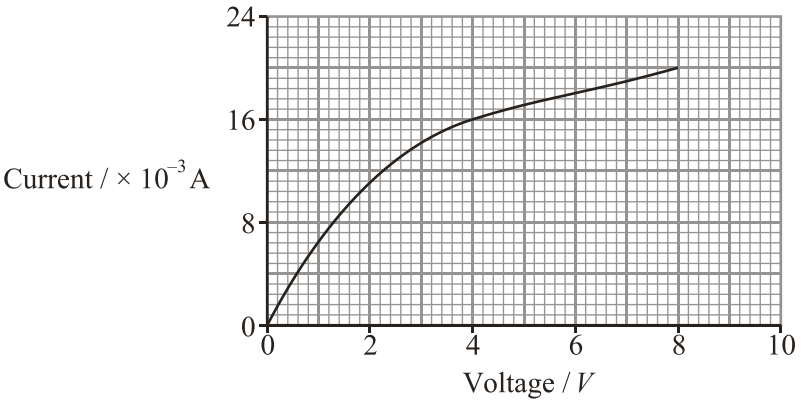
Name: _____
HR: _____
Date: _____
DP Physics

ISTANBUL INTERNATIONAL COMMUNITY SCHOOL
IICS SINCE 1911

Circuitry II

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.

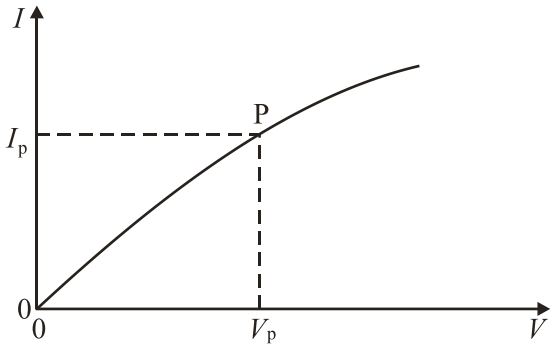
B. 4 000 Ω.

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. $\frac{1}{G}$

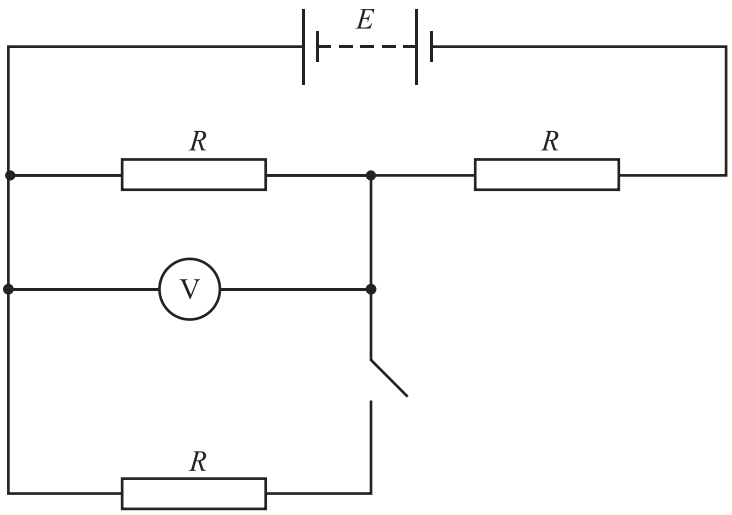
B. G

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.



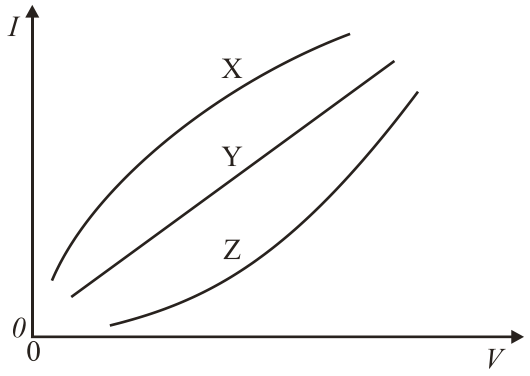
The voltmeter has infinite resistance.

