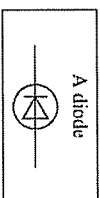
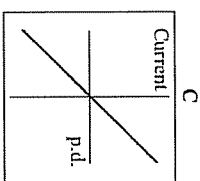
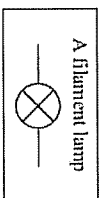
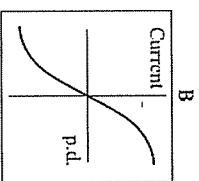
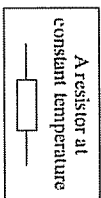
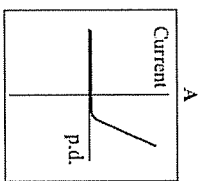


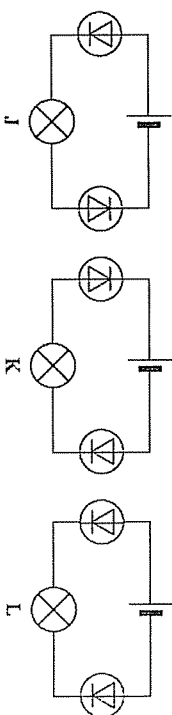
Electrical circuits

1. (a) The graphs, A, B and C, show how the current through a component varies with the potential difference (p.d.) across the component. Draw a line to link each graph to the correct component. Draw only three lines.

Component



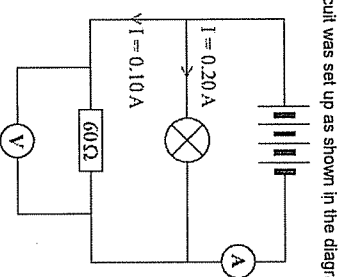
- (b) Each of the circuits, J, K and L, include two diodes.



In which one of the circuits, J, K or L, would the filament lamp be on?

(1)
(Total 3 marks)

2. A circuit was set up as shown in the diagram.



- (a) Each cell provides a potential difference of 1.5 volts.
(i) What is the total potential difference provided by the four cells in the circuit?

Total potential difference = volts

(1)

- (ii) What will be the reading on the voltmeter?

(1)

- (b) The current through the lamp is 0.20 amps.
The current through the resistor is 0.10 amps.
What is the reading on the ammeter?

Reading on ammeter = amps

(1)

(c) Use a phrase from the box to complete the following sentence.

greater than equal to smaller than

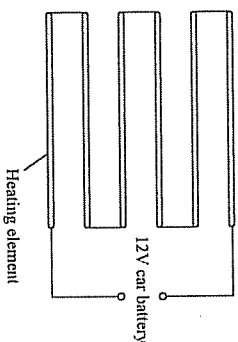
The resistance of the lamp is 60 Ω .

Give a reason for your answer.

(2)
(Total 5 marks)

3. The diagram shows a simple type of car rear window heater. The six heating elements are exactly the same.

Each heating element has a resistance of 5 Ω . The current passing through each element is 0.4 A.



(i) Calculate the total resistance of the six heating elements.

Show clearly how you work out your answer.

Total resistance = ohms

(2)

(ii) Why is the current passing through each element the same?

.....

(1)

(iii) What is the total current passing through the whole circuit?

.....

(1)

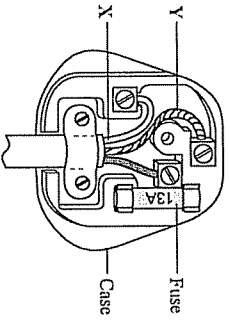
(iv) How is the 12 volt potential difference of the car battery shared between the six heating elements?

.....

(1)
(Total 5 marks)

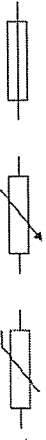
Household electricity

1. (a) The diagram shows the inside of a correctly wired three-pin plug.

