1)

Which equation is used to define resistance?

A power = (current)^2 × resistance

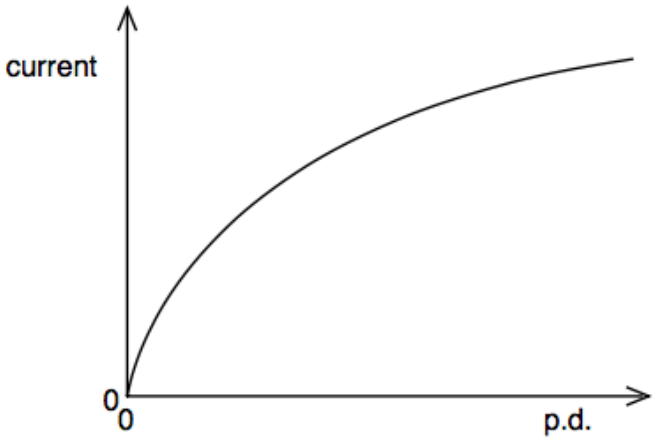
B resistivity = resistance × area ÷ length

C potential difference = current × resistance

D energy = (current)^2 × resistance × time

2)

The graph shows how the current through a lamp filament varies with the potential difference across it.



Which statement explains the shape of this graph?

A As the filament temperature rises, electrons can pass more easily through the filament.

B It takes time for the filament to reach its working temperature.

C The power output of the filament is proportional to the square of the current through it.

D The resistance of the filament increases with a rise in temperature.

3)

What physical quantity would result from a calculation in which a potential difference is multiplied by an electric charge?

A electric current

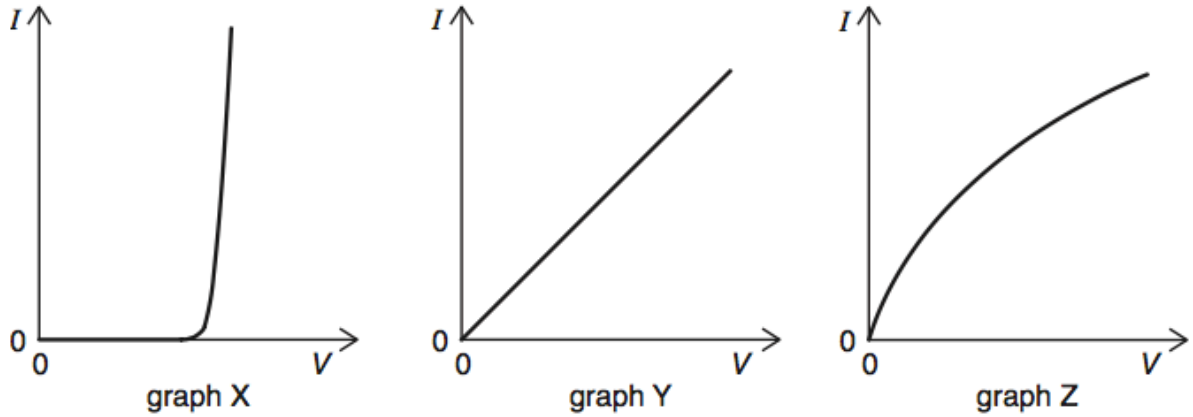
B electric energy

C electric field strength

D electric power

4)

The graphs show the variation with potential difference V of the current I for three circuit elements.



The three circuit elements are a metal wire at constant temperature, a semiconductor diode and a filament lamp.

Which row of the table correctly identifies these graphs?

	metal wire at constant temperature	semiconductor diode	filament lamp
A	X	Z	Y
B	Y	X	Z
C	Y	Z	X
D	Z	X	Y

5)

The current in a component is reduced uniformly from 100 mA to 20 mA over a period of 8.0 s.

What is the charge that flows during this time?

A 160 mC **B** 320 mC **C** 480 mC **D** 640 mC

6)

A student measures a current as 0.5 A.

