

AQA GCSE PHYSICS (HIGHER) • 8463

PHYSICS



EXAM QUESTION PACK

4.2.3 DOMESTIC USES AND SAFETY (PACK 2)

SCORE

/249

PERCENTAGE

%

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Q1.

Diagram 1 shows a hairdryer.

Diagram 2 shows how the heaters and fan of the hairdryer are connected to a 3-pin plug. The hairdryer does not have an earth wire.

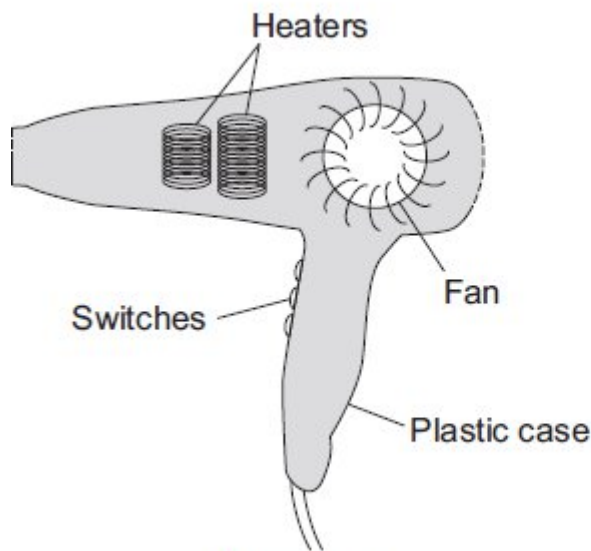


Diagram 1

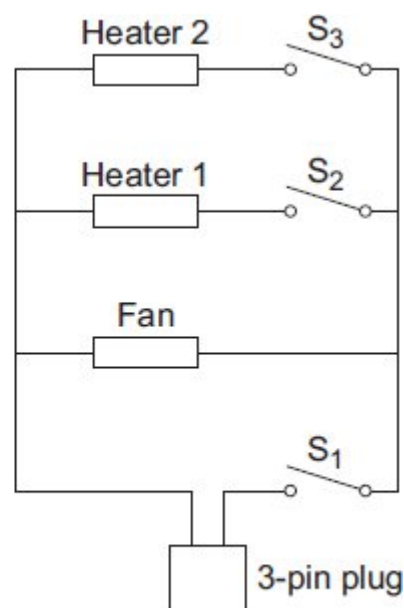


Diagram 2

- (a) What colour is the insulation around the wire connected to the live pin inside the plug?

_____ (1)

- (b) Why does the hairdryer **not** need an earth wire?

(1)

- (c) All the switches are shown in the OFF position.

- (i) Which switch or switches have to be ON to make:

(1) only the fan work; _____

(2) heater 2 work? _____

(2)

- (ii) The heaters can only be switched on when the fan is also switched on.

Explain why.

(2)

- (d) The table shows the current drawn from the 230 volt mains electricity supply when different parts of the hairdryer are switched on.

	Current in amps
Fan only	1.0
Fan and heater 1	4.4
Fan and both heaters	6.5

Calculate the maximum power of the hairdryer.

Show clearly how you work out your answer and give the unit.

Maximum power = _____

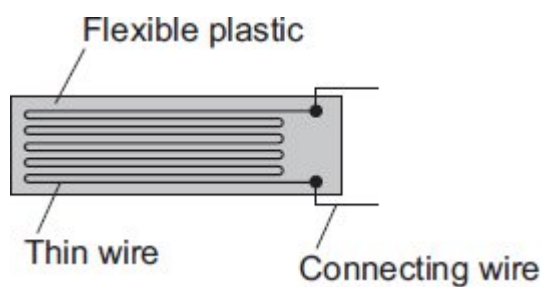
(3)

(Total 9 marks)

Q2.

The diagram shows a strain gauge, which is an electrical device used to monitor a changing force.

Applying a force to the gauge causes it to stretch.
This makes the electrical resistance of the wire change.



- (a) (i) Using the correct symbols, **add** to the diagram to show how a battery, an ammeter and a voltmeter can be used to find the resistance of the strain gauge drawn above.

(2)

- (ii) When in use, the strain gauge is always connected to a d.c. power supply, such as a battery.

How is a d.c. (direct current) power supply different from an a.c. (alternating current) power supply?

(1)

- (b) Before any force is applied, the unstretched gauge, correctly connected to a 3.0 V battery, has a current of 0.040 A flowing through it.

- (i) Calculate the resistance of the unstretched gauge.

Show clearly how you work out your answer.

Resistance = _____ Ω

(2)

- (ii) Stretching the gauge causes the current flowing through the gauge to decrease.

What happens to the resistance of the gauge when it is stretched?

(1)

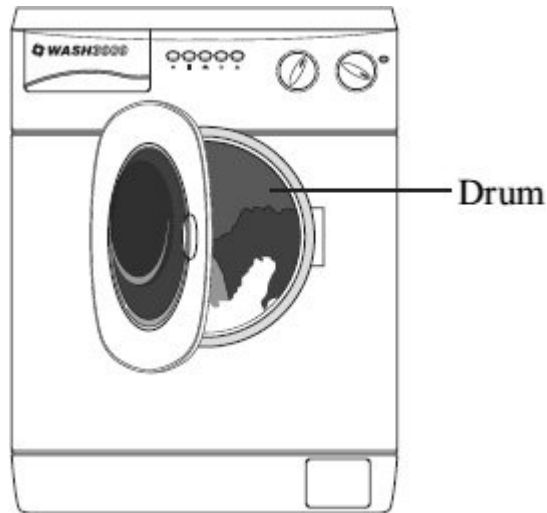
- (iii) What form of energy is stored in the gauge when a force is applied and the gauge stretches?

(1)

(Total 7 marks)

Q3.

The picture shows a new washing machine. When the door is closed and the machine switched on, an electric motor rotates the drum and washing.



- (a) What happens to the energy wasted by the electric motor?

(1)

- (b) The diagram shows the label from the new washing machine.

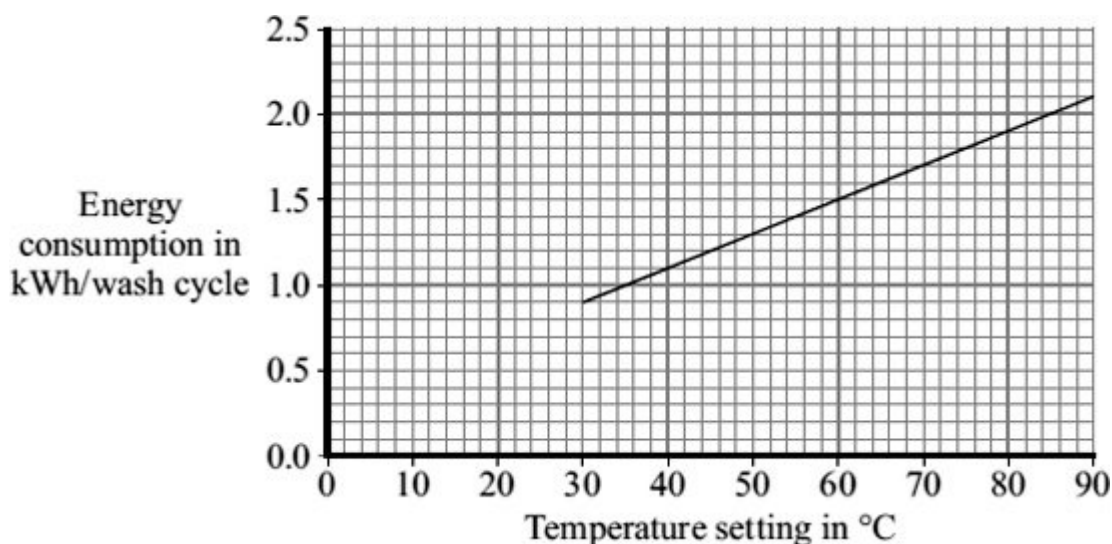
Model – Wash 3000 Energy A	
More efficient A B C D E Less efficient	A
Energy consumption kWh/wash cycle (based on 40 °C wash)	1.1

An 'A' rated washing machine is *more energy efficient* than a 'C' rated washing machine.

Explain what being *more energy efficient* means.

(2)

- (c) The graph shows that washing clothes at a lower temperature uses less energy than washing them at a higher temperature. Using less energy will save money.



- (i) Electricity costs 12 p per kilowatt-hour (kWh).
The temperature setting is turned down from 40 °C to 30 °C.

Use the graph and equation in the box to calculate the money saved each wash cycle.

$\text{total cost} = \text{number of kilowatt-hours} \times \text{cost per kilowatt-hour}$
--

Show clearly how you work out your answer.

Money saved = _____ p

(2)

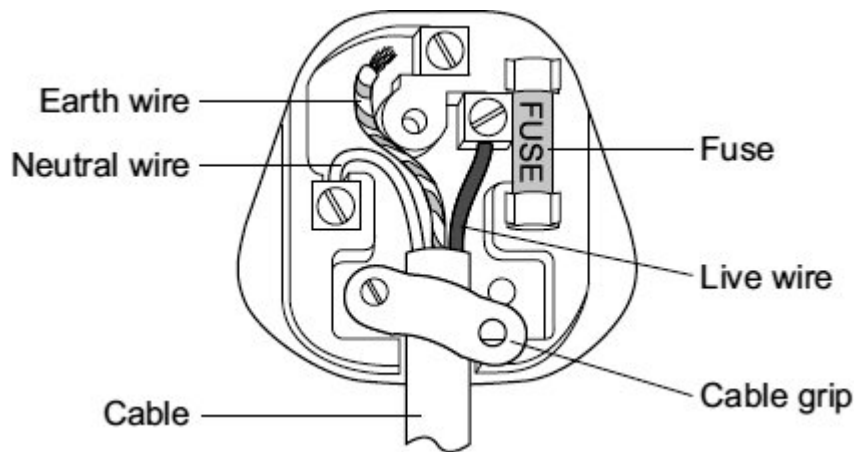
- (ii) Suggest why reducing the amount of energy used by washing machines could reduce the amount of carbon dioxide emitted into the atmosphere.

(1)

(Total 6 marks)

Q4.

- (a) The diagram shows the inside of an incorrectly wired three-pin plug.



- (i) What **two** changes need to be made so that the plug is wired correctly?

1. _____

 2. _____

(2)

- (ii) Which one of the wires inside a plug is there to make an appliance with a metal case safer to use?

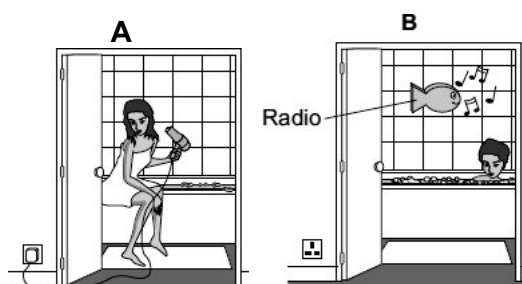
(1)

- (iii) The fuse inside a plug is a safety device.

Explain what happens when too much current passes through a fuse.

(2)

- (b) Each of these pictures shows an electrical appliance being used in a bathroom.



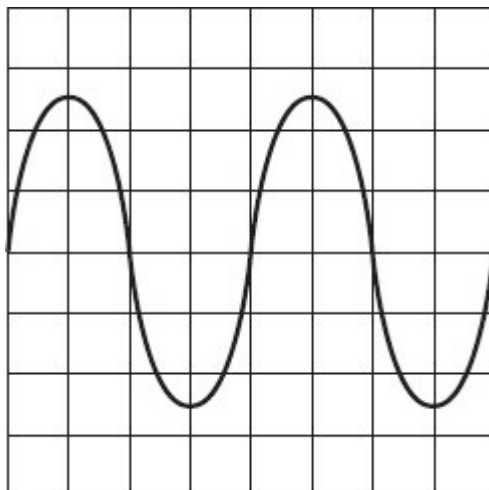
Using the hairdryer in picture **A** is dangerous. However, it is safe to use the battery-operated radio in picture **B**.

Explain why.

(2)
(Total 7 marks)

Q5.

An oscilloscope is connected to an alternating current (a.c.) supply. The diagram shows the trace produced on the oscilloscope screen.



Each horizontal division on the oscilloscope screen represents 0.002 s.

- (a) Calculate the frequency of the alternating current supply.

Show clearly how you work out your answer and give the unit.

Frequency = _____

(3)

- (b) What is the frequency of the a.c. mains electricity supply in the UK?