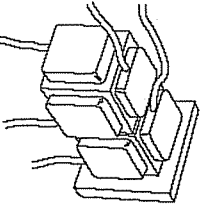


- (i) What colour is the insulation on the wire labelled X?
Draw a ring around your answer.
blue brown green/yellow (1)
- (ii) What name is given to the wire labelled Y?
Draw a ring around your answer.
earth live neutral (1)
- (iii) What material would be suitable for the case of the plug?
.....
(1)

- (iv) Which one of the following is the correct circuit symbol for a fuse?
Draw a ring around your answer.
.....
(1)



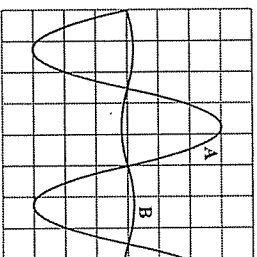
- (b) A householder does not have enough electric sockets in the kitchen. To overcome the problem, the householder uses two adaptors to plug five appliances into a single electric socket.



Explain why this is dangerous.

-
.....
.....
.....
(2)
(Total 6 marks)

2. The diagram shows two oscilloscope traces, A and B.

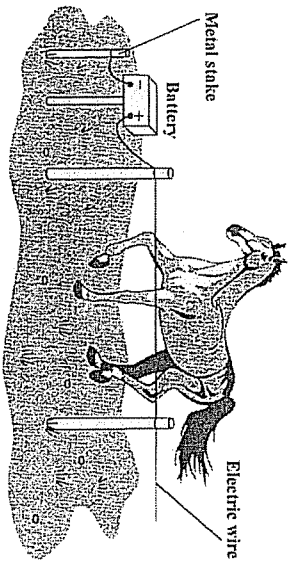


Trace A shows how the potential difference between the live and neutral terminals of an electricity supply changes with time.

- (a) Describe how the potential of the live terminal varies with respect to the neutral terminal of the electricity supply.
.....
.....
(1)
- (b) What does trace B show?
.....
(2)
- (c) Each horizontal division on the oscilloscope represents 0.005 s.
(i) What is the period of this electricity supply?
.....
Period = seconds (1)
- (ii) Calculate the frequency of the supply.
.....
Frequency = hertz (1)

3. (a) The diagram shows an electric fence, designed to keep horses in a field.

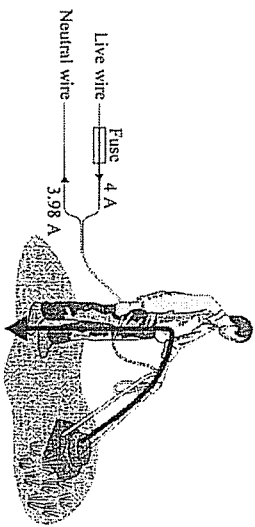
(Total 5 marks)



When a horse touches the wire the horse receives a mild electric shock. Explain how.

(2)

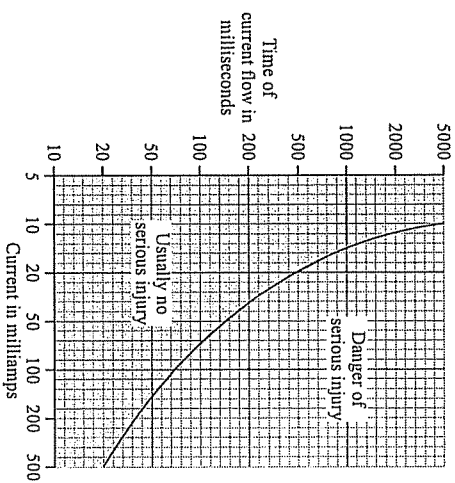
- (b) The diagram shows how a person could receive an electric shock from a faulty electrical appliance. Using a residual circuit breaker (RCB) can help to protect the person against receiving a serious shock.



- (i) Compare the action of an RCB to that of a fuse.

(2)

- (ii) The graph illustrates how the severity of an electric shock depends upon both the size of the current and the time for which the current flows through the body.



Within how long must the RCB cut off the current if the person using the lawnmower is to be in no danger of serious injury?

Time = milliseconds

(2)
(Total 6 marks)