

# DO NOT WRITE ON THESE SHEETS

1. (a) Many substances burn. Some of them are used as fuels. Some fuels are burned in power stations to generate electricity.

Tick the boxes by the **two** fuels which are **most often** burned in power stations.

coal

paraffin wax

natural gas

petrol

paper

- (b) Burning fuels can pollute the air.  
Give **two** substances which pollute the environment when fuels burn.

1 .....

2 .....

- (c) Some power stations do not burn fuels. They use other energy resources to generate electricity.

Give **two** energy resources which are **not** fuels and which are used to generate electricity.

1 .....

2 .....

2 marks

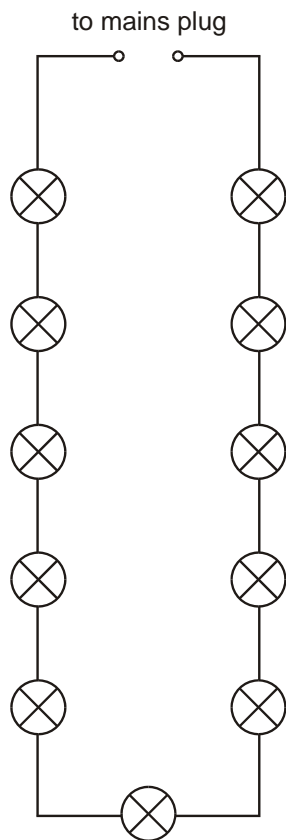
2 marks

2 marks

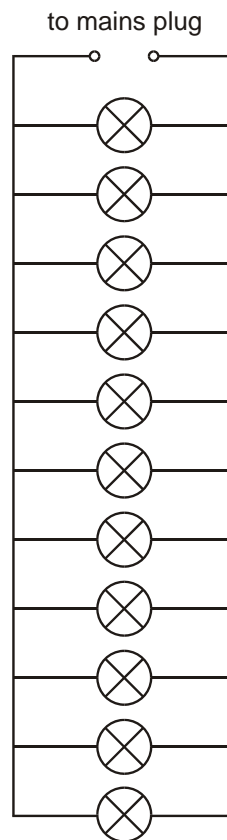
Maximum 6 marks

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2. (a) Ahmed bought two sets of lights to put on a tree in his garden. Circuit diagrams for the two sets of lights are shown below.



circuit A



circuit B

Choose words from the list below to fill the gaps in the sentences.

**all      none      some      parallel      series      short**

- (i) **Circuit A** is a ..... circuit.

If one of the bulbs breaks in **circuit A** ..... of the other bulbs will go out.

1 mark

- (ii) **Circuit B** is a ..... circuit.

If one of the bulbs breaks in **circuit B** ..... of the other bulbs will go out.

1 mark

- (b) Light rays from the bulbs hit the mirror of Ahmed's car.

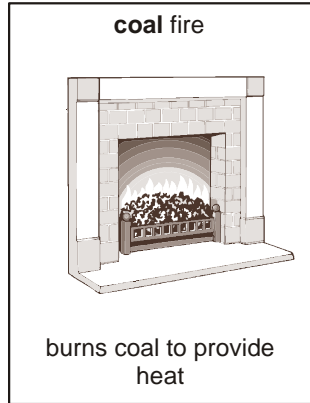
What happened to the light rays when they hit the mirror?

.....

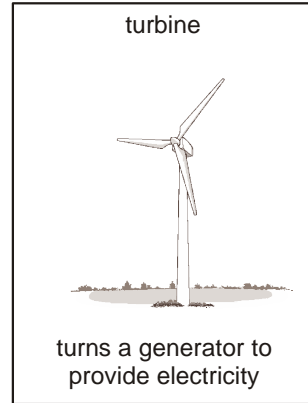
1 mark

# DO NOT WRITE ON THESE SHEETS

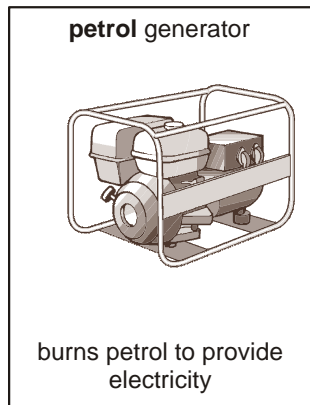
3. The drawings below show six ways of providing energy.