(1)
(Total 4 marks)

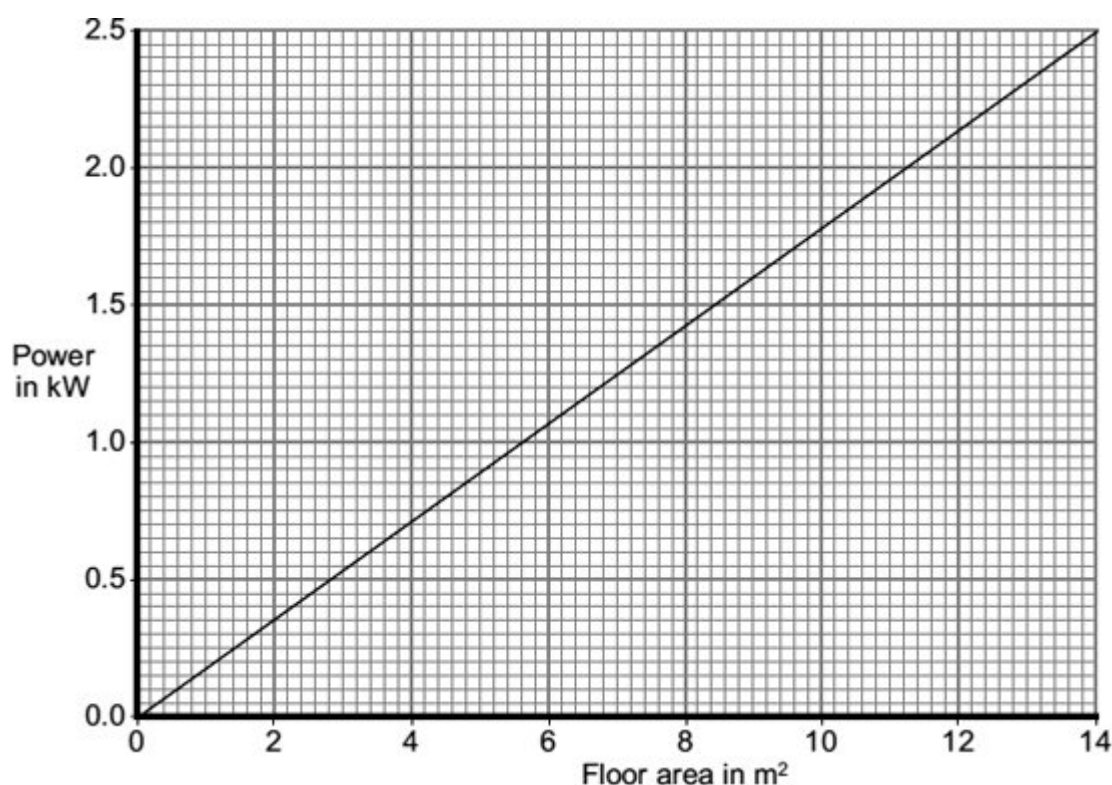
Q6.

A homeowner has installed electric underfloor heating in the kitchen. When the heating is switched on, an electric current flows through wires running under the tiled floor surface.

- (a) What is an electric current?

_____ (1)

- (b) The graph shows how the power output of an underfloor heating system depends on the area of the floor that is heated.



The area of the homeowner's kitchen floor is 9.0 m².

Calculate, using the graph, the current drawn from the 230 V mains supply by the heating system.

Show clearly how you work out your answer and give the unit.

Current = _____

(4)
(Total 5 marks)

Q7.

- (a) Use numbers given in the box to complete the following sentences.

12	50	110	230
----	----	-----	-----

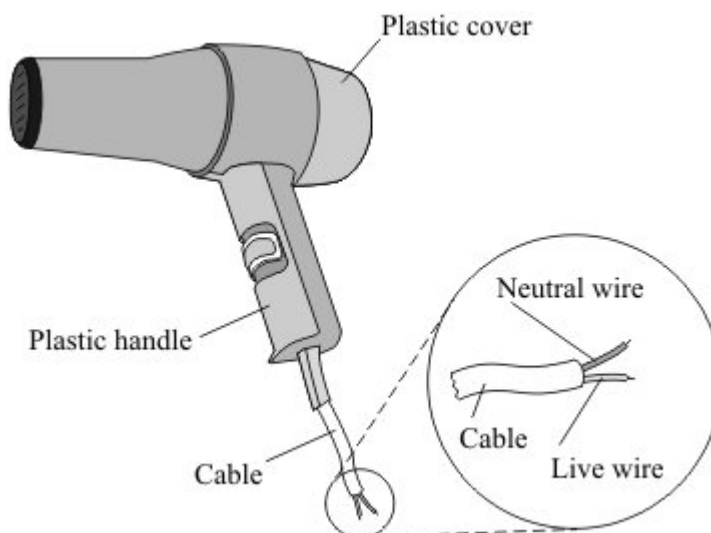
In the UK, the mains electricity supply is _____ volts.

The frequency of the UK mains electricity supply is _____ hertz.

(2)

- (b) The diagram shows a hairdryer designed to be used with the UK mains supply.

The cable connecting the hairdryer to the plug does not have an earth wire.



- (i) Why does the hairdryer **not** need a cable with an earth wire?

(1)

- (ii) Which **one** of the following materials are the two wires inside the cable made from?

Draw a ring around your answer.

aluminium

copper

steel

(1)

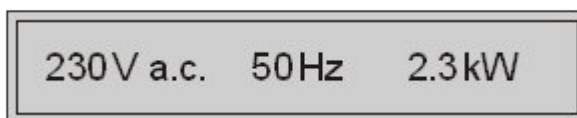
(Total 4 marks)

Q8.

- (a) Describe the difference between an alternating current (a.c.) and a direct current (d.c.).

(2)

- (b) The diagram shows the information plate on the bottom of an electric wallpaper steamer.



- (i) Calculate the current used by the steamer.

Show clearly how you work out your answer.

Current _____ A

(2)

- (ii) Which **one** of the following fuses should be used inside the plug of the steamer?

Draw a ring around your answer.

1 A

3 A

5 A

10 A

13 A

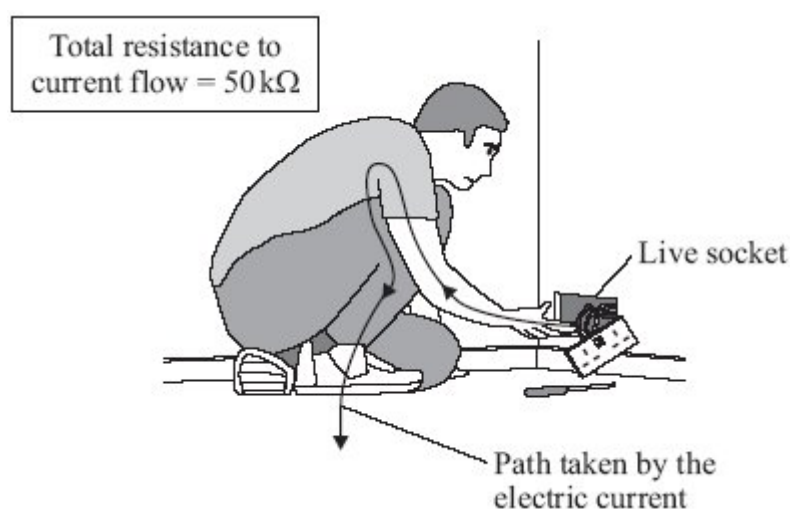
(1)

(Total 5 marks)

Q9.

The diagram shows someone accidentally touching the live wire inside a dismantled 230 volt mains electricity socket.

A current flows through the person giving him an electric shock.



- (a) (i) Calculate the current that will flow through the person.

Show clearly how you work out your answer.

Current = _____ A

(2)

- (ii) Rubber is a good insulator.

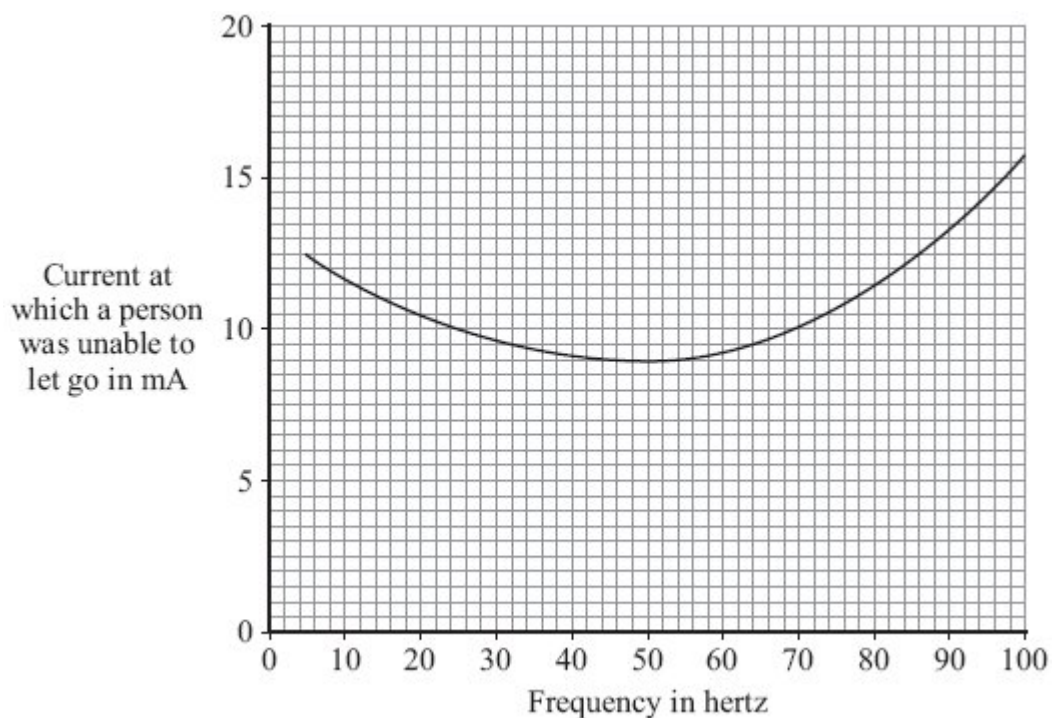
Explain why it is a good idea for electricians to wear rubber soled boots when working.

(2)

- (b) If the current flowing through a person is too high, the person cannot let go of the electrical source.

Different people were tested to see whether the ability to let go of an electrical source depended on the frequency of the current.

The results of the test are shown in the graph.



- (i) What is the frequency of the mains electricity supply in the UK?

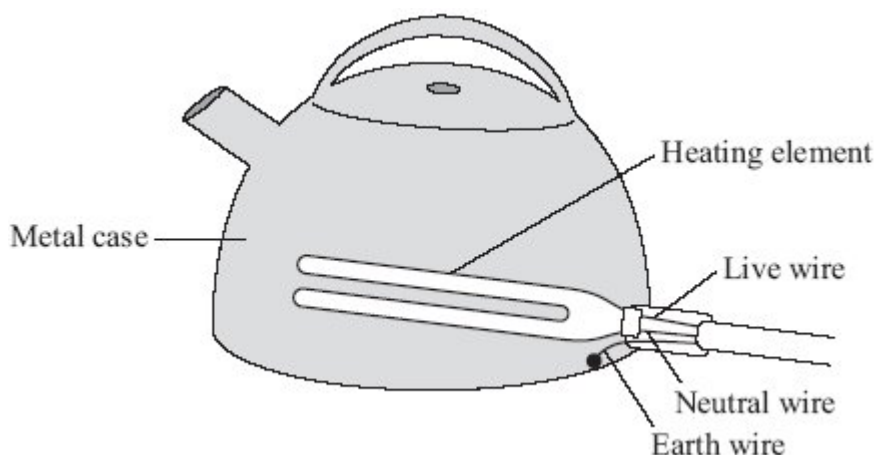
(1)

- (ii) From a safety point of view, is the frequency of the UK mains electricity supply suitable?

Give a reason for your answer.

(1)

- (c) The diagram shows how the electric supply cable is connected to an electric kettle. The earth wire is connected to the metal case of the kettle.



If a fault makes the metal case live, the earth wire and the fuse inside the plug protect anyone using the kettle from an electric shock.

Explain how.

(2)

(Total 8 marks)

Q10.

- (a) Each letter **A**, **B**, **C**, **D** and **E** represents an energy transformation.

