

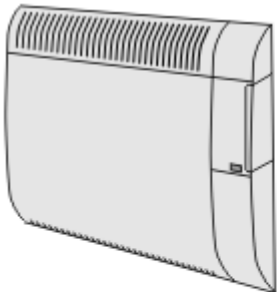
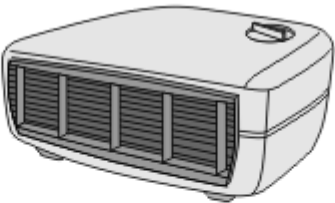
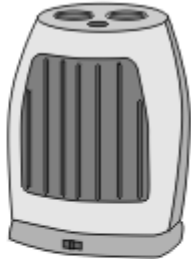
**Name of the Student:** \_\_\_\_\_

**Max. Marks : 22 Marks**

**Time : 22 Minutes**

**Q1.**

The pictures show three different types of electric heater.

 <p><b>400W oil-filled panel heater (wall mounted)</b></p> <ul style="list-style-type: none"> <li>• 3 heat settings</li> <li>• Efficient background heat</li> <li>• Safety overheat cut-out</li> </ul>	 <p><b>3kW fan heater</b></p> <ul style="list-style-type: none"> <li>• 2 heat settings</li> <li>• Power indicator light</li> <li>• Cool air fan setting</li> </ul>	 <p><b>1800W ceramic heater</b></p> <ul style="list-style-type: none"> <li>• 2 heat settings</li> <li>• 8 hour timer</li> <li>• Power indicator light</li> <li>• Safety overheat cut-out</li> </ul>
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- (a) The ceramic heater is run on full power for 5 hours.

Use the following equation to calculate, in joules, the amount of energy transferred from the mains to the heater.

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

Show clearly how you work out your answer.

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Energy transferred = \_\_\_\_\_ joules

**(2)**

- (b) Which heater will be the most expensive to run on its highest heat setting?

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**(1)**

- (c) A heater is needed for a small office.

Comparing each type of heater with the other two, give **one** advantage of using each type of heater in the office.

oil-filled panel heater \_\_\_\_\_

fan heater \_\_\_\_\_

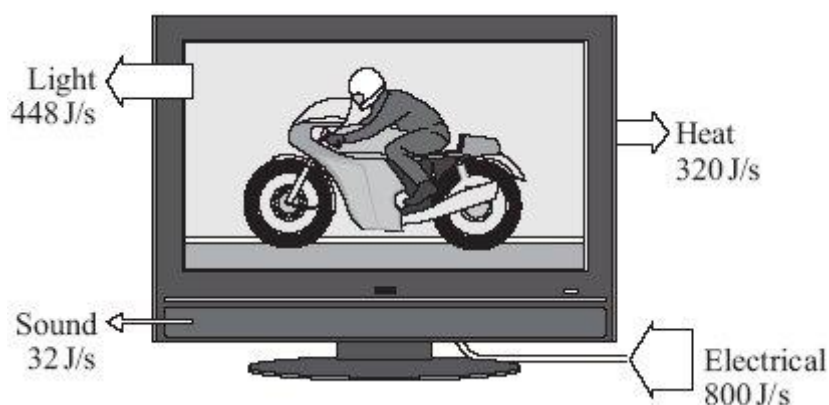
ceramic heater \_\_\_\_\_

(3)

(Total 6 marks)

## Q2.

- (a) The diagram shows the energy transformations produced by a TV.



- (i) Calculate the efficiency of the TV, using the information in the diagram..

Show clearly how you work out your answer.

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Efficiency = \_\_\_\_\_

(2)

- (ii) What eventually happens to the useful energy transferred by the TV?

