Rewarding Learning

Centre Number

| 71 | |
|---|---|

Candidate Number

| |
|---|

General Certificate of Secondary Education
2011–2012

# Science: Single Award (Modular)

## Electricity, Waves and Communication Module 5

## Foundation Tier

**[GSC51]**

GSC51

**WEDNESDAY 29 FEBRUARY 2012**
**9.30 am–10.15 am**

### TIME

45 minutes.

### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
Write your answers in the spaces provided in this question paper.
Answer **all six** questions.

### INFORMATION FOR CANDIDATES

The total mark for this paper is 45.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

| For Examiner's use only | |
|---|---|
| Question Number | Marks |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| Total Marks | |

| Examiner Only | |
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| Marks | Remark |
| | |

**1** **(a)** Below are four statements, but only **two** are correct descriptions of waves.

Circle the two correct statements.

**Amplitude is the length of one complete vibration**

**Wavelength is the length of one complete vibration**

**Wavelength is the number of vibrations per second**

**Amplitude is the maximum height of a wave**

[2]

**(b)** Complete the sentences below.

Choose from:

**energy** **longitudinal** **vibrations** **wavelength**

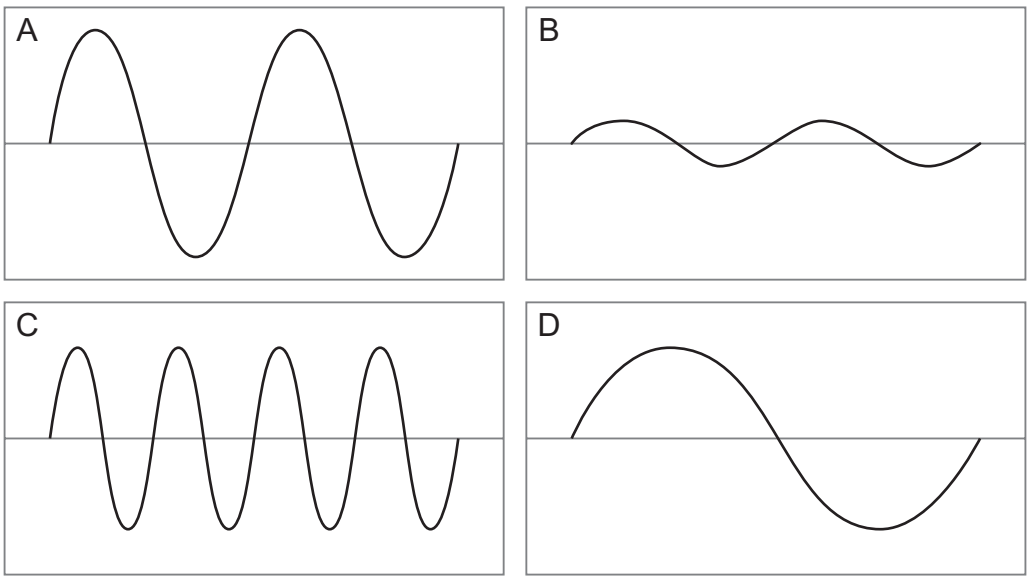
A wave is a series of _____.

Waves carry _____ from one place to another.

There are two types of waves, transverse and

_____. [3]

**(c)** The diagrams below show four waves **A**, **B**, **C** and **D**.




**(i)** Which wave (**A**, **B**, **C** or **D**) has the smallest amplitude?

Answer _____ [1]

**(ii)** Which wave (**A**, **B**, **C** or **D**) has the longest wavelength?

Answer _____ [1]

**(iii)** Which two waves have the same frequency?

Answer _____ and _____ [1]

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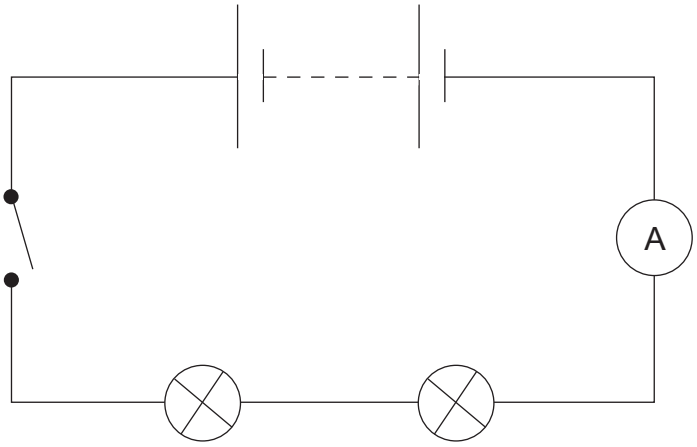
**2** **(a)** Shown below is a simple electric circuit, with two identical bulbs.




**(i)** Using the correct symbol show how a voltmeter is added to the circuit to allow the voltage of **one** bulb to be measured. [2]

**(ii)** The diagram shows the switch open. Explain fully the effect that closing the switch will have.

_____

_____

_____ [2]

**(iii)** What term is used to describe how the bulbs are connected in this circuit?

Circle the correct answer.

**parallel** **series** **short** [1]

**(iv)** The voltage supplied by the batteries is 6 V. How much voltage will each bulb receive?

Circle the correct answer.