A electrical to gravitational potential

B electrical to heat

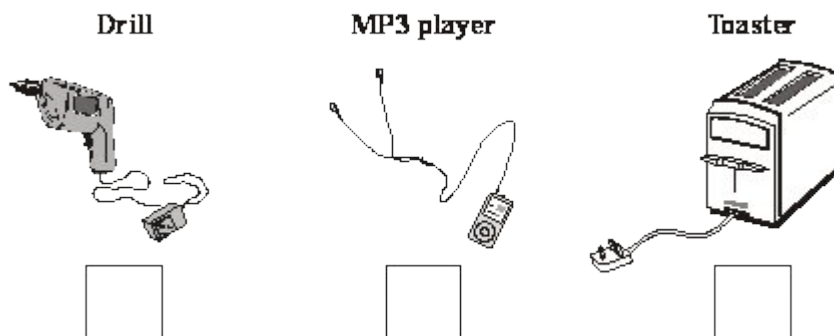
C electrical to kinetic

D electrical to light

E electrical to sound

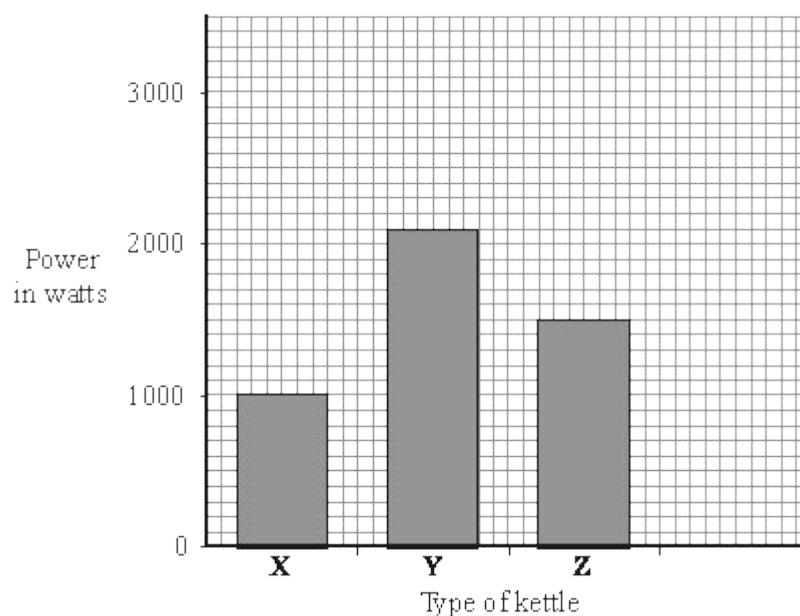
Match each of the following devices to the useful energy transformation that it is designed to make.

Write the correct letter, **A, B, C, D** or **E**, in the box below the device. Use each letter once or not at all.



(3)

(b) The bar chart shows the power of three electric kettles.



(i) What is the power of kettle Y?

(1)

(ii) In one week each kettle is used for a total of 30 minutes.

Which kettle costs the most to use?

(1)

(iii) A new 'express boil' kettle boils water faster than any other kettle.

Draw a fourth bar on the chart to show the possible power of an 'express boil' kettle.

(1)

- (c) Some friends are going on holiday. They want to be able to boil water to make their own hot drinks. They cannot decide which to take, a travel kettle or a small portable immersion heater that can be placed in a mug.



Travel Kettle

- 1 k W element
- Holds 1 litre
- Works on 110V or 230V
- Washable water filter

Immersion heater

- 0.4 k W element
- Heates up to 0.5 litres of water
- Works on 230 V only
- Small compact size

- (i) Give **one** advantage of taking the travel kettle.

(1)

- (ii) Give **one** advantage of taking the immersion heater.

(1)

(Total 8 marks)

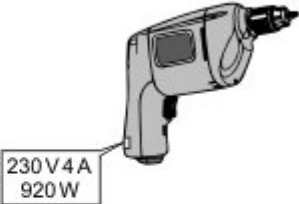
Q11.

- (a) Look at this electrical safety information poster.

**Get it right!
Choose the right fuse.**

Most fuses are 3 A or 13 A.

To choose the right fuse you must know the power of the appliance.



Power is marked on the information plate.

Power over 700 W use a 13 A fuse. • Fan heaters • Kettles • Dishwashers • Washing machines	Power under 700 W use a 3 A fuse. • Radios • Table lamps • Portable TVs • Electric blankets
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- (i) Complete the table to show which size fuse, 3 A or 13 A, should be fitted to each of the appliances.

Appliance	Power rating	Fuse
Hairdryer	1600 W	
Electric saw	350 W	
Food mixer	1200 W	

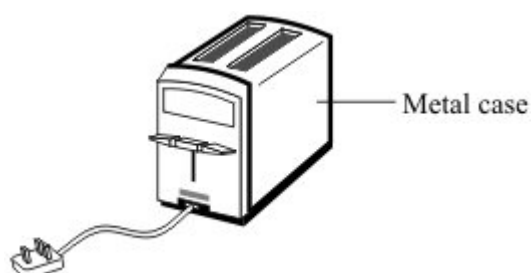
(2)

- (ii) The plug of an electric kettle has been wrongly fitted with a 3 A fuse.

What will happen to the fuse when the kettle is switched on?

(1)

- (b) The drawing shows a toaster, which takes a current of 4 A from the 230 V mains electricity supply.



- (i) Use the equation in the box to calculate the power of the toaster.

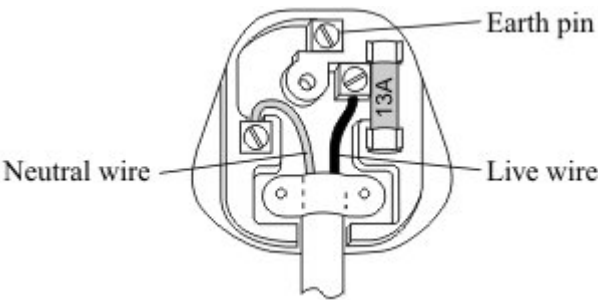
Power (watt, W)	=	current (ampere, A)	×	potential difference (volt, V)
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Show clearly how you work out your answer.

Power = _____ W

(2)

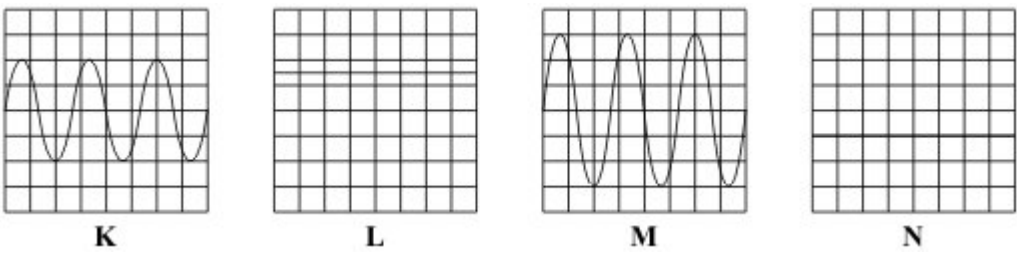
- (ii) A householder rewires the toaster with a new cable and plug. The diagram shows how the new cable has been connected to the plug.



Explain why the toaster may **not** be safe to use.

(2)

- (c) The diagram shows the oscilloscope traces produced by four different electricity supplies. The settings on the oscilloscope are the same for each electricity supply.



- (i) Which **two** supplies give a direct current (d.c.)?

_____ and _____

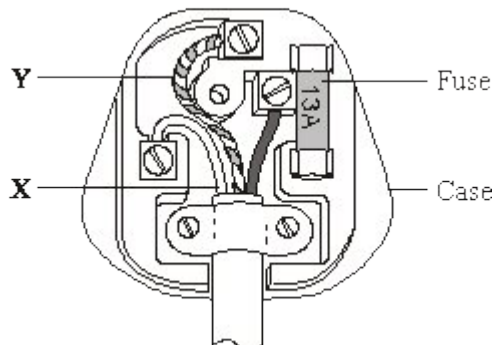
(1)

- (ii) Supply **K** provides a peak potential difference of 6 V.

What is the peak potential difference provided by supply **M**?

Q12.

- (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

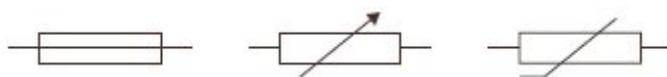
(1)

- (iii) What material would be suitable for the case of the plug?

(1)

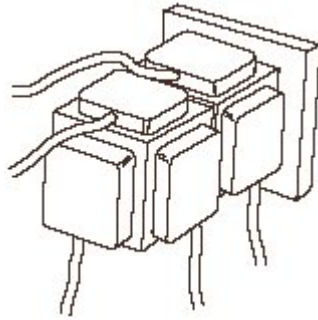
- (iv) Which **one** of the following is the correct circuit symbol for a fuse?

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.



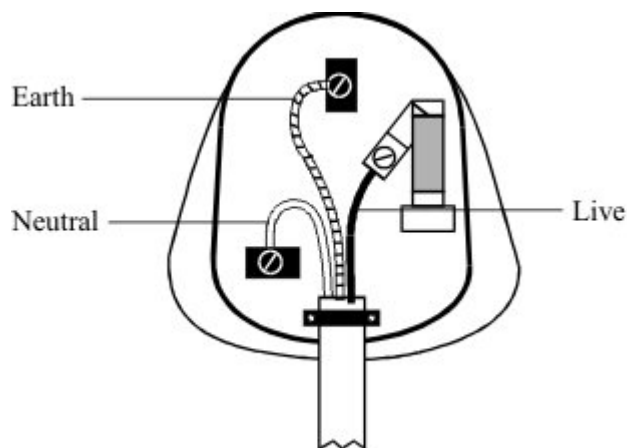
Explain why this is dangerous.

(2)

(Total 6 marks)

Q13.

The diagram shows the inside of a mains plug.

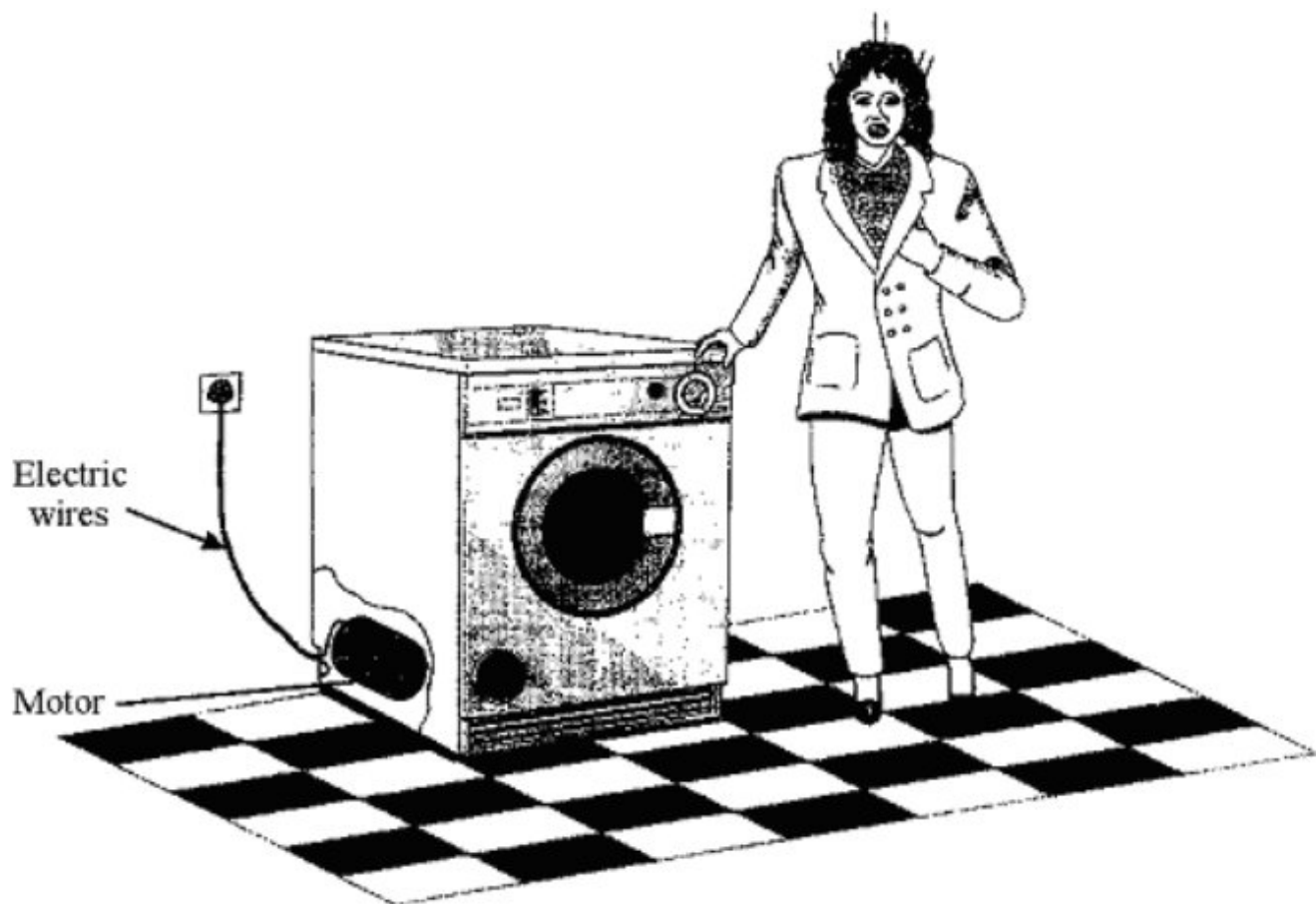


(a) Complete the table.

