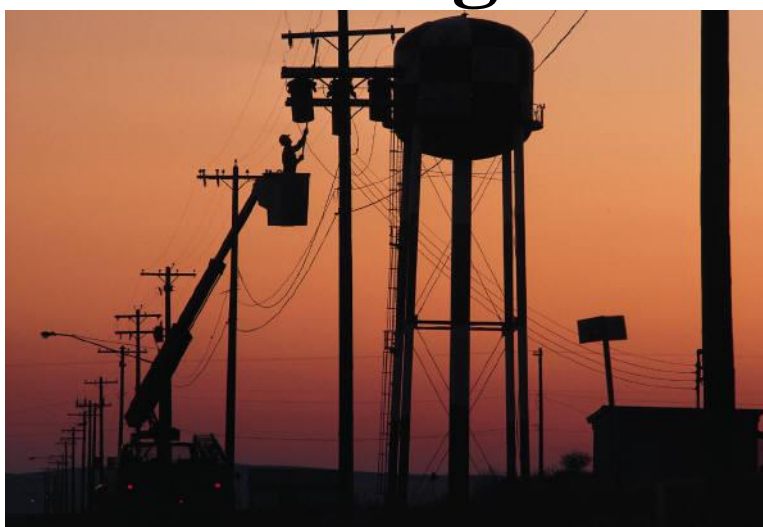


# Task Booklet

## Electricity

### And

## Charge

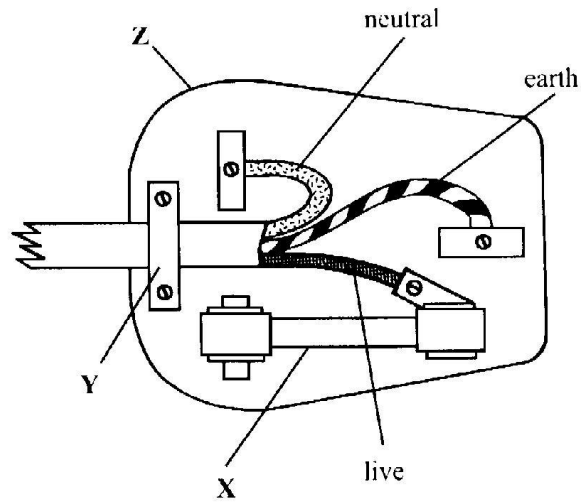


Name: .....

Teacher: .....

# Task 1

1. The diagram shows a 3-pin plug.



(a) Complete the table to show the colours of the wires.

Wire	Colour
earth	
live	
neutral	

(3 marks)

(b) Name the parts labelled X and Y.

Part X .....

Part Y .....

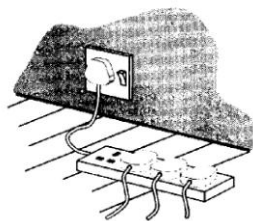
(2 marks)

(c) Explain why part Z is made from plastic.

.....  
 .....

(1 mark)

2. (a) An adaptor can be used to connect up to four appliances in parallel to on 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	1A
hairdryer	4A
heater	8A
iron	6A
television	2A

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

..... (1 mark)  
Current = ..... A

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

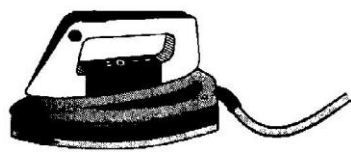
(iii) Calculate the electrical power used when the television, computer and hairdryer are plugged into the adaptor. Show clearly how you work out your answer and give the unit.  
.....  
.....  
.....

Electrical power = ..... (2 mark)

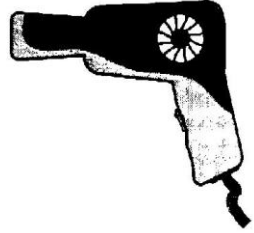
(iv) What would happen to the fuse if the heater is also plugged into the adaptor?  
..... (1 mark)

Give a reason for your answer.  
.....  
..... (1 mark)

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



Iron



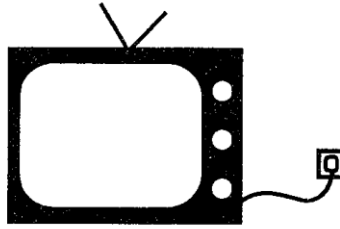
Hairdryer

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

(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 marks)

## Task 2

1. A television is connected to the mains supply using a cable.



(a) **Circle** the mains voltage used in the United Kingdom.