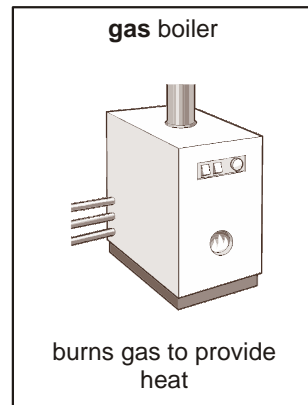
**A**



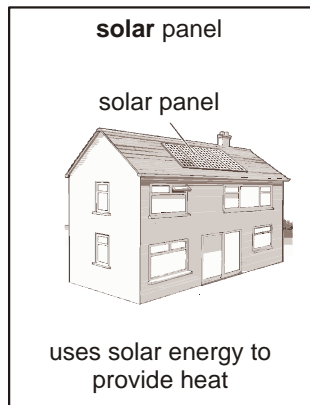
**B**



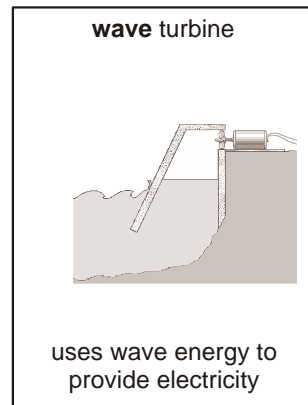
**C**



**D**



**E**



**F**

(a) From the drawings, give the names of **two** fossil fuels.

1. ....

2. ....

2 marks

(b) (i) What is the source of energy for a solar panel?

.....

1 mark

(ii) Why can the solar panel **not** work at night?

.....

1 mark

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(c) What makes the blades of the turbine in drawing B go round?

.....

1 mark

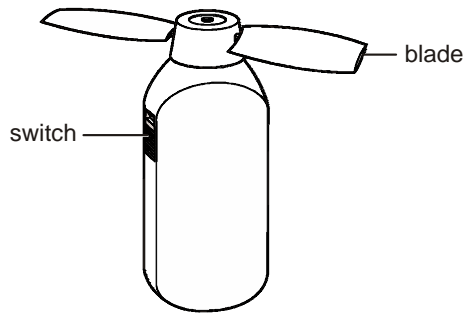
(d) Renewable energy resources will **not** run out.  
From the drawings, give **one** energy source that will **not** run out.

.....

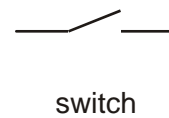
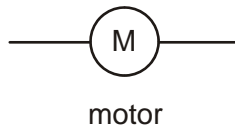
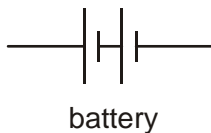
1 mark

maximum 6 marks

4. Susan has a small fan to keep herself cool.  
When she switches it on, a motor turns the blades to blow air.



(a) The diagrams below show the symbols for a battery, a motor and a switch.



**In the space below**, draw a series circuit diagram for the fan using these symbols.

1 mark

(b) (i) Which part provides energy for the circuit?

.....

1 mark

(ii) Some of this energy is used to turn the blades.  
The rest of the energy is wasted.

Complete the sentence below. Choose words from the list.

**chemical                  heat                  light                  sound**

1 mark

When the blades are turning, energy is wasted as

..... energy and ..... energy.

1 mark

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(c) Susan built a circuit using a battery, a motor and a switch.  
She closed the switch to turn the motor on.

(i) Susan added a bulb to the circuit. The current in the circuit **decreased**.  
How did this affect the motor?

.....

1 mark

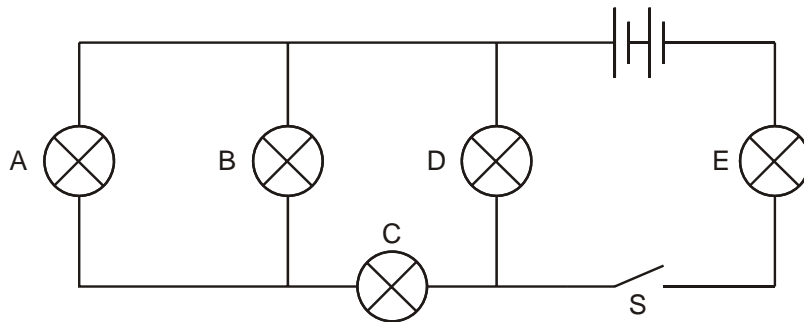
(ii) Susan removed the motor from the circuit. The current in the circuit **increased**.  
How did this affect the bulb?

.....

1 mark

maximum 6 marks

5. (a) Max built **circuit 1** as shown below.