Wire	Colour of insulation
Earth	
Live	
Neutral	

(3)

(b) The diagram shows a washing machine without an earth connection. The live wire has become loose and is touching the metal case of the washing machine.



- (i) Draw on the diagram the path taken by the electricity when the person touches the metal case of the machine.

(1)

- (ii) Describe how the path of the electricity would change if the washing machine had an earth connection.

(2)

- (c) Some electrical appliances use a cable which does not have an earth wire. Which **one** of the following appliances can safely use this type of cable?

hairdrier

iron

refrigerator

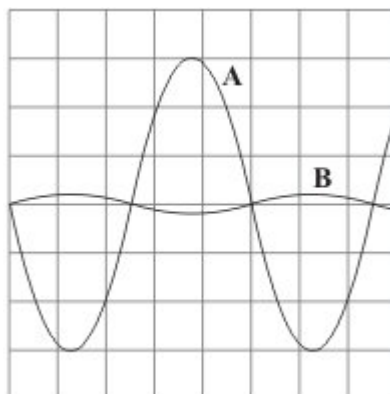
Give a reason for your answer.

(2)

(Total 8 marks)

Q14.

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.

(2)

- (b) What does trace **B** show?

(1)

- (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.

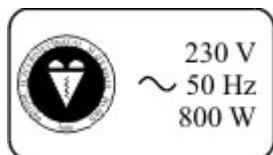
Frequency = _____ hertz

(1)

(Total 5 marks)

Q15.

The information plate on a hairdrier is shown.



- (a) What is the power rating of the hairdrier?

(1)

- (b) (i) Write down the equation which links current, power and voltage.

(1)

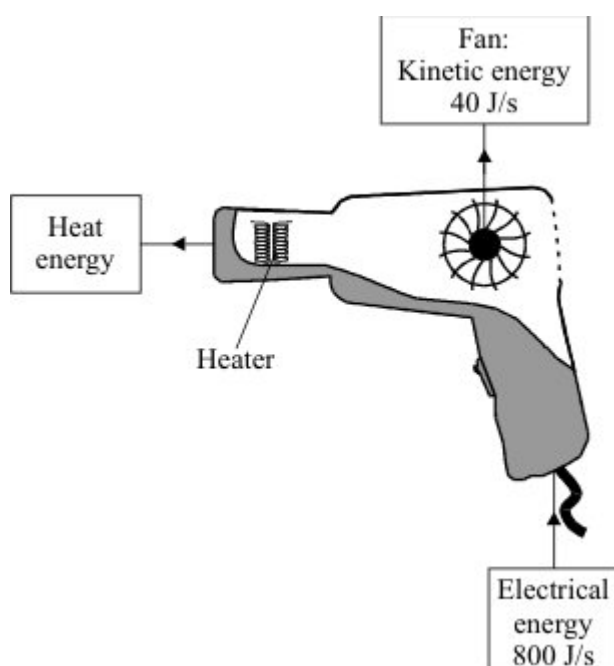
- (ii) Calculate the current in amperes, when the hairdrier is being used. Show clearly how you work out your answer.

Current = _____ amperes
(2)

- (iii) Which **one** of the following fuses, 3A, 5A or 13A, should you use with this hairdrier?

(1)

- (c) The hairdrier transfers electrical energy to heat energy and kinetic energy.



Calculate the efficiency of the hairdrier in transferring electrical energy into heat energy.

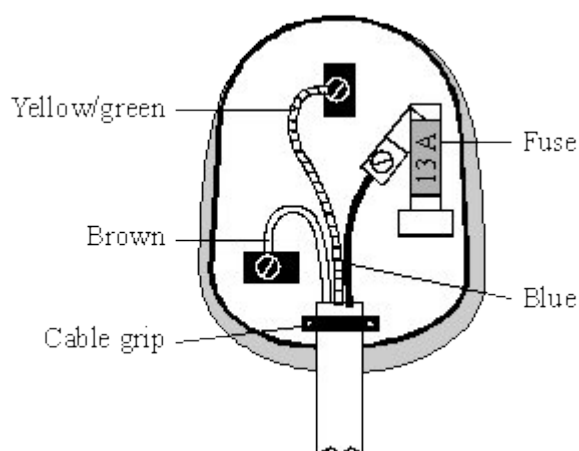
Efficiency = _____

(2)

(Total 7 marks)

Q16.

- (a) The diagram shows a 13 amp plug.



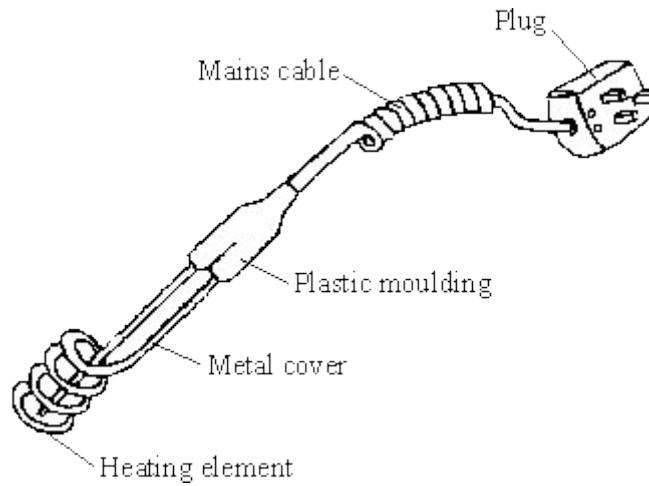
- (i) What is wrong with the way this plug has been wired?

(1)

- (ii) Why do plugs have a fuse?

(1)

- (b) The diagram shows an immersion heater which can be used to boil water in a mug.



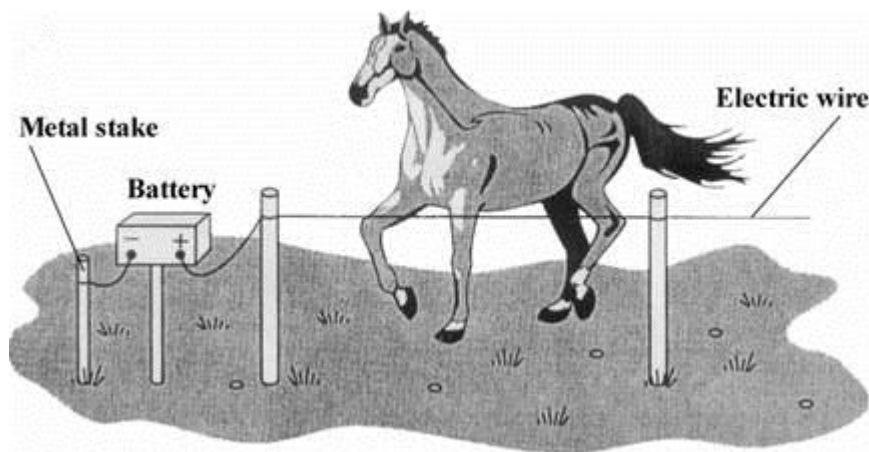
Which part of the immersion heater should be connected to the earth pin of the plug?

(1)

(Total 3 marks)

Q17.

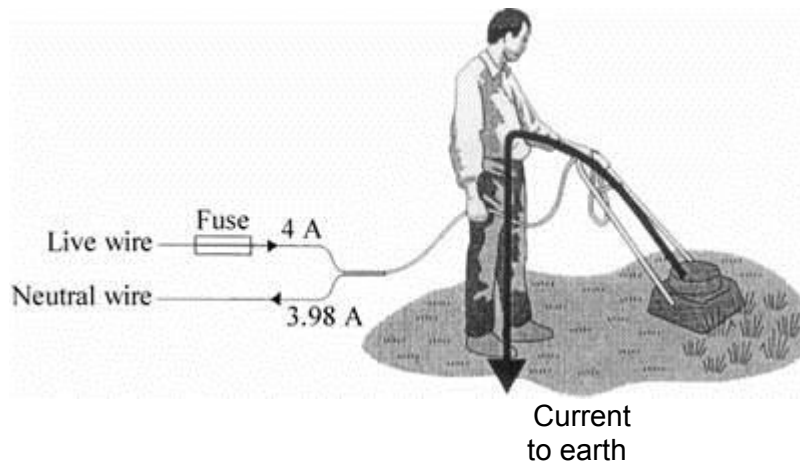
- (a) The diagram shows an electric fence, designed to keep horses in a field.



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

(2)

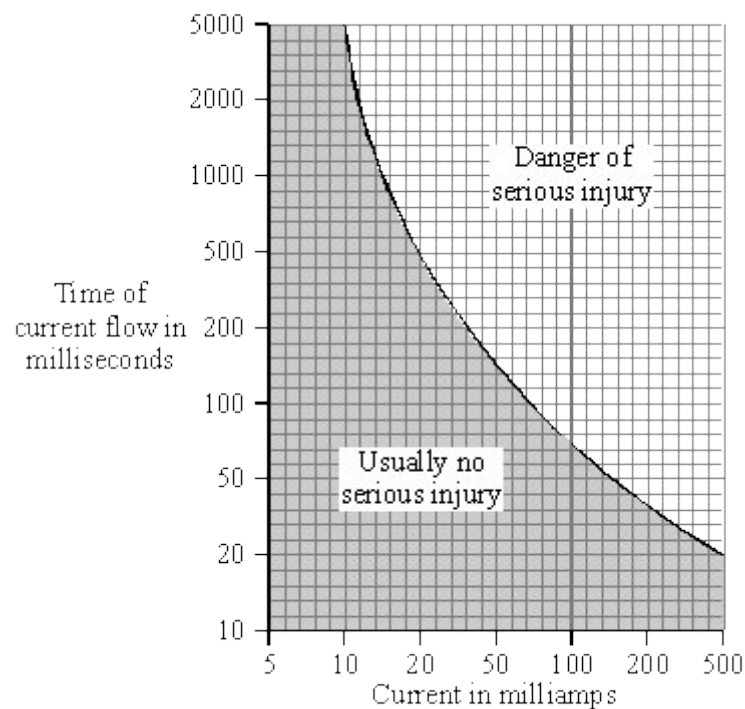
- (b) The diagram shows how a person could receive an electric shock from a faulty electrical appliance. Using a residual circuit breaker (RCB) can help to protect the person against receiving a serious shock.



- (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.

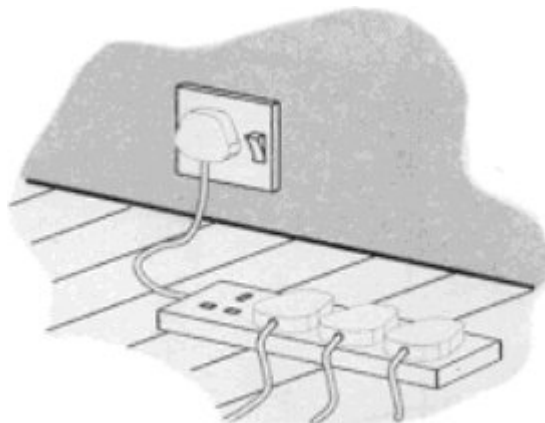


Within how long must the RCB cut off the current if the person using the lawnmower is to be in no danger of serious injury?

Time = _____ milliseconds

Q18.

- (a) An adaptor can be used to connect up to four appliances in parallel to one 230 V mains socket. The adaptor is fitted with a 13 A fuse. The table gives a list of appliances and the current they draw from a mains socket.



Appliance	Current
computer	1 A
hairdryer	4 A
heater	8 A
iron	6 A
television	2 A

- (i) What current will flow to the adaptor when the television, computer and hairdryer are plugged into the adaptor?

Current = _____ A

(1)

- (ii) Write down the equation which links current, electrical power and voltage.

(1)

- (iii) Calculate the electrical power used when the television, computer and hairdryer are plugged into the adaptor. Show clearly how you work out your answer and give the unit.

Electrical power = _____

(2)

- (iv) What would happen to the fuse if the heater is also plugged into the adaptor?

Give a reason for your answer.

(2)

- (b) The diagram shows **two** of the appliances.



Iron



Hairdryer

- (i) For safety reasons, it is important that the iron has an earth wire connected to its outer metal case. Explain why.