Which of the following correctly expresses this result?

A 50 mA **B** 50 MA **C** 500 mA **D** 500 MA

7)

Which electrical quantity would be the result of a calculation in which energy is divided by charge?

A current

B potential difference

C power

D resistance

8)

A wire carries a current of 2.0 amperes for 1.0 hour.

How many electrons pass a point in the wire in this time?

A 1.2×10^{-15}

B 7.2×10^{3}

C 1.3×10^{19}

D 4.5×10^{22}

9)

What is an equivalent unit to 1 volt?

A $1\,JA^{-1}$ **B** $1\,JC^{-1}$ **C** $1\,WC^{-1}$ **D** $1\,Ws^{-1}$

10)

The potential difference between point X and point Y is 20V. The time taken for charge carriers to move from X to Y is 15s, and, in this time, the energy of the charge carriers changes by 12J.

What is the current between X and Y?

A 0.040A **B** 0.11A **C** 9.0A **D** 25A

11)

Which of the following describes the electric potential difference between two points in a wire that carries a current?

A the force required to move a unit positive charge between the points

B the ratio of the energy dissipated between the points to the current

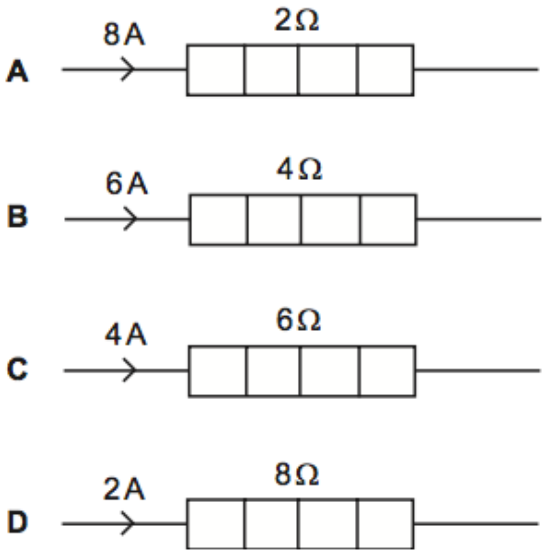
C the ratio of the power dissipated between the points to the current

D the ratio of the power dissipated between the points to the charge moved

12)

The diagram shows four heaters and the current in each.

Which heater has the greatest power dissipation?

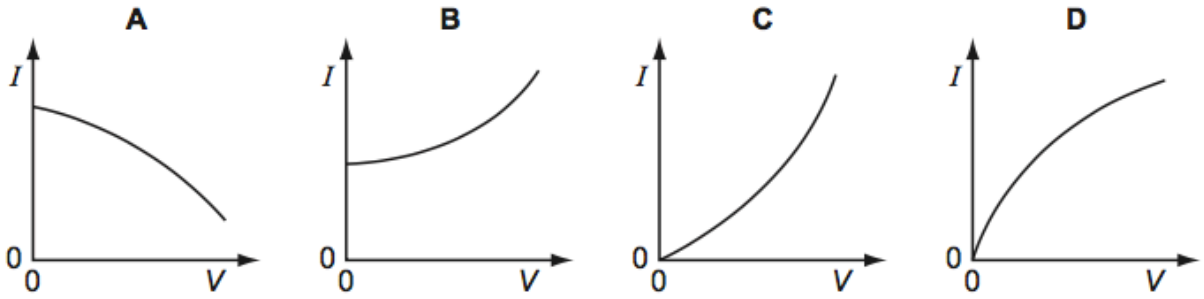


13)

The resistance of a thermistor decreases significantly as its temperature increases.

