5 (a) A student investigates the resistance of a lamp.

(i) The student uses a circuit that contains an ammeter, a battery, a lamp and a voltmeter to determine the resistance of the lamp.

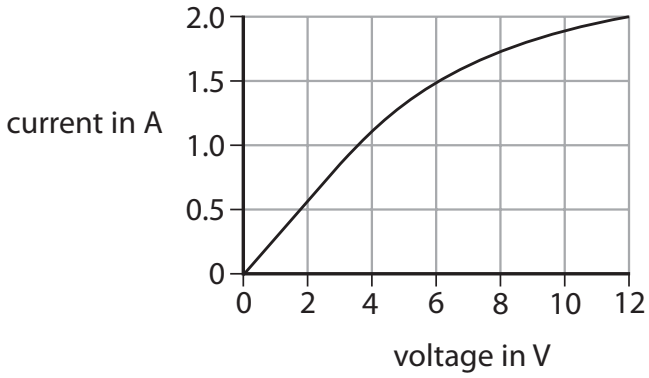
Draw a circuit diagram to show how he should connect the apparatus.

(3)

(ii) State the relationship between voltage, current and resistance.

(1)

(iii) The student obtains this graph for a filament lamp.



Calculate the resistance of the lamp when the voltage is 6.0 V.

Give the unit.

(3)

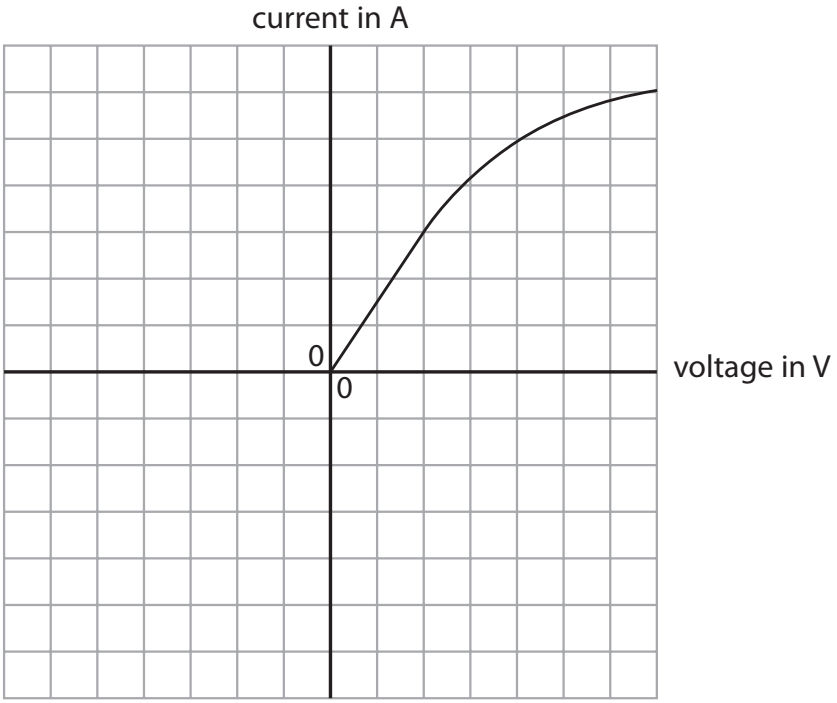
resistance = ... unit .....

(iv) The student reverses the battery connections and then repeats his measurements.

On the axes below, sketch the graph that he would obtain.

Part of the graph has been done for you.

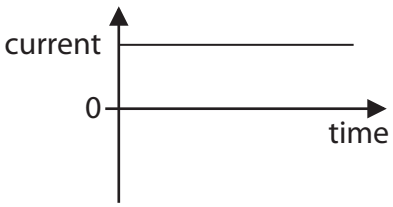
(2)



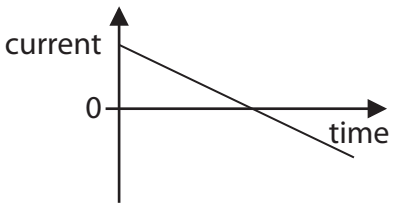
(b) The student replaces the filament lamp with a light emitting diode (LED).
He notices that there is no current in the diode when the battery is reversed.
He replaces the battery with an a.c. supply.

Which graph shows how the current in the diode varies with time?

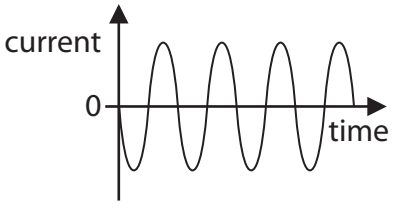
(1)



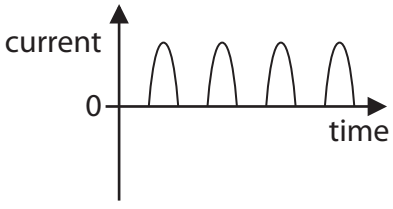
☒ **A**



☒ **B**



☒ **C**



☒ **D**

(Total for Question 5 = 10 marks)