(2)

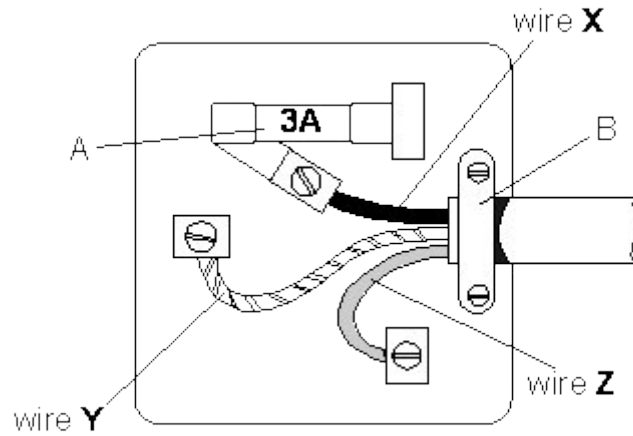
- (ii) The hairdryer does not have an earth wire. It is safe to use because it is double *insulated*. Explain what the term *double insulated* means.

(2)

(Total 10 marks)

Q19.

The diagram below shows an electric mains plug.



- (a) Name the parts of the plug labelled **A** and **B**.

A _____

B _____

(2)

- (b) Name the colour of each of the wires **X**, **Y** and **Z**.

X _____

Y _____

Z _____

(3)

- (c) Name a suitable material for the case of the plug.

(1)

- (d) Electric fires have three wires connected in the plug. One is the live wire to feed electric current in, another is the neutral (return) wire.

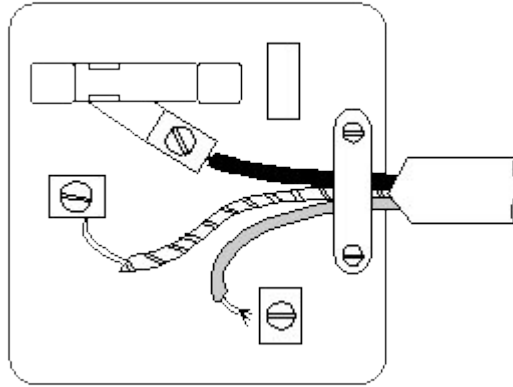
- (i) What is the third wire called?

(1)

- (ii) Why is it important that the third wire is also connected?

(1)

- (e) The diagram below shows a badly wired mains plug.



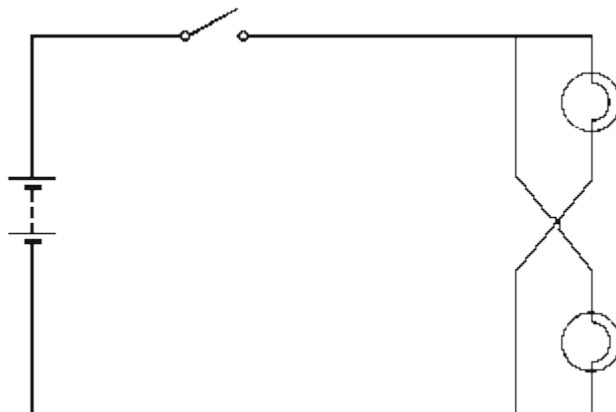
Look at the plug carefully. What **four** changes should be made to make the plug safe?

1. _____
- _____
2. _____
- _____
3. _____
- _____
4. _____
- _____

(4)
(Total 12 marks)

Q20.

The circuit diagram below shows a circuit used to supply electrical energy to the two headlights of a car.



The current through the filament of one car headlight is 3.0 A. The potential difference across each of the two headlights is 12 V.

- (a) Suggest a suitable fuse for the circuit. _____

(1)

- (b) Calculate the resistance of the headlight filament when in use.

Answer _____ W

(2)

- (c) Calculate the power supplied to the two headlights of the car.

Answer _____ W

(2)

- (d) The fully charged car battery can deliver 72 kJ of energy at 12 V. How long can the battery keep the headlights fully on?

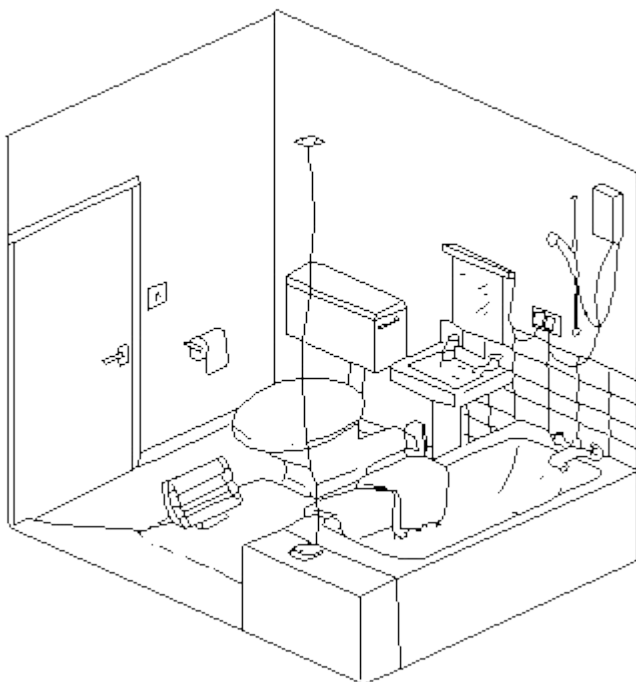
Answer _____ s

(2)

(Total 7 marks)

Q21.

- (a) The picture below shows the bathroom in a house.



Describe **three** examples of dangerous practice in the use of mains electricity in this bathroom.

1. _____

2. _____

3. _____

(3)

- (b) In the table below three electrical appliances are listed with their power ratings and the number of hours they are used each week.

ELECTRICAL APPLIANCE	POWER RATINGS (W)	TIME USED EACH WEEK (h)	k Wh USED EACH WEEK
TV	200	35	
Kettle	2000	2	
Toaster	1000	1	
Cooker	11 500	7	

- (i) Complete the table by inserting the number of kWh used by each appliance each week.

(ii) Which appliance would cost the least to run per week?

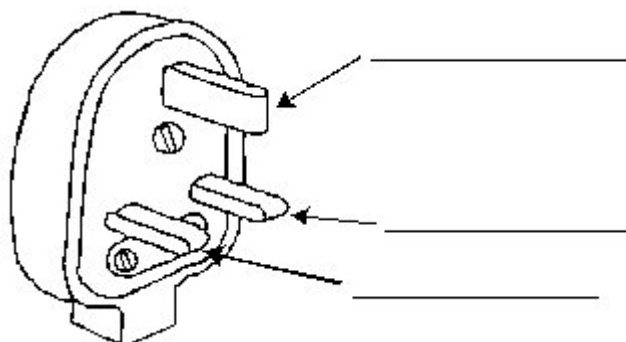
(iii) The cost of running a toaster is 8p per week. How much does it cost to run the kettle each week?

(6)

(Total 9 marks)

Q22.

- (a) The diagram below shows the three pins in a mains plug. The pins connect with the live, neutral and earth terminals in a socket.



On the diagram, label each pin to show which is:

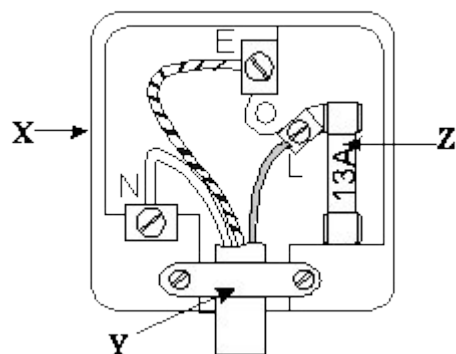
the live pin,

the neutral pin,

the earth pin.

(3)

- (b) The diagram below shows the inside of a mains plug.



- (i) Name **one** material which could be used for the part labelled X.

(ii) Complete the sentences below.

The part labelled **Y** is called the _____.

This is used to hold the _____ firmly in place.

The component labelled **Z** is the _____.

(iii) The plug is used with an electric fire.

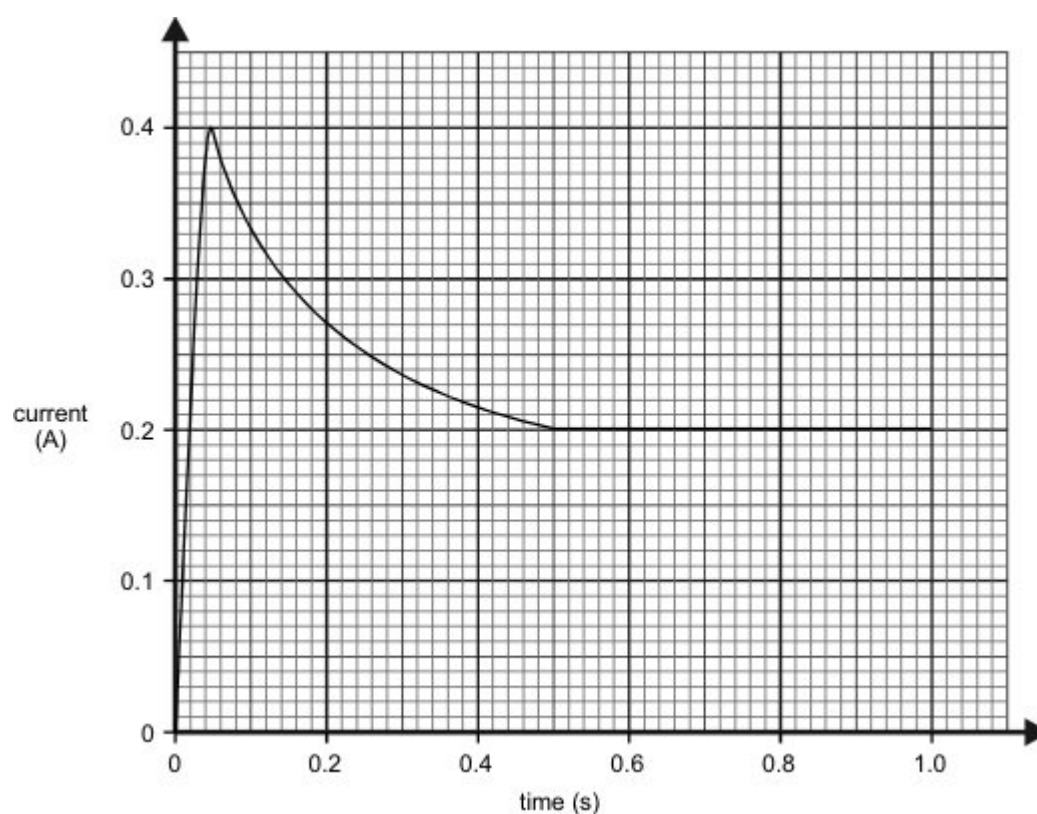
Which part of the electric fire is connected to the earth pin?

(5)

(Total 8 marks)

Q23.

When a mains lamp is switched on it takes 0.5 seconds for the filament to reach its normal operating temperature. The way in which the current changes during the first second after switching on is shown in the sketch graph below. Mains voltage is 240 V.



(a) Calculate the resistance of the filament whilst the lamp is drawing the **maximum** current.

(3)

- (b) Describe how the resistance of the lamp changes after the current has reached its maximum value.

(2)

- (c) Calculate the **maximum** power taken by the lamp.

(2)

- (d) Calculate the power of the lamp in normal use.

(2)

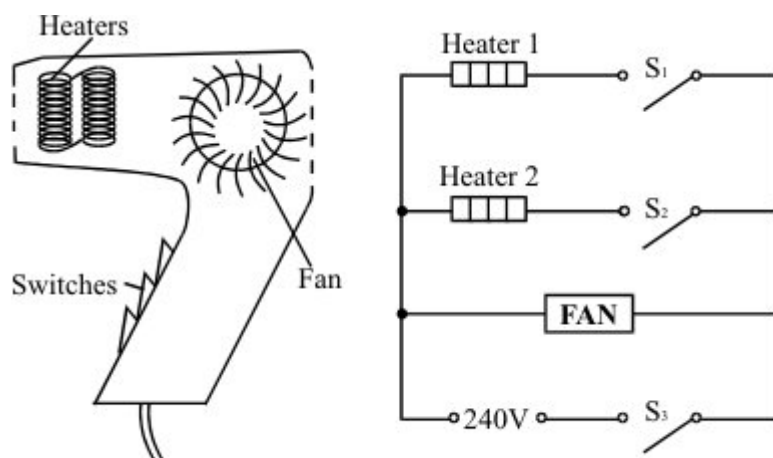
- (e) Calculate the energy used by the lamp in six hours of normal use.