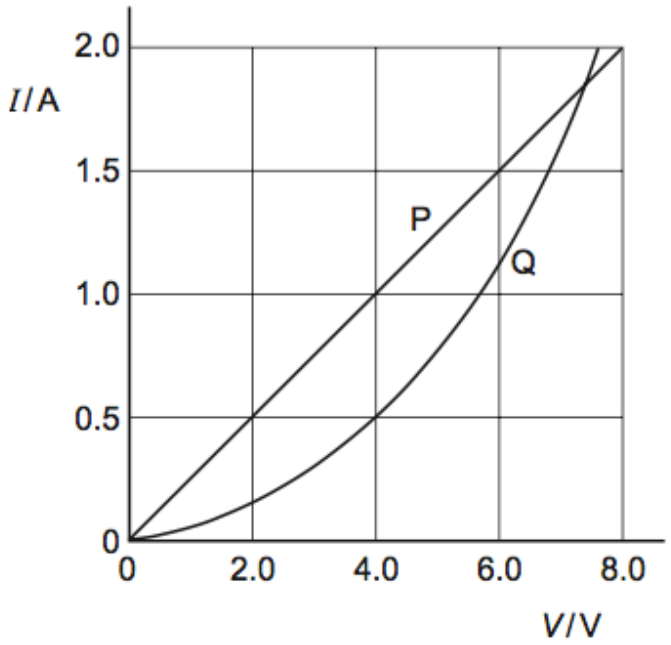
The thermistor is kept in air. The air is at room temperature.

Which graph best represents the way in which the current I in the thermistor depends upon the potential difference V across it?



14)

The *I*-*V* characteristics of two electrical components P and Q are shown below.



Which statement is correct?

A P is a resistor and Q is a filament lamp.

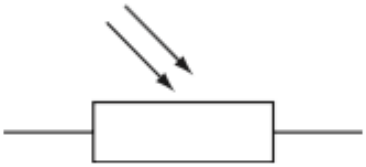
B The resistance of Q increases as the current in it increases.

C At 1.9 A the resistance of Q is approximately half that of P.

D At 0.5 A the power dissipated in Q is double that in P.

15)

Which electrical component is represented by the following symbol?



A a diode

B a light-dependent resistor

C a resistor

D a thermistor

16)

Which expression involving base units is equivalent to the volt?

A $kg\,m^2\,s^{-1}\,A^{-1}$

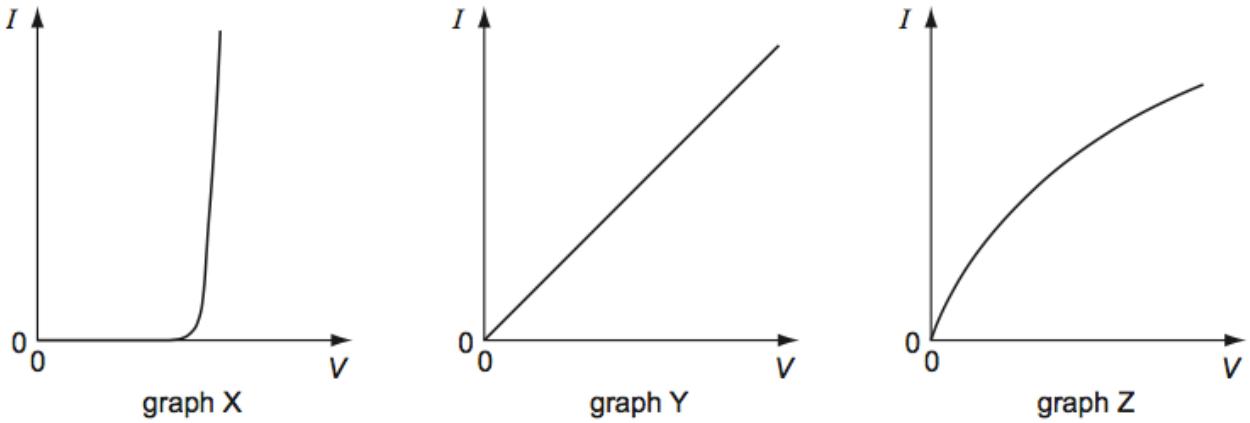
B $kg\,m\,s^{-2}\,A$

C $kg\,m^2\,s^{-1}\,A$

D $kg\,m^2\,s^{-3}\,A^{-1}$

17)

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



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

Which row of the table correctly identifies these graphs?

	metal wire at constant temperature	semiconductor diode	filament lamp
A	X	Z	Y
B	Y	X	Z
C	Y	Z	X
D	Z	X	Y

18)

An electrical component has the following circuit symbol.