**circuit 1**

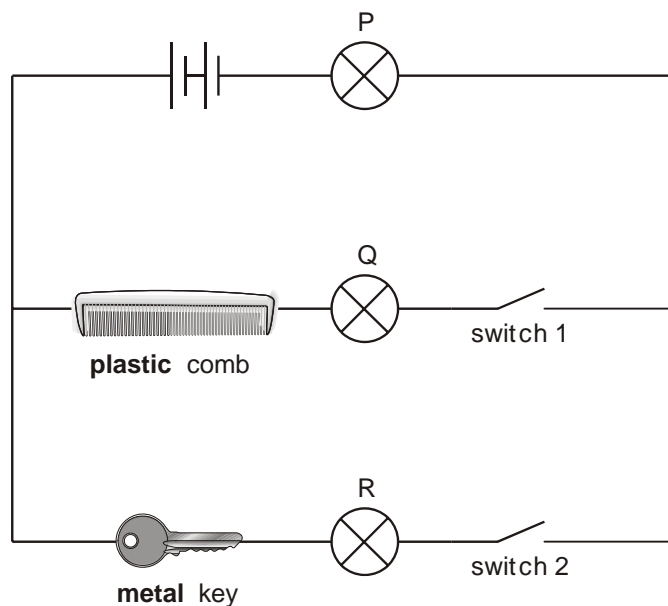
He closed the switch, S, and all the bulbs came on. One of the bulbs then broke and **all** the bulbs went off.

Which bulb must have broken? Give the letter.

.....

1 mark

(b) Max built **circuit 2** as shown below.  
He connected a plastic comb and a metal key in different parts of the circuit.



**circuit 2**

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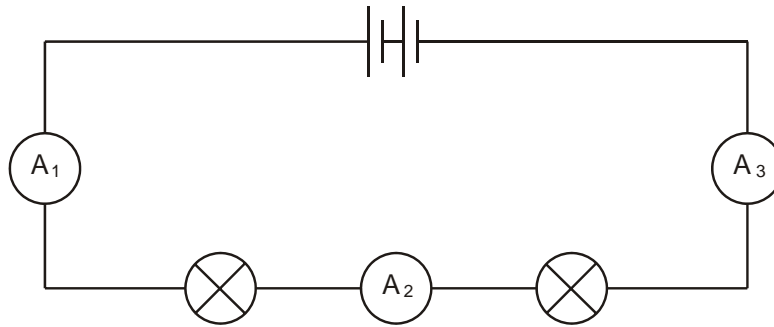
Look carefully at **circuit 2**.

Complete the table below to show which bulbs in circuit 2 will be on or off when different switches are open or closed. Write **on** or **off** in the boxes below.

switch 1	switch 2	bulb P	bulb Q	bulb R
open	open	off	off	off
open	closed			
closed	open			

2 marks

(c) Max built **circuit 3** using a battery, two bulbs and three ammeters.



**circuit 3**

The current reading on ammeter  $A_1$  was 0.8 amps. What would be the reading on ammeters  $A_2$  and  $A_3$ ? Place **one** tick in the table by the correct pair of readings.

reading on ammeter $A_2$ (amps)	reading on ammeter $A_3$ (amps)	correct pair of readings
0.8	0.8	
0.8	0.4	
0.4	0.8	
0.4	0.4	

1 mark

maximum 4 marks

6. (a) A torch battery is an energy resource. How is the energy stored in a torch battery? Tick the correct box.

as chemical energy

as kinetic energy

as potential energy

as thermal energy

1 mark

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(b) When a torch is switched on, energy is transferred from the battery to the bulb. How is energy transferred from the battery to the bulb? Tick the correct box.

by electricity

by light

by sound

by thermal energy

1 mark

(c) Energy is transferred from the torch bulb to the surroundings. Choose from the following terms to complete the sentences.

**electricity**      **light**      **sound**      **thermal transfer**

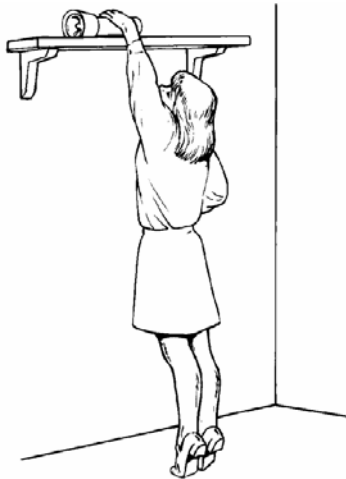
(i) Energy is transferred from the torch bulb to the surroundings in a **useful** way by .....

1 mark

(ii) Some energy is wasted. The wasted energy is transferred from the bulb to the surroundings by .....

1 mar

(d) The torch is lifted up and put on a high shelf.



Energy is transferred to the torch as it is lifted up. The energy is stored in the torch while it stays on the shelf. What energy has the torch gained?

.....

1 mark

Maximum 5 marks

7. Fossil fuels are used to generate electricity, but over half of the world's population uses biomass as a fuel.

(a) What is 'biomass', which is used as a fuel?

.....

.....

1 mark

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(b) Biomass and fossil fuels are both energy resources. What is the original source of this energy?

.....  
.....