(3)

(Total 12 marks)

Q24.

The diagrams show a hair-dryer and the circuit inside the hair-dryer.



- (a) Switches S_1 , S_2 and S_3 are all shown in the **OFF** position.

Which switch or switches have to be **ON** to make:

- (i) only the fan work? _____
- (ii) both heaters work? _____

(2)

- (b) (i) What happens to the current in the circuit when the heaters are switched on?

- (ii) Suggest why it is important to have the fan working when the heaters are switched on.

(3)

- (c) This hair-dryer has a plastic case. It is connected to a mains socket by a 3-pin plug. The cable connecting the hair-dryer to the plug contains only two wires.

- (i) Write down the colour of the insulation on the wires.

Wire 1 _____

Wire 2 _____

- (ii) Which of the usual three wires is **not** needed?

- (iii) This hair-dryer is safe to use without the third wire. Explain why.

(5)

- (d) The following information is stamped on the hair-dryer.

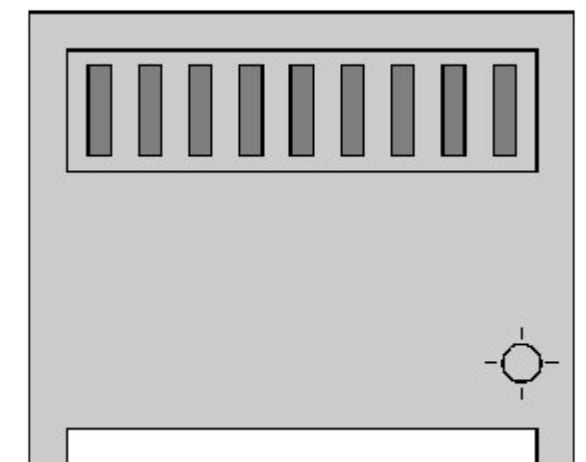


- (i) Which number tells us how fast the hair-dryer uses energy?

- (ii) On what else does the energy used by the hair-dryer depend?

Q25.

- (a) The diagram shows a fan heater.



- (i) A current of 11A flows when the fan heater is working normally. Fuses of value 3A, 5A, 10A and 13A are available. Which one should be used in the plug of the fan heater?

(1)

- (ii) A fault caused a much higher than normal current to flow in the heater. Describe what happened to the wire in the fuse.

(2)

- (b)

You may find this equation useful when answering this part of the question

$$\text{energy transferred (kWh)} = \text{power (kilowatt, kW)} \times \text{time (hour, h)}$$

- (i) The power of the fan heater is 2.75 kW. Calculate how many kilowatt hours of energy are transferred when the fan heater is used for 6 hours.

Number of kilowatt hours _____

(2)

- (ii) How much will it cost to use the fan heater for 6 hours if one Unit of electricity costs 7p?

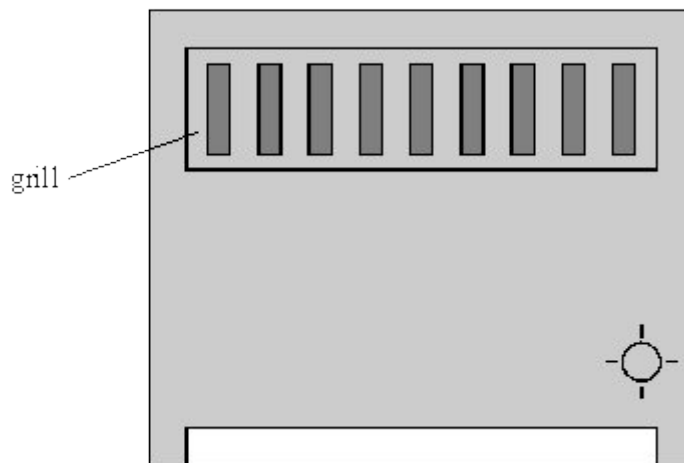
Cost _____ p

(2)

(Total 7 marks)

Q26.

The diagram shows a fan heater.



- (a) Complete this sentence.

The fan heater is designed to transfer electrical energy as _____ energy and _____ energy.

(2)

- (b) The fan heater is connected to the mains by a three core cable.

- (i) Why are the wires in the cable made out of copper?

- (ii) Why are the wires in the cable covered by plastic?

(2)

- (c)

You may find this equation useful when answering this part of the question

$$\text{energy transferred (kWh)} = \text{power (kilowatt, kW)} \times \text{time (hour, h)}$$

- (i) The power of the fan heater is 2.75 kW.
Calculate how many kilowatt hours (kWh) of energy are transferred when the fan heater is used for 6 hours.

Number of kilowatt hours _____

(2)

- (ii) How much will it cost to use the fan heater for 6 hours if one Unit of electricity costs 7p?

Cost _____ p

(2)

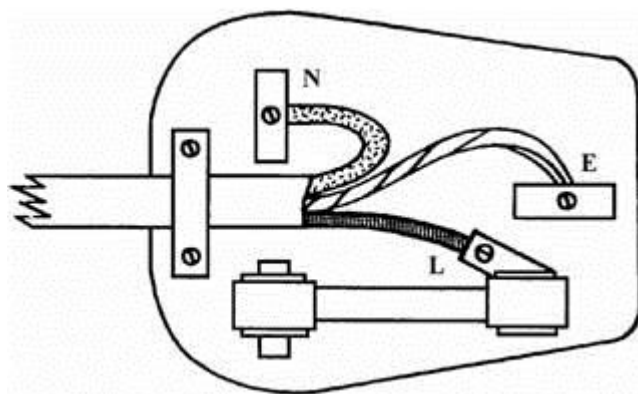
- (d) A fault caused a much higher than normal current to flow in the heater.
Describe what happened to the wire in the fuse.

(2)

(Total 10 marks)

Q27.

The diagram shows the inside of a 3-pin plug.



- (a) What colour wire should be connected to each terminal?

Terminal **E** _____

Terminal **N** _____

Terminal **L** _____

(3)

- (b) Name **two** parts inside the 3-pin plug which help to make it safe.

1. _____

2. _____

(2)

(Total 5 marks)

Q28.

- (i) Write the equation which shows the relationship between the electric *current*, the *power* and the *voltage*.

(1)

- (ii) Calculate the power if the current is 5 A and the voltage is 400 000 V. Show clearly how you work out your answer and give the unit.

Power = _____

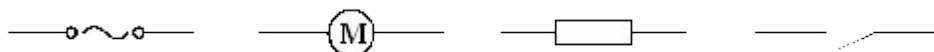
(2)

(Total 3 marks)

Q29.

In a hairdryer circuit there is a heater and a motor. It is important that the motor is always running when the heater is switched on.

- (a) Using the symbols shown below only **once** each, draw a circuit for a hairdryer.



(2)

- (b) Modern hairdryers are described as *double insulated*.

Explain what this term means.

(2)

- (c) On a modern hairdryer handle it states:

1600 W 230 V 50 Hz

- (i) [A] Write an equation which shows the relationship between current, power and voltage.

(1)

- [B] Calculate the current in the hairdryer when it is on full power.
Show clearly how you get your answer.

Current = _____ A

(2)

- (ii) [A] Write an equation which shows the relationship between current, resistance and voltage.

(1)

- [B] The resistance of the heater is 20 ohms. Calculate the resistance of the motor.

Show clearly how you get your answer.

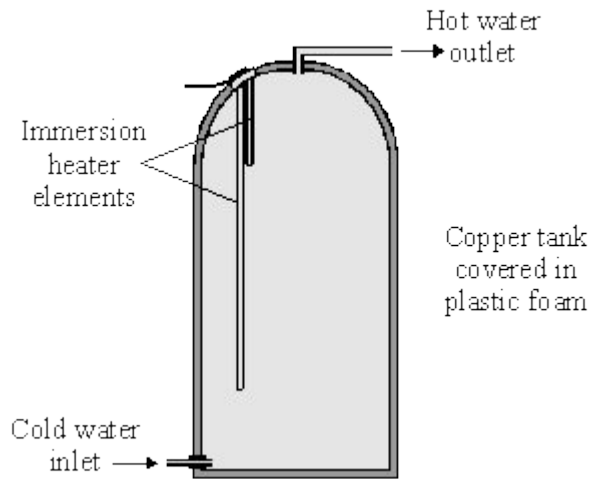
Resistance = _____ ohms

(2)

(Total 10 marks)

Q30.

The diagram shows a type of electric immersion heater in a hot water tank. These hot water tanks are normally found in airing cupboards.



Information on the immersion heater states:

230 V
10 A

- (a) (i) What is the equation which shows the relationship between power, current and voltage?

_____ (1)

- (ii) Calculate the power of the heater. Show clearly how you get to your answer and give the units.

Power = _____ (2)

- (b) (i) What rating of fuse should be in the immersion heater circuit?

_____ (1)

- (ii) There are three wires in the cable to the immersion heater. Two of the wires are connected to the immersion heater. The third wire is connected to the copper tank.

Explain the function of this third wire and the fuse in the circuit.

_____ (3)

- (c) (i) What is the equation which shows the relationship between resistance, current and voltage?

_____ (1)

- (ii) Calculate the resistance of the heater. Show clearly how you get to your answer and give the units.

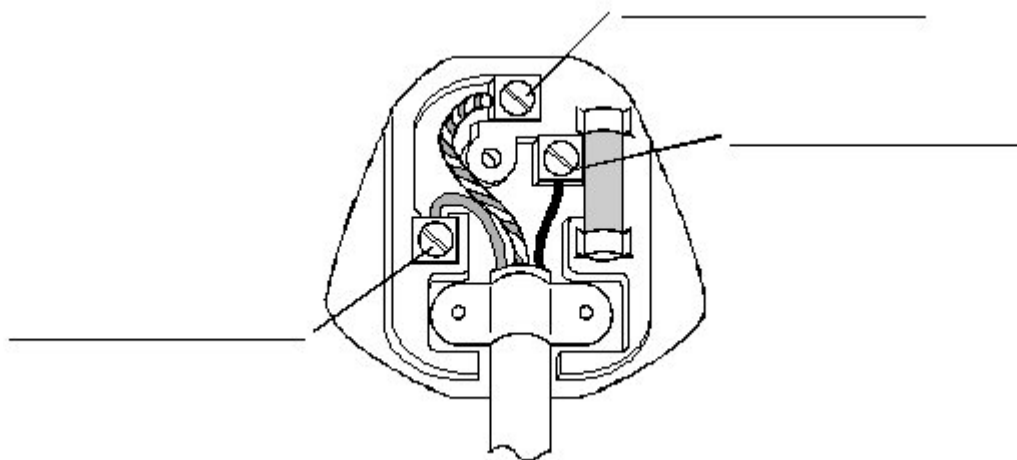
Resistance = _____ (2)

(Total 10 marks)

Q31.

The diagram shows the inside of a mains plug.

- (a) Label the earth, live and neutral pins.



(3)

- (b) (i) Explain how the earth wire and the fuse protect a person from an electric shock when there is a short circuit to the metal case of an appliance.

(4)

- (ii) What is the most appropriate size fuse rating for a fuse in a television?

Circle the correct answer.

3 A 5 A 13 A

(1)

(Total 8 marks)

Q32.

A combination oven can cook food by using three methods; a microwave generator, a grill and a heating element.

voltage	230 V
microwave power (max)	900 W
grill power	1300 W
convection heater power	1200 W

- (a) What is the current when the oven is operating using full microwave power? Give the equation and show your working.

Current = _____ A

(3)

- (b) It is possible to cook using infrared radiation, from the grill, and microwaves. What is the maximum current in the oven when using both together?

Current = _____ A

(2)

- (c) For baking and roasting, the microwave is used at 450 W and the convection heating element is on fully at 1200 W. A thawed or fresh medium-sized chicken takes 30 minutes to cook.

Calculate the energy transferred in kilowatt-hours.

Use:

units (kWh) = power (kW) × time (h)

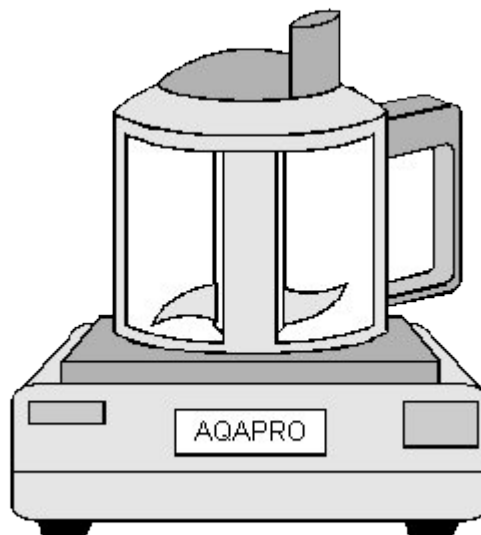
Energy = _____ kWh

(2)

- (d) Why is a combination oven of this sort more economical than a convection-only oven?