12

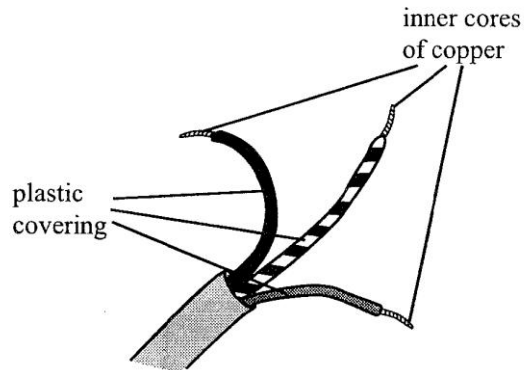
50

120

230

440

(b) The electrical cable has inner cores of copper covered with plastic.



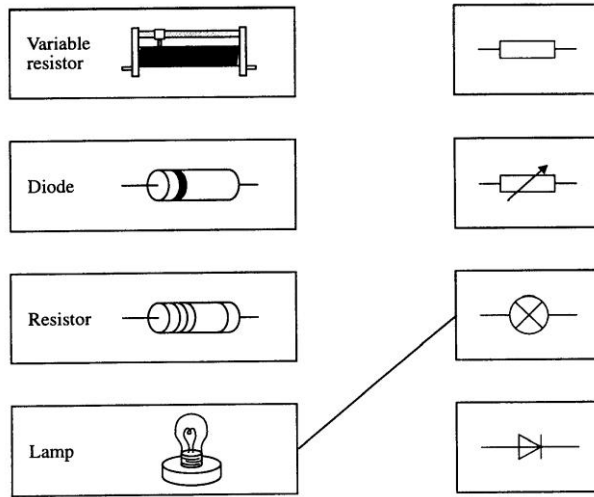
(i) Explain why copper is used.

.....  
..... (1 mark)

(ii) Explain why plastic is used.

.....  
..... (1 mark)

2. (a) Draw lines to join the picture to the correct circuit symbol. The lamp has been done for you.

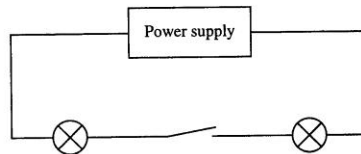


(2 marks)

(b) A family tent is to be fitted with a simple lighting circuit.



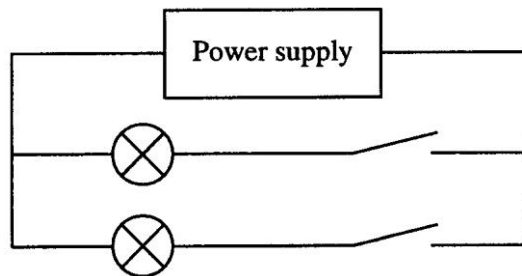
The diagram shows the first circuit used.



- (i) Are the lamps connected in series or in parallel? ..... (1 mark)  
 (ii) This is not a good circuit for using in the tent. Why?

..... (1 mark)

The diagram shows the second circuit used.



(iii) Give **two** reasons why this circuit is better than the first circuit.

1. \_\_\_\_\_

2. \_\_\_\_\_

(2 mark)



# Task 4

1. (a) (i) Complete the sentence by choosing the correct word from the box.

electrons                      neutrons                      protons

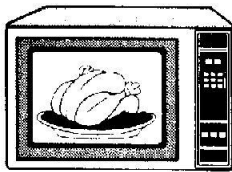
An electric current is a flow of ..... (1 mark)

(ii) What is the name and circuit symbol for the instrument used to measure electric current?