What does this symbol represent?

A variable resistor (rheostat)

B fuse

C light-dependent resistor

D thermistor

19)

A filament lamp operates normally at a potential difference (p.d.) of 6.0 V. The variation with p.d. V of the current I in the lamp is shown in Fig. 5.1.

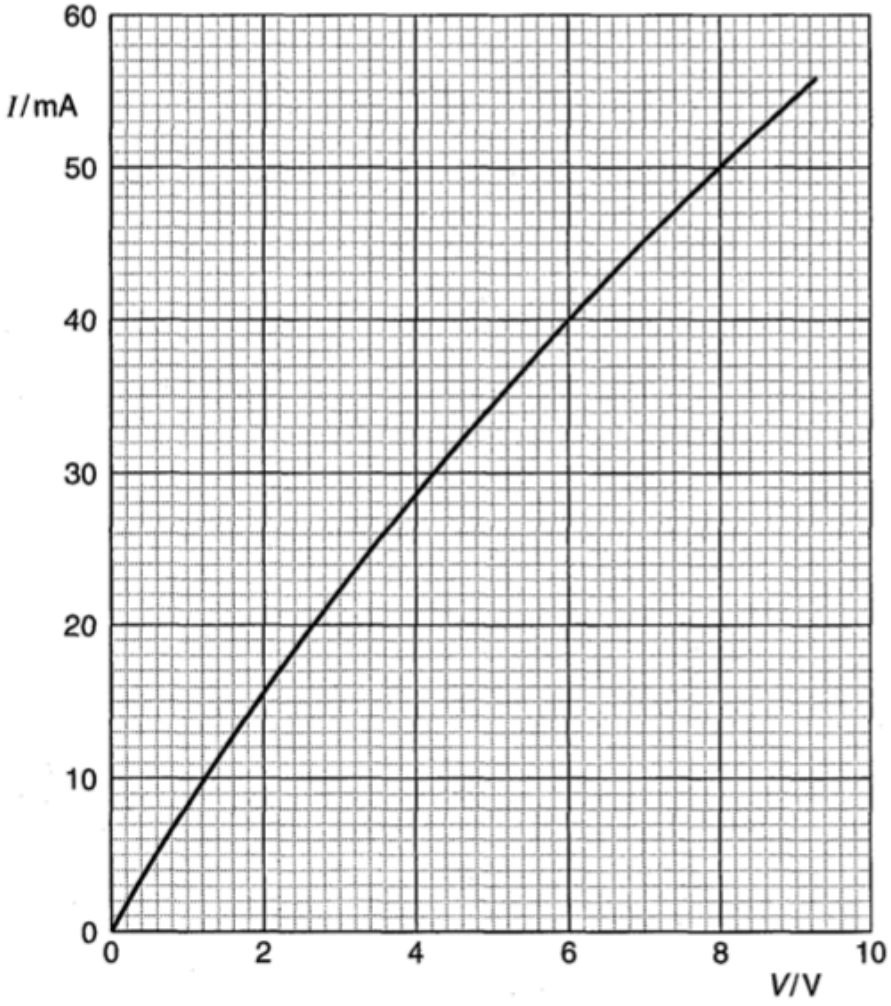


Fig. 5.1

(a) Use Fig. 5.1 to determine, for this lamp,

(i) the resistance when it is operating at a p.d. of 6.0 V,

resistance = ... Ω

(ii) the change in resistance when the p.d. increases from 6.0 V to 8.0 V.

change in resistance = ... Ω
[4]