



# **GCSE Physics**

## **Electricity in the Home**

### **Mark Scheme**

**Time available: 55 minutes**

**Marks available: 49 marks**

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## Mark schemes

1.

- (a) pin  
made from brass because it is (hard and) a (good electrical) conductor  
*accept copper for brass*  
*metal is insufficient*  
*heat conductor on its own negates*

1

outer case  
plastic/rubber because it is a (good electrical) insulator  
*heat insulator on its own negates*

1

- (b) (i) live

1

(ii) makes it hot/warm  
*melts is insufficient*

1

- (iii) 8.7

*accept an answer that rounds to 8.7*  
*allow 1 mark for correct substitution ie  $2000 = 230 \times I$*   
*an answer of 0.0087 or 0.009 or 3.0(4) or 5.65 or 5.7 gains 1 mark*

2

- (c) a (large) current goes from the live wire to the earth wire  
*accept metal case for live wire*  
*accept a current goes from live to earth*  
*do not accept electricity for current*

1

(which causes) the fuse to (overheat and) melt

*accept blow for melt*  
*break is insufficient*  
*do not accept snap / blow up for melt*

1

- (d) reduce chance of an electric shock

*accept to reduce the risk of an accident*  
*accept prevent electric shock*  
*accept prevent electrocution*  
*accept prevent or reduce the risk of an (electrical) fire*  
*accept an electric shock can kill you*  
*accept it can kill you*  
*accept so you can use it safely*

1

[9]

<b>2.</b>	(a) charge	1
	(b) (i) blue	1
	(ii) earth wire	1
	fuse	1
	(c) (i) case is non-metal / non-conducting / plastic / insulator <i>must refer to case / outside of appliance</i> <i>do not accept plastic coating / covering</i>	1
	(ii) earth (wire)	1
	(d) (i) 60 (W) <i><math>P = 3 \times 20</math> gains 1 mark</i> <i>provided no subsequent step shown</i>	2
	(ii) 15 <i><math>300 = 20 \times Q</math></i> <b>or</b> <i><math>20 = 300 / Q</math> gains 1 mark</i>	2
	C / coulombs <i>must clearly be upper case C accept J / V or As</i>	1
		<b>[11]</b>
<b>3.</b>	(a) (i) (3-pin) <u>plug</u> <i>do <b>not</b> accept plug socket</i>	1
	(ii) live and neutral	1
	(iii) double	1
	(b) direct current (d.c.) only	1

(c) (i) live

1

(ii) too great a current flows

*accept a surge of current*

*accept too great a power*

*accept an electrical fault*

*do **not** accept voltage / energy / electricity too high*

1

(iii) can be reset

*accept does not need replacing*

1

(disconnects circuit) faster

*cheaper is insufficient*

*does not melt is insufficient*

*quicker to fix / replace is insufficient*

1

[8]

4.

(a) (i)

Wire	Plug terminal
Live	C
Neutral	A
Earth	B

*all 3 correct for 2 marks*

*allow 1 mark for 1 correct*

2

(ii) plastic

**or**

rubber

*accept:*

*ABS*

*UF / urea formaldehyde*

*nylon*

*PVC*

1

(b) (i) 600

*allow 1 mark for correct substitution,*

*ie  $P = \frac{30\,000}{50}$*

*provided no subsequent step*

2

- (ii) power is greater than 820 (W)  
*power is 1200 W is insufficient*

1

the lead /cable / wire will overheat / get (too) hot  
*accept lead / cable will melt*  
*may overheat / get hot is insufficient*

1

so there is a risk of fire  
*accept causing a fire*

1

- (c) X

any **one** from:

- most / more efficient
- smallest energy input (per second)
- cheapest to operate  
*mark only scores if X is chosen*  
*mark is for the reason*  
*accept smallest input (power) for same output (power)*  
*accept wastes least energy*  
*smallest (power) input is insufficient*  
*uses least electricity is insufficient*

1

[9]

5.

- (a) (i) 50 (Hz)

1

- (ii) 2760 (W)

1

- (b) 12

*allow 1 mark for correct substitution, ie 2400/200*

**or**

*allow 1 mark for 2760/230 provided no subsequent step shown*

2

amps

1

- (c) the charge is directly proportional to the time switched on for  
*accept for 1 mark the longer time (to boil), the greater amount of charge*  
*or positive correlation*  
*or they are proportional*

2

[7]

6.

- (a) (i) earth wire

1

- (ii) double

1

- (b) if too much current flows through the wire

*accept power for current*

*do **not** accept electricity for current*

*accept if more than 20 amps flows through the wire*

1

the fuse (overheats and) melts

*accept 'blows' for melts*

*do not accept explodes / breaks / snaps etc*

1

breaking the circuit

*accept stopping the current flow*

1

[5]