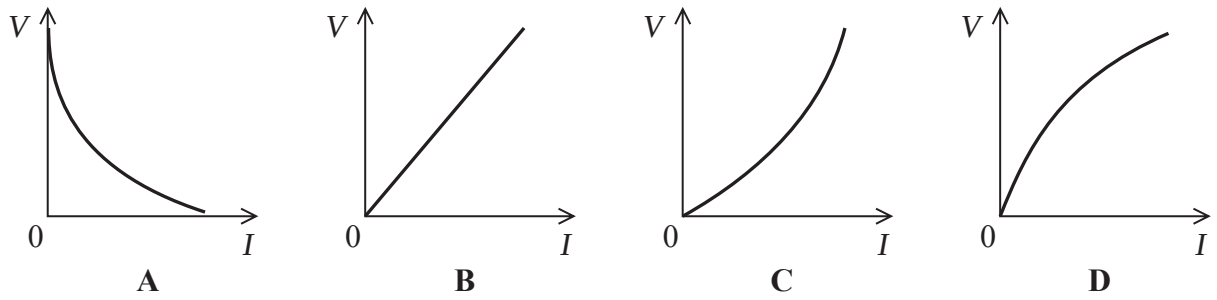
1 Which of the following graphs of potential difference *V* against current *I* correctly shows the behaviour of a filament lamp?



☒ **A**

☒ **B**

☒ **C**

☒ **D**

(Total for Question = 1 mark)

2 A rechargeable cell carries the marking 150 milliamp hours2
What charge does this correspond to?

☒ **A** 9 C

☒ **B** 540 C

☒ **C** 9000 C

☒ **D** 540 000 C

(Total for Question = 1 mark)

3 The current in a filament lamp is 250 mA.

How much charge flows through the lamp in 3 minutes?

☒ **A** 0.75 C

☒ **B** 45 C

☒ **C** 750 C

☒ **D** 45 000 C

(Total for Question 1 mark)

4 A rechargeable cell stores a maximum energy of 4200 J. The cell has an e.m.f. of 1.5 V and after 2.0 hours use the cell is completely discharged.

Assuming the e.m.f. stays constant, the charge passing through the cell during this time is

☒ **A** 1400 C

☒ **B** 2800 C

☒ **C** 5600 C

☒ **D** 6300 C

(Total for Question = 1 mark)

5 An electric motor with potential difference V and current I lifts a mass m through a height h in time t at a steady speed v.

The efficiency of the motor is given by

☒ **A** $\frac{½mv^2}{VIt}$

☒ **B** $\frac{VI}{mg}$

☒ **C** $\frac{VIt}{mv}$

☒ **D** $\frac{mgh}{VIt}$

(Total for Question = 1 mark)

6 A current of 0.2 A flows through a lamp for 3 hours.

The total charge passing through the lamp in this time is

☒ **A** 2160 C

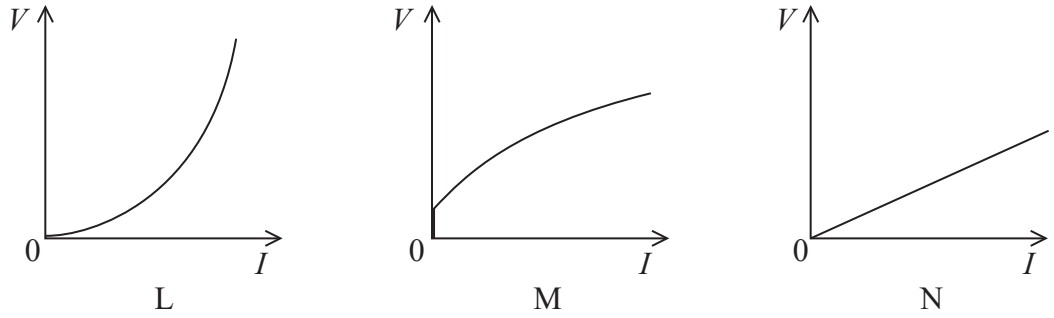
☒ **B** 600 C

☒ **C** 36 C

☒ **D** 0.6 C

(Total for Question = 1 mark)

7 The graphs show the variation of potential difference V with the current I for three components.



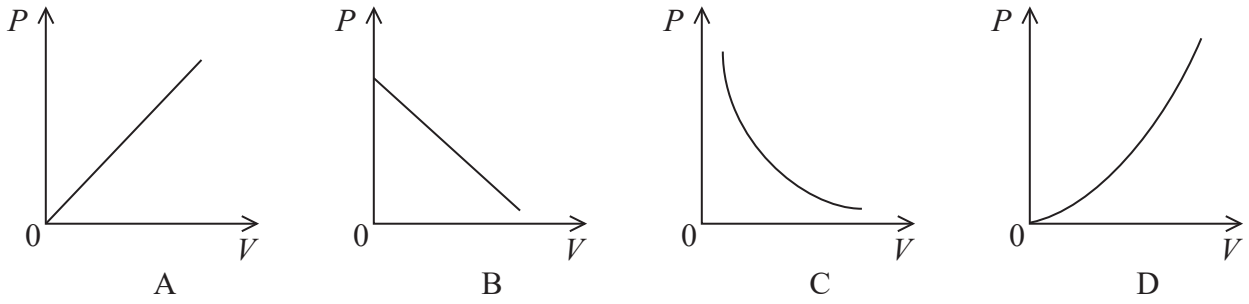
The three components are a metal wire at constant temperature, a filament lamp and a diode.