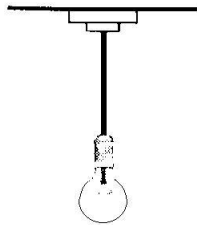
Name: ..... (2 mark)

Symbol:

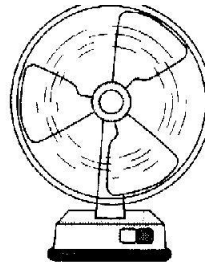
(b) When an electric current flows through a wire, the wire will get hot. **Two** of the following make use of this heating effect. Which **two**?



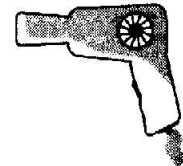
Microwave oven



Light bulb



Fan



Hairdryer

1.....

2.....

(2 marks)

(c) A 0.2 kW light bulb is switched on for 3 hours.

Use the following equation to calculate, in kWh, how many units of electrical energy are transferred to the bulb during the 3 hours.

$$\text{units} = \text{power} \times \text{time}$$

..... (1 mark)

Number of units = ..... kWh

2. (a) The list gives energy resources which can be used to produce electricity.

- |          |       |              |      |
|----------|-------|--------------|------|
| coal     | gas   | nuclear fuel | oil  |
| sunlight | tides | waves        | wind |
|          |       |              | wood |

Circle the **four non-renewable** energy resources. (4 marks)

(b) Use words from the list to complete the sentences about generating electricity.

**gas**                      **generator**                      **smoke**

**steam**                      **transformer**                      **turbine**                      **water**

In coal-fired power stations, coal is burnt to release \_\_\_\_\_.

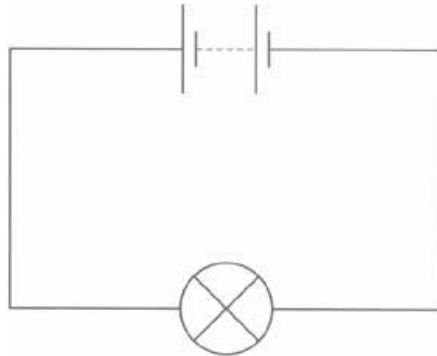
This is used to change \_\_\_\_\_ into

\_\_\_\_\_ which drives a \_\_\_\_\_.

Electricity is produced by a \_\_\_\_\_.

(5 marks)

3 (a) This simple circuit can be used to light a bulb.



(i) Write the letter **N** next to the part of the circuit diagram which shows the **negative** terminal of the battery.

(1 mark)

(ii) Draw an arrow on the diagram to show the direction in which **electrons** move around the circuit.

Label the arrow **E**.

(1 mark)

(iii) The current from a battery is **direct current**.

The current from the mains supply is **alternating current**.

Use your ideas about electron movement to explain the **difference** between direct current and alternating current.

---

---

---

(2 marks)

(iv) The voltage of the battery is 12V. The current through the bulb is 0.5A.

Calculate the power transferred to the bulb.

You **must** show how you work out your answer, including any equation used.

power = \_\_\_\_\_ unit \_\_\_\_\_ (4 marks)

(b) Nigella is cooking the dinner. She uses a 3kW oven for half an hour.

(i) Calculate the energy transferred to the oven.

Use the equation below. You **must** show how you work out your answer.

$$\text{energy} = \text{power} \times \text{time}$$

energy = \_\_\_\_\_ kWh (2 marks)

(ii) Electricity costs 8p per until.

What is the cost of the electricity Nigella uses to cook the dinner?

Put a **ring** around the correct answer.

6p

8p

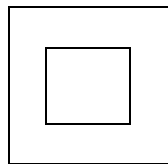
12p

24p

48p

(1 mark)

(c) The food mixer Nigella uses has marked on it the double insulated symbol.



This means there are only two wires from the food mixer to the plug.

Which two wires are used by the food mixer?