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 ½ E
B.	0	½ E
C.	½ E	less than ½ E
D.	½ E	½ 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)

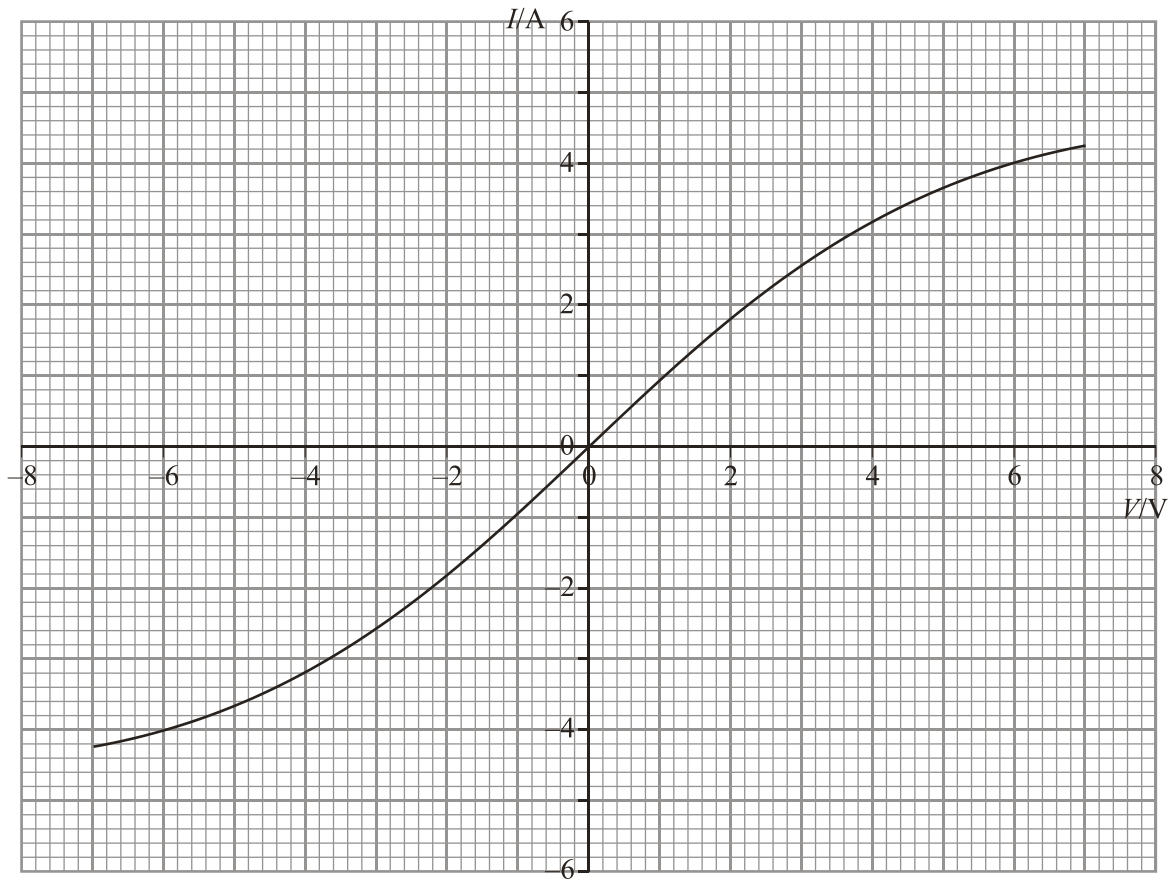
5. This question is about electrical components.

(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.

component X

(2)

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



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.

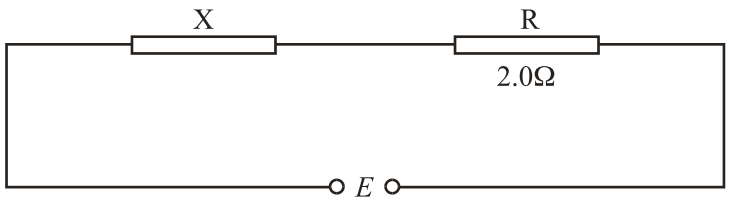
.....

.....

.....

(2)

A resistor R of constant resistance 2.0 Ω 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 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)