Q33.

The drawing shows a food processor. It has an electric motor. Inside is a blade which spins round and cuts up the food.



The food processor is designed to transfer electrical energy to kinetic energy. However some of the energy is wasted as heat and sound.

The power input to the food processor is 1150 W. The power of the spinning blade is 900 W.

- (i) Calculate how much energy is wasted when the food processor is used for two minutes.

Show clearly how you get to your answer and give the unit.

Energy = _____

(3)

- (ii) Why does the food processor produce sound when it is switched on?

(1)

(Total 4 marks)

Q34.

Carefully read the following extract from a safety leaflet. Then answer the questions.

An RCD adaptor is an automatic safety switch. It should be used when there is a particular risk of electric shock. For example, it is recommended that it is used with an electric lawnmower.

Inside one make of RCD is an electromagnet that holds the switch closed so that the RCD is switched on. An electronic circuit in the RCD monitors the difference between the current in the live wire and the current in the neutral wire.

If something goes wrong and this difference is greater than 30 milliamps then the RCD will trip (= switch off) within 40 milliseconds.

- (a) Suggest **two** reasons why there is a particular risk of an electric shock when using an electric lawnmower.

1. _____

2. _____

(2)

- (b) Why will there be a difference between the current in the live wire and the current in the neutral wire if something goes wrong?

(1)

- (c) (i) Use the words charge, current and time to write an equation which shows the relationship between them.

(1)

- (ii) Calculate how much charge flows when a current of 30 milliamps passes for 40 milliseconds.

Clearly show how you get to your answer and give the unit.

Charge = _____

(3)

(Total 7 marks)

Mark schemes

Q1.

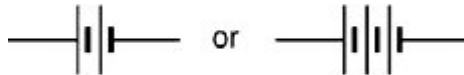
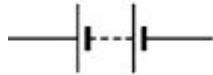
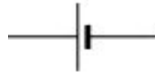
- (a) brown 1
- (b) outside / case is plastic / an insulator
accept is double insulated
accept non-conductor for plastic
*do **not** accept it / hairdryer is plastic* 1
- (c) (i) (1) S_1
and no other 1
- (2) S_1 and S_3
both required, either order 1
- (ii) S_1 must be ON (for either heater to work)
*do **not** accept reference to 'fan' switch* 1
- S_1 switches the fan on 1
- (d) 1495
allow 1 mark for correct substitution
ie, 6.5×230 2
- watt(s) or W
an answer of 1.495 kW gains 3 marks
although the unit is an independent mark for full credit
the unit and numerical value must be consistent
accept joules per second or J/s 1

[9]

Q2.

- (a) (i) ammeter and battery **in series** with the **gauge**
symbols must be correct
ignore a voltmeter drawn in series

accept



not



or cells reversed to cancel out

1

voltmeter in parallel with the gauge

symbol must be correct

accept a freestanding circuit

diagram provided strain gauge is labelled or a resistor symbol used for the strain gauge

1

(ii) d.c. flows only in one direction

a.c. changes direction is insufficient

1

(b) (i) 75

this answer only

*allow 1 mark for correct substitution **and** transformation,*

$$\text{ie resistance} = \frac{3.0}{0.040}$$

2

(ii) increases

1

(iii) elastic / strain potential

*do **not** accept potential*

1

[7]

Q3.

(a) transferred to surroundings / surrounding molecules / atmosphere

'it escapes' is insufficient

or

becomes dissipated / spread out

accept warms the surroundings

accept degraded / diluted
 accept a correct description for
 surroundings eg to the washing machine
 do **not** accept transformed into heat on its own

1

- (b) a smaller proportion / percentage of the energy supplied is wasted
 owtte
 accept a statement such as 'less energy is wasted' for **1**
 mark
 do **not** accept costs less to run
 ignore references to uses less energy

2

- (c) (i) 2.4 (p)
 accept 2 p if it is clear from the working out this is rounded
 from 2.4 p
 allow **1** mark for correct substitution of correct values
 ie 0.2×12
 allow **1** mark for calculating cost at 40 °C (13.2 p)
or
 cost at 30 °C (10.8 p)

2

- (ii) any **one** from:
- less electricity needed
 ignore answers in terms of the washing machine releasing
 less energy
 an answer in terms of the washing machine releasing CO₂
negates the mark
 do **not** accept less energy is produced
 - fewer power stations needed
 - less fuel is burned
 accept a correctly named fuel
 do **not** accept less fuel is needed

1

[6]

Q4.

- (a) (i) connect the earth wire (to pin)
 answers must be in terms of correcting the faults
- screw cable grip (across cable)
 accept tighten the cable grip
- (ii) earth (wire)
 accept the green and yellow (wire)

1

1

1

(iii) any **two** from:

- fuse gets (very) hot
- fuse melts
accept blows for melts
do not accept break / snap fuse / blow up
- circuit breaks/ switches off
accept stops current flowing

2

(b) any **two** from:

it refers to hairdryer

- hairdryer is plugged into mains (electricity socket)
hairdryer works from the mains
or
hairdryer is using 230 V
accept 240 for 230
- water conducts electricity
do not accept water and electricity don't mix
- radio is low power / current / pd / voltage
accept radio not connected to the mains
do not accept radio is waterproof
- (the current in / p.d.across) hairdryer more likely to give a (fatal) electric shock
accept the idea of electrocution if hairdryer is wet
accept the idea of radio not causing electrocution if wet

2

[7]

Q5.

(a) 125

allow 1 mark for obtaining time period = 0.008 (s)

or

frequency = 1 / time period (or their calculated time period)

2

hertz

or

Hz

do not accept hz

1

(b) 50 (hertz)

1

[4]

Q6.

- (a) (rate of) flow of charge / electrons / ions

accept movement for flow
*do **not** accept flow of electricity*

1

- (b) 7(.0)

accept 6.96 / 6.95 or an answer that would approximate to 6.96 if rounded
*allow **1** mark for obtaining correct power and changing to watts ie 1600*

or

*allow **2** marks for correct substitution and transformation ie $1600 \div 230$*

*an answer 0.00696 / 0.007 gains **2** marks*

*allow **1** mark for 1.6 / 230 or 1.7 / 230*

*an answer 7.39 or 7.4 gains **2** marks*

3

amp (ere)

accept A

1

[5]

Q7.

- (a) 230

1

50

1

- (b) (i) has a plastic case

accept outside is plastic
accept cover / handle/ hair dryer is plastic / non-conductor

or does not have a metal case **or** plastic is an insulator

accept is double insulated

1

- (ii) copper

1

[4]

Q8.

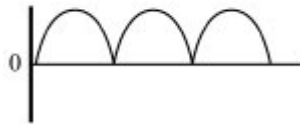
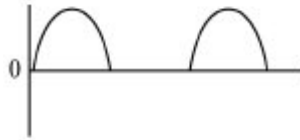
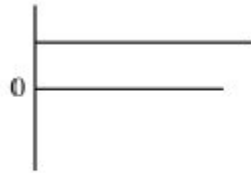
- (a) d.c. flows in (only) one direction

1

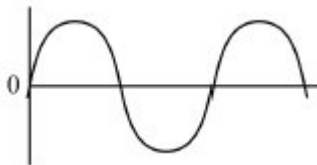
a.c. changes direction (twice every cycle)

accept a.c. constantly changing direction
ignore references to frequency

accept answers presented as a clear diagram
e.g.



ac:



1

(b) (i) 10

allow 1 mark for correct transformation and substitution i.e.

$$\frac{2.3}{230} \text{ or } \frac{2300}{230} \text{ an answer 0.01 gains 1 mark}$$

2

(ii) 13 A

e.c.f.

accept the fuse size that is the next listed value greater than
answer (b)(i)

1

[5]

Q9.

(a) (i) 0.0046

accept 4.6 mA

allow 1 mark for correct substitution and transformation

$$\text{i.e. current} = \frac{230}{50000}$$

an answer of 4.6 gains 1 mark

2

(ii) • increases overall resistance

1

• (in event of a shock) gives a smaller current

- accept gives smaller shock*
do **not** accept no shock/current
- 1
- (b) (i) 50 (hertz)
ignore units
- 1
- (ii) NO has the lowest current at which people cannot let go
answer and reason needed
accept a sensible reason in terms of their answer to (b) (i)
- or YES changing the frequency changes the current by only a small amount
- 1
- (c) a current flows through from the live wire/metal case to the earth wire
accept a current flows from live to earth
do **not** accept on its own if the current is too high
- this current causes the fuse to melt
accept blow for melt
- 2

[8]

Q10.

- (a) electric drill **C**
- 1
- MP3 player **E**
- 1
- toaster **B**
- 1
- (b) (i) 2100
no unit required / ignore units
accept 2.1 kW must have units for this
- 1
- (ii) **Y**
- 1
- (iii) bar drawn with any height greater than **Y**
ignore width of bar
- 1
- (c) (i) any **one** from:
answers must be a comparison
- holds more water
do not accept 1 litre of water on its own
 - works in other countries
accept a named country
accept works at 2 voltages

- boils faster
- has a more powerful element
*do **not** accept 1 kW element on its own*
- can filter water

1

ignore can wash filter

(ii) any **one** from:

- it weighs less
- smaller to pack
- cheaper to use
*answers must be a comparison
or state why the chosen feature is an advantage
accept boils enough for one drink*

1

[8]

Q11.

(a) (i) hairdryer 13

all correct

saw 3

allow 1 mark for 2 correct

1

mixer 13

1

(ii) fuse melts

*accept blows/ breaks/ snaps for melts
do **not** accept blows up
do **not** accept fuse gets hot on its own
do **not** accept does not work on its own*

1

(b) (i) 920

allow 1 mark for correct substitution

2

(ii) no earth (wire)

1

*outside / case may become live
cause a fire insufficient*

or danger of electric shock

1

(c) (i) L and N

both required

1

- (ii) 9 (volts)
correct answer only

1

[9]

Q12.

- (a) (i) blue

1

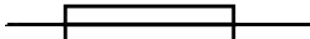
- (ii) earth

1

- (iii) rubber / plastic

accept any suitable **named** non conductor eg polypropylene
do **not** accept bakelite
do **not** accept an insulator

1

- (iv) 

1

- (b) any **two** from:

- draws too high a current
accept power for current
do **not** accept electricity/ electric for current
accept too much current goes through the socket
do **not** accept too many currents go through the socket
- socket overloaded
it = socket do **not** accept circuit for socket
- wiring gets too hot / melts
accept socket for wiring
do **not** accept fuse melts or blows
do **not** accept plug/ appliances overheating
- (may) cause a fire
- (may) cause sparking
- (possible) physical damage to the socket
a physical reason, such as stick out from the wall is insufficient
ignore reference to electric shocks

2

[6]

Q13.

- (a) earth yellow and green
accept green and yellow

1

live	brown	1
neutral	blue	1
(b)	(i) path shows electricity flowing from washing machine through to the person (and on to earth) <i>ignore direction of arrows</i>	1
	(ii) electricity flows through earth wire (to earth) or goes to ground not escaping electricity not fuse wire blowing	1
	not through the person or miss the person or not electrocuting not electric shock	1
(c)	hairdrier <i>hairdrier needed for second mark except allow double insulated if iron or fridge but not plastic case</i>	1
	double insulated or plastic case <i>accept 'It's made of plastic' accept 'it does not conduct'</i>	1

[8]

Q14.

(a)	alternates <i>accept switches accept (constantly) changes accept goes up and down</i>	1
	between positive and negative	1
(b)	potential difference between the neutral <u>and</u> earth (terminal) <i>accept voltage for p.d</i> or potential of the neutral terminal with respect to earth	1
(c)	(i) 0.025 (s)	1
	(ii) 40 (Hz) <i>accept $1 \div \text{their (a)(i)}$</i>	1

[5]

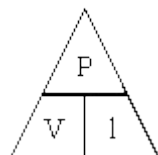
Q15.