Put a tick (✓) in the box next to the correct answer.

earth and neutral

live and earth

live and neutral

positive and live

(1 mark)

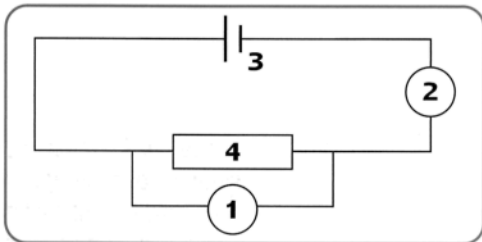
## Task 5

**1** Choose the word that best completes each sentence.

- a One end of the .....is connected to the outer metal case of some equipment.  
 A earth wire                      B live wire  
 C neutral wire                      D fuse                      [1]
- b The purpose of a fuse is to prevent .....  
 A power cuts                      B surges  
 C electrocution                      D overheating                      [1]
- c The purpose of the earth-wire is to prevent  
 A power cuts                      B Surges  
 C electrocution                      D overheating                      [1]
- d Double insulation means  
 A the wires are covered in two layers of plastic  
 B the appliance has no exposed parts that can become live  
 C the appliance has an extra metal case  
 D there are two sets of wires                      [1]

**2** Match the words A,B,C and D to the missing information on the diagram, 1-4.

- a The part labelled 1 in the diagram is the  
 A ammeter                      B lamp  
 C motor                      D voltmeter                      [1]
- b The part labelled 2 in the diagram is the ...  
 A ammeter                      B lamp  
 C buzzer                      D voltmeter                      [1]
- c The part labelled 3 in the diagram is the ...  
 A transformer                      B cell  
 C motor                      D generator                      [1]
- d The part labelled 4 in the diagram is the ...  
 A thermistor                      B variable resistor  
 C resistor                      D motor



[1]

**3** Choose the correct answer.

- a A battery labelled as 12 Amp-hours will last hours if it is supplying a current of 3 Amps.  
 A 3                      B 3 6                      C 4                      D 9

- b The electrical power of a circuit using a 4 volt supply to provide a 3 Amp current is .....watts.  
 A 0.75                      B 7                      C 4                      D 12                      [1]
- c 6 volts is needed to make a current of 2 amps flow through a .....ohm resistor.  
 A 3                      B 8                      C 4                      D 12                      [1]
- d If a current of 0.5 Amps flows through a 12-ohm resistor, a volt supply is needed.  
 A 2                      B 6                      C 1                      D 12                      [1]
- 4.** Choose the most appropriate answer.
- a Current is...  
 A a flow of negatively charged protons  
 B able to alter the resistance of a circuit  
 C a flow of negatively charged electrons  
 D a flow of positively charged protons [1]
- b A rechargeable cell ,,  
 A stores electrical energy  
 B is only available in one size  
 C costs less than dry cells to buy  
 D can be recharged using mains electricity                      [1]
- c A solar cell ...  
 A converts light energy into electrical energy  
 B can be used in the dark  
 C provides alternating current  
 D can store energy to be used later                      [1]

Choose the answer that is **false**.

- 5. a** Electrical energy...  
 A is measured in kilowatts-hours  
 B is measured in kilowatts  
 C is distributed through the national grid  
 D can be supplied using renewable energies                      [1]
- b Batteries...  
 A are best used to power vehicles for long journeys  
 B contain electrolyte and electrodes.  
 C are called wet batteries if they include a liquid electrolyte  
 D can contain mercury compounds which are damaging to the environment                      [1]

6. Choose the best answer.

a A 60W filament bulb provides 3 J of light and 57 J of thermal energy. Its efficiency is... A 57% B 3% C 5% D 95%

[1]

b When the bulb is used for 3 hours, the electrical energy used is ...

A 0,18kWh B 180 kWh  
C 0.9kWh D 180 J

[1]

c A more efficient bulb can be used to provide the same amount of light energy.

A The more efficient bulb produces more thermal energy than the filament bulb

B The more efficient bulb uses less electrical energy than the filament bulb

C The more efficient bulb costs the same to run as the filament bulb

D The more efficient bulb produces more useful energy than the filament bulb [1]

**(Total 20 marks)**