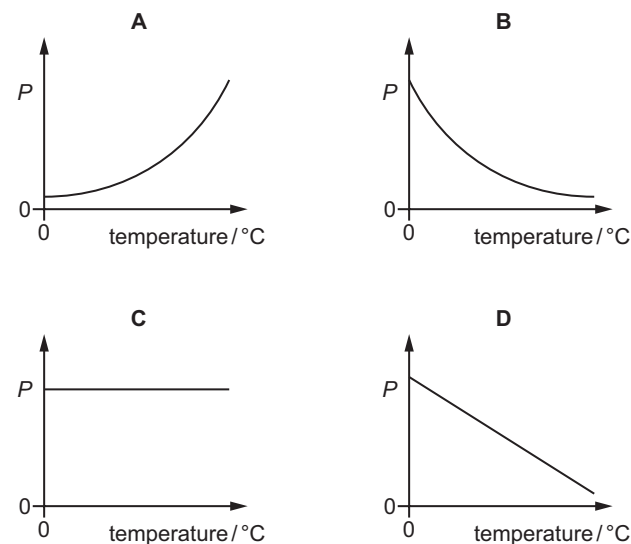
What is the diameter of the wire?

- A** $5.7 \times 10^{-5} \text{ m}$
- B** $1.0 \times 10^{-4} \text{ m}$
- C** $4.0 \times 10^{-4} \text{ m}$
- D** $7.1 \times 10^{-4} \text{ m}$

32 A thermistor is connected to a cell with negligible internal resistance.



Which graph shows the variation with temperature of power, P , dissipated in the thermistor?



33 A metal electrical conductor has a resistance of $5.6 \text{ k}\Omega$. A potential difference (p.d.) of 9.0 V is applied across its ends.

How many electrons pass a point in the conductor in one minute?

- A** 6.0×10^{20}
- B** 1.0×10^{19}
- C** 6.0×10^{17}
- D** 1.0×10^{16}

A-Level Physics: **w25 11**

31 There is a potential difference V across a resistor of resistance R . The current in the resistor is I .

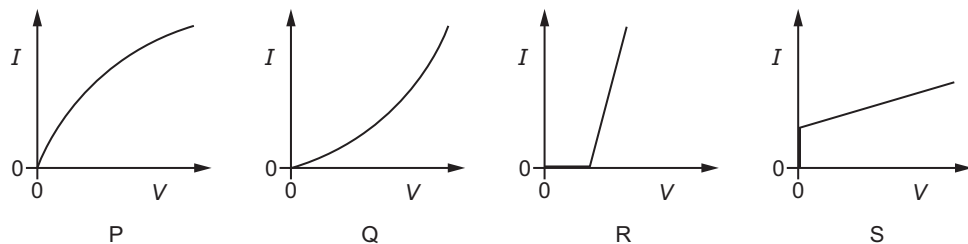
Which equation gives the power P dissipated by the resistor?

- A** $P = V^2 I$
- B** $P = \frac{V^2}{I}$
- C** $P = V^2 R$
- D** $P = \frac{V^2}{R}$

32 What is a possible charge on a particle?

- A** $6.40 \times 10^{-20} \text{ C}$
B $4.00 \times 10^{-19} \text{ C}$
C $1.12 \times 10^{-18} \text{ C}$
D $9.11 \times 10^{-18} \text{ C}$

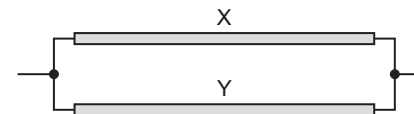
33 The graphs show possible current–voltage (I – V) characteristics for a filament lamp and for a semiconductor diode.



Which row identifies the I – V graphs for the lamp and for the diode?

	filament lamp	semiconductor diode
A	P	R
B	P	S
C	Q	R
D	Q	S

36 Two identical wires X and Y, each of length L and radius r , are connected in parallel as shown.



The total resistance of this combination is R_1 .

Wire X is replaced with a wire of the same material with length L and radius $2r$.

The total resistance of the new combination is R_2 .

What is the ratio $\frac{R_1}{R_2}$?

- A** $\frac{2}{5}$ **B** $\frac{2}{3}$ **C** $\frac{3}{2}$ **D** $\frac{5}{2}$