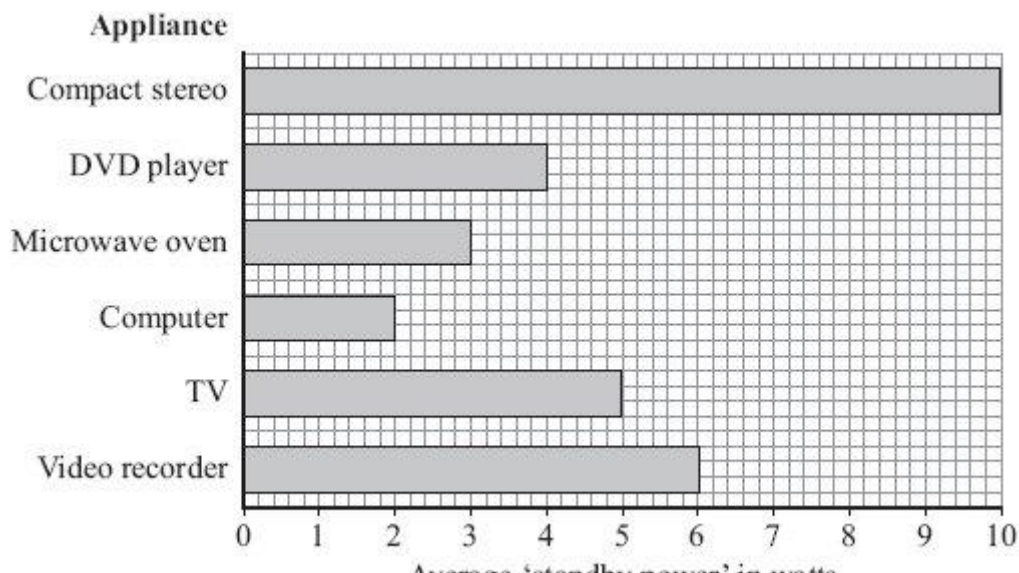
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(1)

- (b) Electrical appliances left on standby use energy.

The bar chart shows the power for the appliances that one family leaves on standby when they go on holiday.



The family is on holiday for a total of 175 hours.

- (i) Use the information in the bar chart and the equation in the box to calculate the energy wasted by leaving the compact stereo on standby while the family is on holiday.

energy transferred (kilowatt-hour, kWh)	=	power (kilowatt, kW)	×	time (hour, h)
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Show clearly how you work out your answer.

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Energy wasted = \_\_\_\_\_ kilowatt-hours

(2)

- (ii) Electricity costs 12 p per kilowatt-hour.

Use the equation in the box to calculate the cost of leaving the compact stereo on standby while the family is on holiday.

total cost = number of kilowatt-hours × cost per kilowatt-hour
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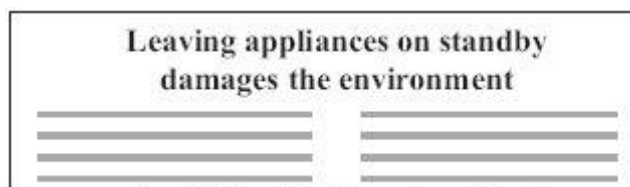
Show clearly how you work out your answer.

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Cost = \_\_\_\_\_ p

(1)

- (c) A headline from a recent newspaper article is shown below.



Explain why leaving appliances on standby damages the environment.

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(2)

(Total 8 marks)

### Q3.

(a) Electricity is distributed from power stations to consumers along the National Grid.

- (i) Transformers are part of the National Grid. Transformers are *efficient* devices. What is meant by a device being *efficient*?

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(1)

- (ii) When electricity flows through a cable, some energy is transformed into heat.

Explain how the National Grid system reduces the amount of energy lost as heat.

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(2)

(b) Read this information taken from a recent newspaper article.

- Researchers have found that children living close to overhead power cables are more likely to develop leukaemia.
- The researchers studied two groups of children. One group had developed leukaemia, the other group was healthy.
- Although the researchers found a link, they are unable to explain why it happened. They say that the results may have happened by chance.
- Other factors that have not been investigated, such as the environment, the geographical area or the children's genes, could be important.
- A cancer research charity said that childhood leukaemia was most likely to be caused by factors that parents were unable to control.

- (i) Why did the researchers study a group of healthy children?

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(1)

- (ii) The information does not say how many children were studied.

Why should this data have been included in the article?

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(1)

- (iii) The researchers could not be certain that the overhead power cables were responsible for the increased chance of children developing leukaemia.

Explain why.

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(2)

- (iv) The results of the research carried out by scientists may worry some people.

What do you think scientists should do?

Put a tick (✓) in the box next to your choice.

Scientists should publish their research findings straight away.

☐

Scientists should not publish their research findings until they have found out as many facts as possible.

☐

Give a reason for your choice.

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(1)

(Total 8 marks)