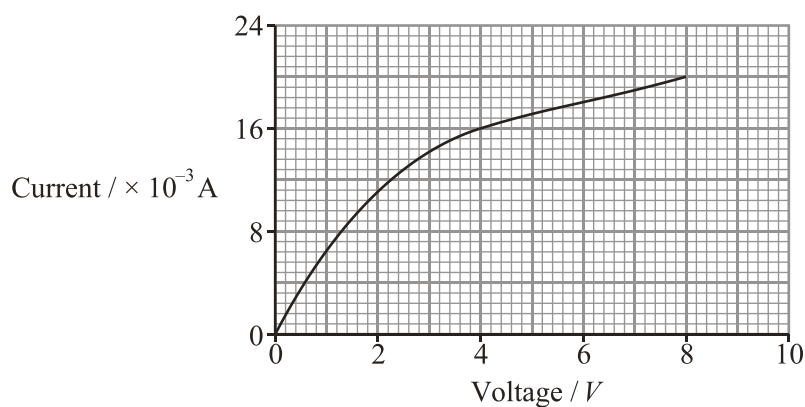


Name: _____
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 Date: _____
 DP Physics

Circuitry IV

1. The graph below shows the current/voltage characteristics of a filament lamp.

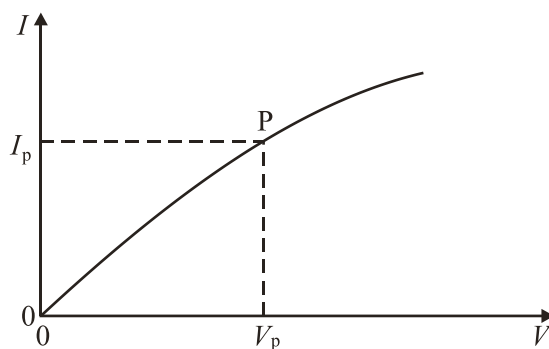


The resistance of the filament at 4.0 V is

- A. 250 Ω .
- B. 4 000 Ω .
- C. 8 000 Ω .
- D. 64 000 Ω .

(1)

2. The variation with potential difference V of the current I in an electric lamp is shown below.

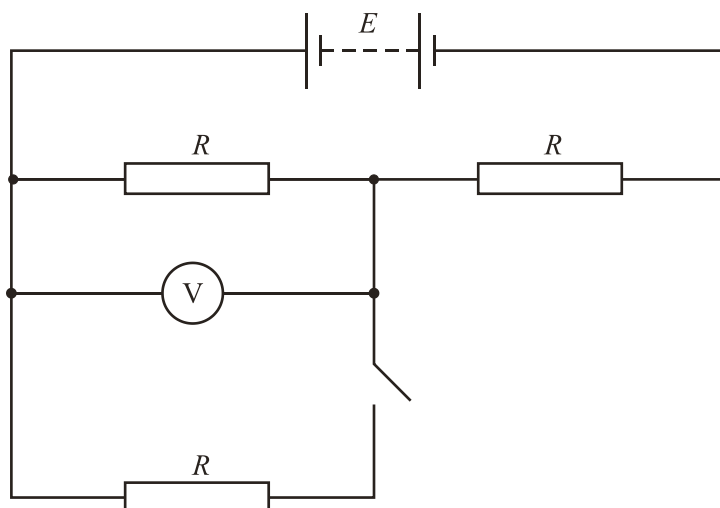


At point P, the current is I_p , the potential difference is V_p and the gradient of the tangent to the curve is G . What is the resistance of the lamp at point P?

- A. $\frac{1}{G}$
- B. G
- C. $\frac{I_p}{V_p}$
- D. $\frac{V_p}{I_p}$

(1)

3. A battery of e.m.f. E and negligible internal resistance is connected to three resistors, each of resistance R , a voltmeter and a switch, as shown below.



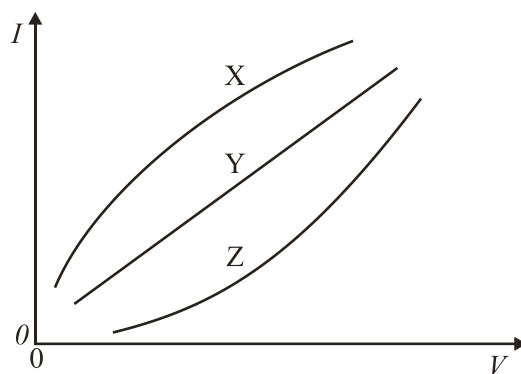
The voltmeter has infinite resistance.

What are the readings on the voltmeter when the switch is open and when it is closed?

	Switch open	Switch closed
A.	0	less than $\frac{1}{2} E$
B.	0	$\frac{1}{2} E$
C.	$\frac{1}{2} E$	less than $\frac{1}{2} E$
D.	$\frac{1}{2} E$	$\frac{1}{2} E$

(1)

4. The graph below shows the variation with voltage V of the current I in three resistors X, Y and Z.



Which of the following corresponds to resistors for which the resistance increases with increasing current?