1 mark

(c) Give the names of **three** fossil fuels which are often burned to generate electricity.

1. ....
2. ....
3. ....

1 mark

(d) Fossil fuels are often described as non-renewable energy resources. Explain why they are called 'non-renewable'.

.....  
.....

1 mark

(e) There are advantages and disadvantages of burning different fuels.

(i) Give **one** advantage of using biomass rather than fossil fuel as an energy resource.

.....  
.....

1 mark

(ii) Give **one** advantage of using fossil fuel rather than biomass as an energy resource.

.....  
.....

1 mark

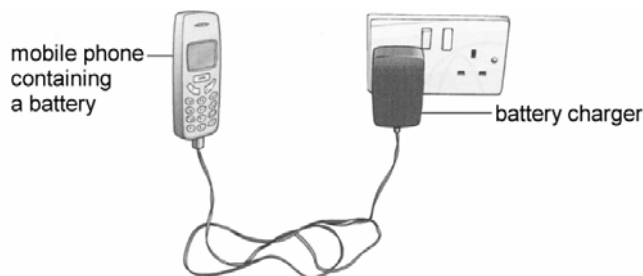
(iii) Give **one disadvantage** of using both fossil fuel and biomass.

.....  
.....

1 mark

Maximum 7 marks

8. (a) Jacquie has a mobile phone. Energy is stored in the battery of the phone. The drawing shows the battery being charged.



(i) Which energy transfer takes place in the battery as it is being charged? Tick the correct box.

chemical to sound

sound to thermal

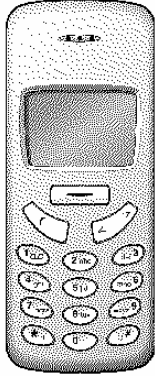
# DO NOT WRITE ON THESE SHEETS

electrical to chemical

thermal to electrical

1 mark

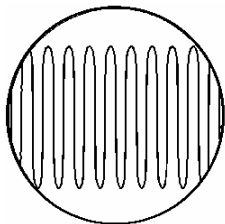
- (ii) When the battery is fully charged, Jacquie unplugs the phone.  
Which energy transfers take place when the mobile phone rings?  
Tick the correct box.



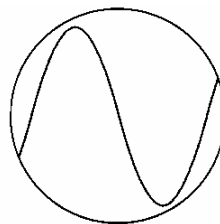
- chemical to electrical to sound
- electrical to chemical to sound
- kinetic to electrical to sound
- thermal to electrical to sound

1 mark

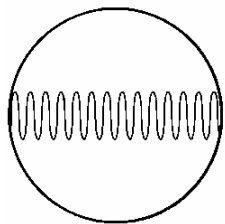
- (b) Jacquie can change the ring-tone of her phone.  
The diagrams below show the patterns made by four sound waves on an oscilloscope screen. They are all drawn to the same scale.



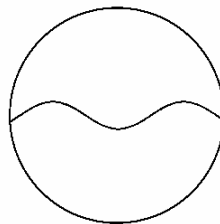
P



Q



R



S

Write the letter of the sound wave that matches each of the descriptions below.

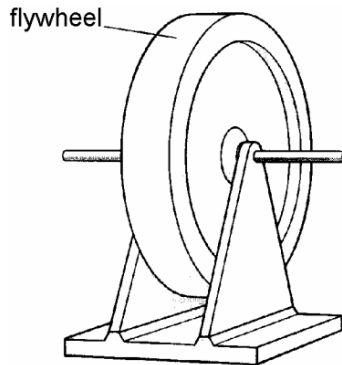
- (i) a loud sound with a low pitch .....
- (ii) a quiet sound with a high pitch .....
- (iii) a loud sound with a high pitch .....

3 marks

Maximum 5 marks

# DO NOT WRITE ON THESE SHEETS

9. A flywheel is a rotating wheel which is used to store energy.



(a) Energy must be transferred to a flywheel to make it rotate. How is the energy in the rotating flywheel classified? Tick the correct box.

as chemical energy

as kinetic energy

as potential energy

as thermal energy

1 mark

(b) A flywheel is rotating at a high speed. No energy is being supplied to it. The flywheel is used to turn a dynamo, and the energy from the dynamo is used to light a bulb.

(i) The bulb is left connected until the flywheel stops rotating. Not all the energy stored in the flywheel is transferred to the bulb. Some of it is lost. Give **two** places from which it is lost, and explain how it is lost.

1. ....

.....

2. ....

.....

2 marks

(ii) The experiment is repeated using a different bulb which gives out more energy each second. Compared to the first light bulb, describe how the second light bulb will affect the motion of the flywheel, and explain your answer.

.....

.....

.....

.....

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2 marks

Maximum 5 marks