Which row of the table correctly identifies these graphs?

	Metal wire at constant temperature	Filament lamp	Diode
☒ **A**	L	M	N
☒ **B**	L	N	M
☒ **C**	N	M	L
☒ **D**	N	L	M

(Total for Question = 1 mark)

8 The graphs show possible variations of power P with potential difference V.



Which graph is correct for a resistor that obeys Ohm's law?

☒ **A**

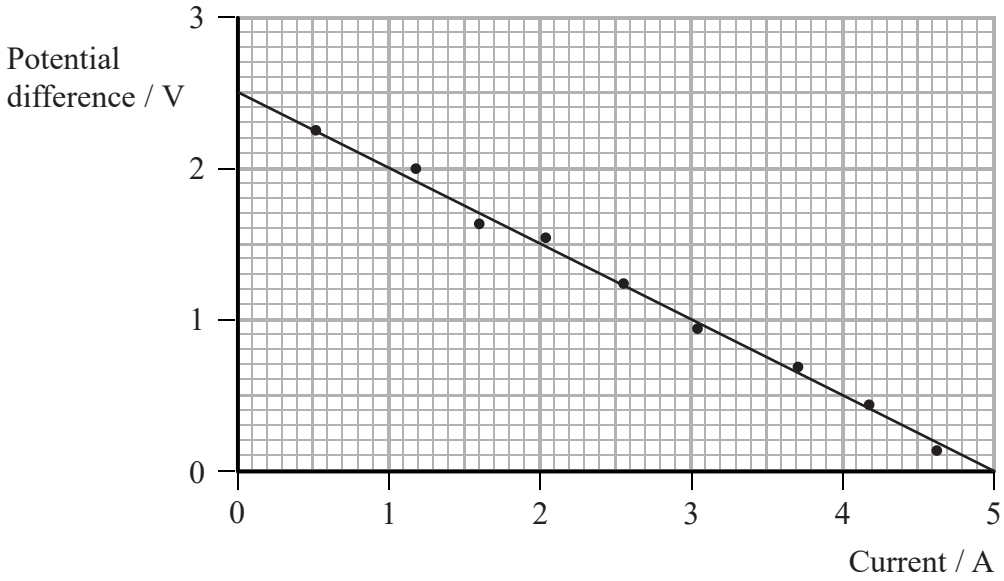
☒ **B**

☒ **C**

☒ **D**

(Total for Question = 1 mark)

9 A student wants to find the internal resistance of a cell. He plots a graph of the potential difference across the terminals of the cell against the current through the cell.



Which of the following quantities gives the internal resistance of the cell?

☒ **A** The area under the graph.

☒ **B** The intercept on the current axis.

☒ **C** The intercept on the potential difference axis.

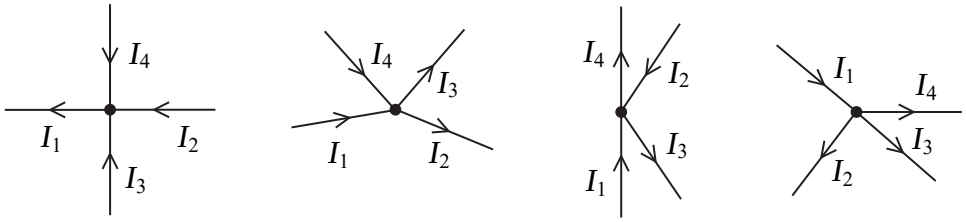
☒ **D** The magnitude of the gradient.

(Total for Question = 1 mark)

10 The diagrams show connected wires that carry currents I_1, I_2, I_3 and I_4.

The currents are related by the equation $I_1 + I_2 = I_3 + I_4$

Identify the diagram that this equation applies to.



A **B** **C** **D**

☒ **A**

☒ **B**

☒ **C**

☒ **D**

(Total for Question = 1 mark)

11 A 100 W lamp connected to the 230 V mains is replaced by a lamp which has twice the resistance. The power of the new lamp is

☒ **A** 25 W

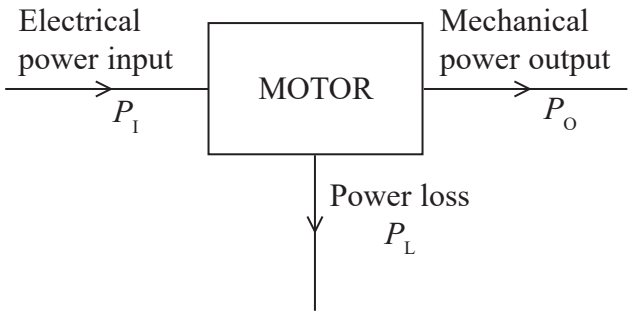
☒ **B** 50 W

☒ **C** 200 W

☒ **D** 400 W

(Total for Question = 1 mark)

12 Electrical power is transferred in a motor as shown.



What is the efficiency of the motor?