- A. X only
- B. Z only
- C. X and Z
- D. Y and Z

(1)

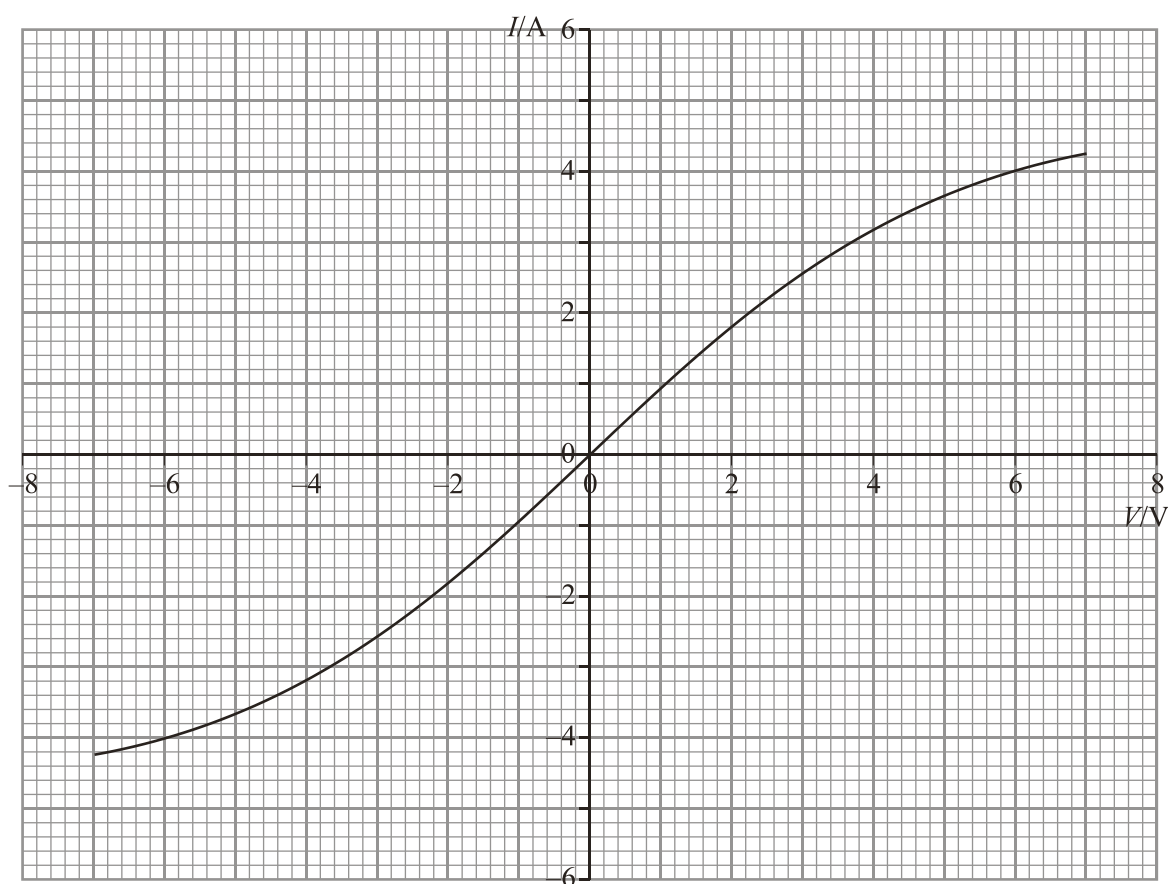
5. This question is about electrical components.

- (a) In the space below, draw a circuit diagram that could be used to determine the current-voltage (I - V) characteristics of an electrical component X.



The graph below shows the I - V characteristics for the component X.

(2)



The component X is now connected across the terminals of a battery of e.m.f. 6.0 V and negligible internal resistance.

- (b) Use the graph to determine
- (i) the current in component X.

.....

(1)

- (ii) the resistance of component X.

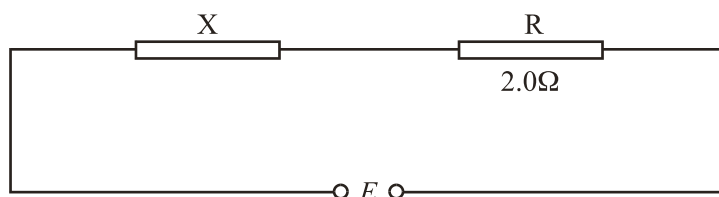
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(2)

A resistor R of constant resistance $2.0\ \Omega$ is now connected in series with component X as shown below.



- (c) (i) On the graph in (a), draw the I - V characteristics for the resistor R.

(2)

- (ii) Determine the total potential difference E that must be applied across component X and across resistor R such that the current through X and R is $3.0\ \text{A}$.

.....

(2)

- (d) (i) A resistor is to be used as a temperature-measuring device. List **two** desirable properties of such a device.

1.
 2.

(2)

- (ii) Explain how a temperature scale could be constructed for this resistance thermometer.

.....

(3)

(Total 14 marks)