(a) 800 (W)

accept 0.8kW but this answer must have the unit

1

(b) (i) power = voltage × current

*accept the equation rearranged**accept $P = VI$* *do not accept C for current**do not accept $P = VA$* *do not accept power = VA**do not accept**unless subsequent calculation shows understanding*

1

(ii) 3.5 (A)

*accept a larger number of d.p. but you must be able to round to 3.5**allow 1 mark for*

$$\text{current} = \frac{\text{power}}{\text{voltage}}$$

$$\text{or } (I =) \frac{800}{230}$$

2

(iii) 5 (A)

independent of (ii) unless e.c.f from part (b)(ii)

1

(c) 0.95 or 95 (%)

allow 1 mark if useful energy output is given as 760 ignore any incorrect unit

2

[7]**Q16.**

(a) (i) live and neutral wrong way around

*accept blue and brown wrong way round or in the wrong place**for credit both wires must be given**do **not** accept the wires are in the wrong holes*

1

(ii) to protect the appliance

accept melt or blow or burns out if too much current or power or energy or electricity flows

accept to stop too much current **or** power **or** energy **or** electricity flowing
 accept stop overheating **or** a fire
 do **not** accept 'safety' unless qualified by above

1

(b) (metal) cover

accept (heating) element
 do **not** accept the mains cable

1

[3]

Q17.

(a) horse completes circuit between wire and earth **or** horse earths the wire

1

charge **or** electrons **or** current **or** electricity flows through the horse

1

(b) (i) **two** from:

- RCB breaks circuit when it detects a difference between currents in live and neutral wires
- fuse breaks circuit only when fuse rating exceeded or when it melts
- RCB is resettable

2

(ii) 500 (ms)

leakage current = 0.02A **1 mark only**

1

[6]

Q18.

(a) (i) 7

1

(ii) (electrical) power = voltage x current

accept $P = V \times I$ (correct standard symbol)
 accept watts = volts x amps
 accept a correct rearrangement

accept  if subsequent use of  is correct

1

(iii) 1610

or their (a)(i) $\times 230$

1.61 kW = **2 marks**

do **not** accept 7×240

2

watts

accept watt
accept W
accept J/s

(iv) melts

accept burns out
accept blows
accept breaks
do **not** accept stops working
do **not** accept burns

2

current greater than 13(A)
or current exceeds fuse rating **or** current 15(A)
do **not** accept too much current
unless qualified

(b) (i) if live wire touches case
accept if case becomes live
accept metal for case

2

current flows to earth **or** ground
or fuse melts **or** stops iron becoming live
accept electricity flows to earth
do **not** accept - you will get a shock
accept with no earth (wire) you would or could get a shock
for 1 mark

(ii) (outer) case is made of insulator
accept outside is plastic
accept outside is not made of metal **or** conductor

cable is (also) insulated
accept wires for cable
do **not** accept it has two layers of insulation without
explanation
do **not** credit answers in terms of heat

2

[10]

Q19.

(a) A – fuse
B – (cable) grip
for 1 mark each

2

(b) X – brown/red
Y – green + yellow/green
Z – blue/black
for 1 mark each

3

(c) any plastic/rubber

- for 1 mark* 1
- (d) (i) earth
for 1 mark 1
- (ii) metal appliance needs earthing/safety qualified
for 1 mark 1
- (e) cut less insulation on earth; neutral wire needs connecting;
fit fuse properly; cable grip needs to be an outer cable **or** allow identifying faults
for 1 mark each 4

[12]

Q20.

- (a) in range $6 < I \leq 13$ A
for 1 mark
(no unit no mark) 1
- (b) 4
gains 2 marks

(else working
gains 1 mark

(resistance of circuit correctly worked (2Ω)) 2
- (c) $72 (I^2 R)$ ecf
gains 2 marks

else working
gains 1 mark

an answer of 36W (ie for one lamp) – (1) 2
- (d) 1000 or 16.7 min (ecf from (c))
gains 2 marks

else working
gains 1 mark
(formula with incorrect substitution – no mark (12V)) 2

[7]

Q21.

- (a) Mains socket – once only
Shower cable can get wet
Trailing cable to fire (not heater unless fire clearly identified)

Use of fire
 Free running cable from ceiling
 Appliance on side of bath
 Use of ordinary light switch
 Free cable to sink light
any 3 each for 1 mark

3

- (b) (i) 7, 4, 1, 80.5
Four right – 2
Three right – 1
All right in W – 1

2

- (ii) Toaster

1

- (iii) 32p
gets 3 marks

Else 8×4
gets 2 marks

Else unit cost = 8p
gets 1 mark

3

[9]

Q22.

- (a) Earth
 return/neutral
 live
for 1 mark each

3

- (b) (i) rubber/plastic
for 1 mark

1

- (ii) cable/wire/grip
 cable/wires
 fuse
for 1 mark each

3

- (iii) case
for 1 mark

1

[8]

Q23.

- (a) Current = 0.4A (1)
 $R = V/I$ or $240/0.4$ (1)
 $R = 600 \text{ ohm}$ (1)

- (b) Doubles
gets 2 marks
OR gets bigger
gets 1 mark
2
- (c) $P = V.I$ or 240×0.4
 $P = 96W$
for 1 mark each
2
- (d) $I = 0.2A$
 $P = 48W$
for 1 mark each
BUT may get equation mark here if not in (c)
2
- (e) $P = V.I.t$ (1)
 $P = 240 \times 0.2 \times 6 \times 3600$
OR $P = 48 \times 6 \times 3600$
gets 1 mark
 $P = 1036800 W$
gets 1 mark
3

[12]

Q24.

- (a) (i) S_3
for 1 mark
1
- (ii) S_1, S_2 and S_3
for 1 mark
1
- (b) (i) increases/current passes through heaters/current unaffected in fan
for 1 mark
1
- (ii) (fan) blows/air moving prevents dryer overheating
for 1 mark each
2
- (c) (i) brown
blue
any order
for 1 mark each
2
- (ii) earth/green and yellow
for 1 mark

			1
	(iii)	(case is) plastic plastic does not conduct (electricity) <i>for 1 mark each</i>	2
(d)	(i)	1300/power <i>for 1 mark</i>	1
	(ii)	time/units of time <i>for 1 mark</i>	1
			[12]

Q25.

(a)	(i)	13A <i>for 1 mark</i>	1
	(ii)	fuse heated melts owtte / blows / burns out Not explodes / burns circuit breaks <i>any 2 for 1 mark each</i>	2
(b)	(i)	2750×6 or 2.75×6 <i>gains 1 mark</i>	
		but 16.5 <i>gains 2 marks</i>	2
	(ii)	$2750 \times 6 \times 7$ or $2.75 \times 6 \times 7$ or (b)(i) $\times 7$ or kW h $\times$ cost / kW h <i>gains 1 mark</i>	
		but 115p or 116p or 115.5p or £1.16 or £1.15 <i>gains 2 marks</i>	2
			[7]

Q26.

(a)		heat / thermal kinetic / movement <i>each for 1 mark</i>	2
(b)	(i)	its a good (electrical) conductor <i>for 1 mark</i>	1
	(ii)	its a good (electrical) <u>insulator</u> / very <u>poor conductor</u>	

for 1 mark

1

- (c) (i) 2.75×6
gains 1 marks

but
16.5
gains 2 marks

2

- (ii) (c)(i) $\times 7$ or no. of kW h $\times$ cost/kW h
gains 1 marks

but
115.5 or e.c.f if correct
gains 2 marks

2

- (d) it would heat and melts / blows / burns out / breaks circuit
any two for 1 mark each (fuse wire just breaks – gains 1)
(blows up – gets 0)
(fuse causing wire to melt gets 1)

2

[10]

Q27.

- (a) E – green and yellow
N – blue (*not* black **but** black / blue OK)
L – brown (*not* red **but** red / brown OK)
for 1 mark each

3

- (b) fuse
screws to secure wires
cable grip (maybe described)
reference to an earth
(plastic case *wrong*)
any two for 1 mark each

2

[5]

Q28.

- (i) power = current $\times$ voltage
or any correctly transposed version
accept watts = amps $\times$ volts
accept $P = IV$
do not credit $P = CV$
accept p.d. for voltage triangle acceptable only if used
correctly in (ii)

1

- (ii) 2 000 000 (1)

2000 kilowatts/kW (2)
accept KW

watts/W (1)

2 megawatts/MW (2)

do not credit mW (1) if correct method is clearly shown but
answer is numerically incorrect **or** unit is absent **or** incorrect
do not credit any working from an incorrect equation in (d)(i)
but an appropriate unit should be credited

2

[3]

Q29.

(a) series circuit

all four components must be included

if a battery included the neatness mark may still be awarded

1

circuit fully functional **or** properly connected

this is the neatness mark

*do not credit a parallel circuit with one switch controlling both
components*

1

(b) case **or** outer parts are made of plastic **or** insulator **or** non-metallic

1

there is no electrical pathway between inner and outer insulation

accept no connection between inner and outer part

do not credit two layers of insulation

1

(c) (i) [A] power = voltage $\times$ current

*accept $P = V I$ **or***

$W = V \times A$

***or** any transformation*

1

[B] $1600 \div 230 = \text{current}$

1

6.96 **or** 7

accept with no working for two marks

accept 6.95

*in [A] award a mark for a triangle if calculation correctly
performed*

1

(ii) [A] voltage = current $\times$ resistance

*accept $V = I R$ **or** any transformation*

1

[B] $230 \div 7 = \text{overall } R = 33$

accept $230 \div 6.96 = \text{overall } R = 33$

resistance of motor = $33 - 20 = 13$

accept with no working for two marks

do not credit negative answer

accept consequential errors from c(i)

in [A] award a mark for a triangle if calculation correctly performed

1

[10]

Q30.

(a) (i) $P = V \times I$

or equivalent

credit a triangle if part (ii) correctly uses the relationship

*credit power = volts $\times$ amps **or** watts $V \times A$*

do not accept C for current

1

(ii) $(P = 230 \times 10 =) 2300$

credit 2.3

1

W **or** J/s

kW

1

(b) (i) 15 A

*credit 13 A **or** amps*

1

(ii) any **three** from

earth

any short (to the metal tank) causes fuse to blow

fuse is in the live wire

to prevent damage to the heater

credit to stop the current

3

(c) (i) $V = I \times R$

or equivalent

credit a triangle if part (ii) correctly uses the relationship

1

(ii) $(230 = 10 \times R =) 23$

ohms **or** Ω

2

[10]

Q31.

- (a) earth at top 1
- neutral on left 1
- live on right 1
- (b) (i) (when a short occurs to the metal case) electricity flows to earth
*a logical sequence of events is required
 which address each of the key aspects* 1
- electricity **or** current flows to earth
*accept flows to ground **or** down the earth wire* 1
- (a surge of current) blows the fuse
- this breaks the (live) circuit
do not accept a short circuit 1
- stops electricity flowing (through person **or** appliance)
do not accept it stops an electric shock 1
- (ii) 3 A
- accept 5A* 1

[8]**Q32.**

- (a) *Formula mark*
 $P = V \times I$
*accept $P = VI$ **or** $W = V \times I$ **or** any transformation* 1
- Substitution mark* $I = 900 \div 230$ 1
- Calculation mark* 3.9
*accept 3.9 **or** 3.91 **or** 4 for three marks with no working* 1
- (b) $900 + 1300 = 2200 \div 230 = 9.6$
*accept 9.57 to 9.6 **or** 10 for both marks with no working* 2
- (c) $1.2 + 0.45 = 1.65$ 1
- $\times 0.5 = 0.825$
*accept 0.8 **or** 0.83 for both marks with no working*

- (d) any **one** from

use less energy (to cook something)

accept fewer energy losses or use less electricity

cook faster

do not credit a cost argument about buying two different ovens

1

[8]

Q33.

- (i)

EITHER

30000 (2) joules/J (1)

or 30 kilojoules/kJ

3

OR

power $\times$ time = energy

1

time = 120 (seconds)

1

- (ii) vibration (of the food processor / some part of the food processor / the food)

1

[4]

Q34.

- (a) any **two** from

(risk of) cutting (through the) cable

accept cutting the wire

grass may be wet

or it may rain

wires may be loose (because cable experiences a lot of movement)

accept cable may be loose

(risk of) touching exposed part(s)

2

- (b) some current will go through (the rest of) the lawnmower / the user / to earth

do not credit any reference to the electromagnet

1

- (c) (i) charge = current $\times$ time

or any transposed version

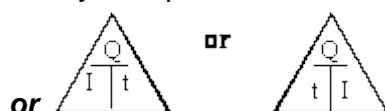
accept $Q = I \times t$

or any transposed version

accept $C = A \times s$

or coulombs = amperes $\times$ seconds

or any transposed version



but only if subsequently used correctly

1

(ii) **EITHER**

1200 microcoulombs / μC

or 1.2 millicoulombs / mC

or 0.0012 coulombs / C

3

OR

correct arithmetic

either

converting milliamps to amps

and milliseconds to seconds

or correct multiplication

unit given as coulombs / C

or millicoulombs / mC

or microcoulombs / μC

example : charge = $30 \times 40 = 1200$ millicoulombs should be credited with 2 marks

1

[7]