☒ **A** $\frac{P_O + P_L}{P_I}$

☒ **B** $\frac{P_I}{P_O}$

☒ **C** $\frac{P_L}{P_I}$

☒ **D** $\frac{P_O}{P_I}$

(Total for Question = 1 mark)

13 During a thunderstorm, a flash of lightning resulted in 600 000 C of charge flowing in a lightning conductor in a time of 40 ms. The current in the conductor was

☒ **A** 1.5×10^4 A

☒ **B** 2.4×10^4 A

☒ **C** 1.5×10^7 A

☒ **D** 2.4×10^7 A

(Total for Question = 1 mark)

14 The amount of electrical energy transferred when a charge of 8 mC moves through a potential difference of 12 V is

☒ **A** 1500 J

☒ **B** 96 J

☒ **C** 9.6×10^{-2} J

☒ **D** 6.7×10^{-4} J

(Total for Question = 1 mark)

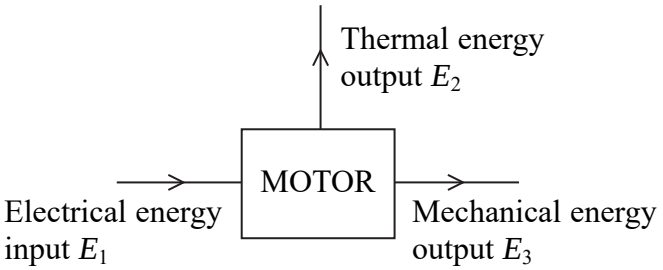
15 A resistor is connected to a cell. An amount of charge Q passes through the resistor in a time t. During this time, the amount of chemical energy converted to electrical energy by the cell is E.

Select the row of the table which correctly gives the current in the resistor and the e.m.f. of the cell.

		Current	**e.m.f.**
☒	**A**	Q/t	EQ
☒	**B**	Qt	EQ
☒	**C**	Q/t	E/Q
☒	**D**	Qt	E/Q

(Total for Question = 1 mark)

16 The diagram shows the energy transfer for an electric motor.



The efficiency of the motor is

☒ **A** $\frac{E_1}{E_2 + E_3}$

☒ **B** $\frac{E_1}{E_2}$

☒ **C** $\frac{E_3}{E_1}$

☒ **D** $\frac{E_2 + E_3}{E_1}$

(Total for Question = 1 mark)

17 A child's toy is operated by a small motor. The potential difference across the motor is 6.0 V and the current in it is 0.20 A. The energy used by the motor in 120 s is

☒ **A** 2.40 J

☒ **B** 60.0 J

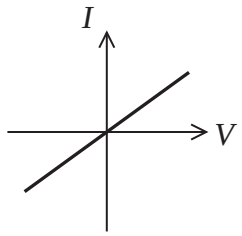
☒ **C** 144 J

☒ **D** 3600 J

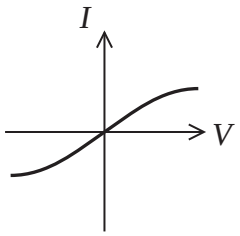
(Total for Question = 1 mark)

18 Which of the following current-potential difference (*I*-*V*) graphs correctly shows the behaviour of a diode?

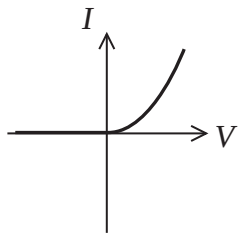
A



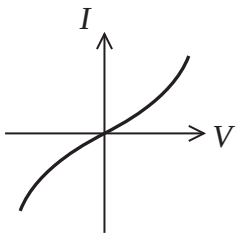
B



C



D



☒ **A**

☒ **B**

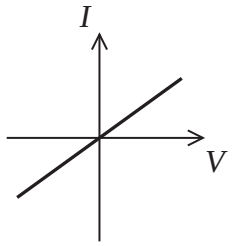
☒ **C**

☒ **D**

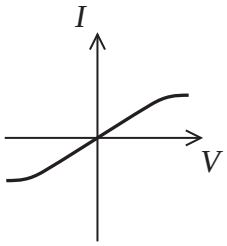
(Total for Question = 1 mark)

19 Which of the following current – potential difference (*I*–*V*) graphs shows the correct behaviour for a filament bulb?

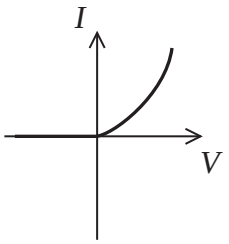
A



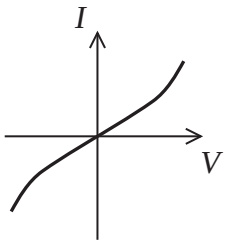
B



c



D



☒ **A**

☒ **B**

☒ **c**

☒ **D**

(t otal for Question = 1 mark)

20 Which of the following SI units is equivalent to the volt?

☒ **A** ampere per ohm

☒ **B** coulomb per second

☒ **C** joule per coulomb

☒ **D** joule per second

(Total for Question = 1 mark)