**6 V** **3 V** **12 V** [1]

**(b)** When electricity flows a heating effect is caused by resistance.

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

**(i)** Name two household appliances that use this heating effect.

1. _____ [1]

2. _____ [1]

**(ii)** Name the unit of resistance.

Choose from:

**amp** **ohm** **watt**

Answer _____ [1]

| Examiner Only | |
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| Marks | Remark |
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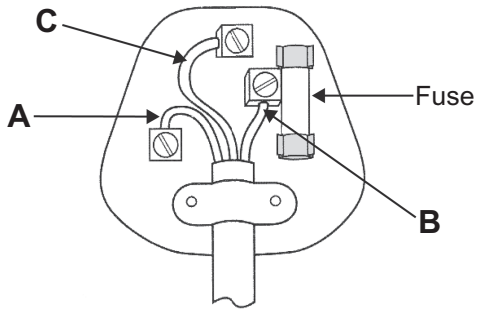
**3** The diagram below shows a 3-pin plug.




**(a) (i)** Name the wires labelled **A** and **B**.

**A** _____ [1]

**B** _____ [1]

**(ii)** What colours are the wire labelled **C**?

_____ and _____ [1]

**(b) (i)** This plug is used to connect a 2500 W washing machine to the 250 V mains.

Use the equation:

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

to calculate the current flowing through the plug.
Show your working out.

Answer _____ A [2]

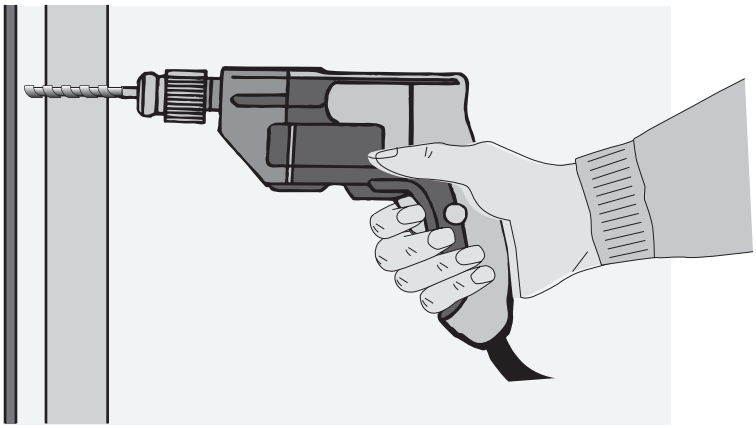
**(ii)** What size of fuse should be fitted inside this plug?

Choose from:

**2 A** **3 A** **5 A** **13 A**

Answer _____ [1]

**(c)** The drill shown in the picture below is double insulated.





Complete the following sentences.

**(i)** The plug of the double insulated drill does not need an

_____ wire. [1]

**(ii)** Double insulation protects the user from electric shock because the case is made of _____. [1]

| Examiner Only | |
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| Examiner Only | |
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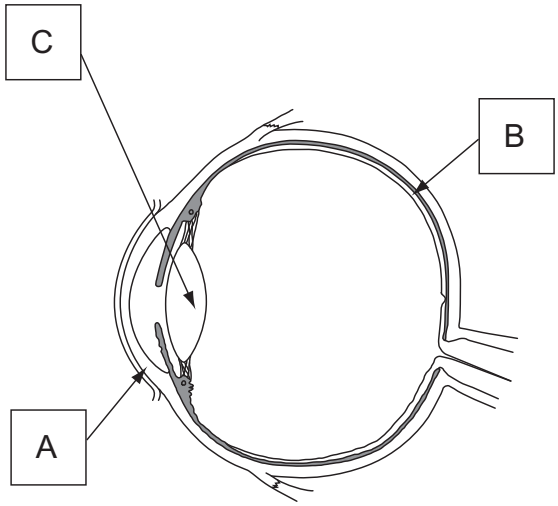
**4** **(a)** Shown below is a diagram of the human eye.




**(i)** Name the parts labelled **A** and **B**.

**A** _____ [1]

**B** _____ [1]

**(ii)** Name the type of lens labelled **C**.

_____ [1]

**(b)** Name two common eyesight problems.

1. _____ [1]

2. _____ [1]

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**(Questions continue overleaf)**

| Examiner Only | |
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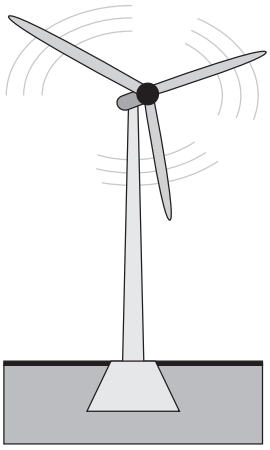
| Marks | Remark |

**5** Below is a diagram of a wind turbine.



The following investigation was carried out to find out how much electricity it produced.

- The wind turbine was used to charge a battery for 12 hours overnight.
- The next morning the battery was used to light a bulb and the time it stayed lit until it was completely out was timed.
- This was repeated every night for a week.
- The results are recorded below.

| Day | **Mon** | **Tues** | **Wed** | **Thurs** | **Fri** | **Sat** | **Sun** |
|---|---|---|---|---|---|---|---|
| Time bulb stayed lit /mins. | 45 | 50 | 2 | 25 | 60 | 35 | 42 |

**(a) (i)** What is measured in this investigation to show the amount of electricity produced by the wind turbine?

_____ [1]

**(ii)** Explain how timing the bulb until it is completely out ensures that the investigation is a fair test (valid).

_____

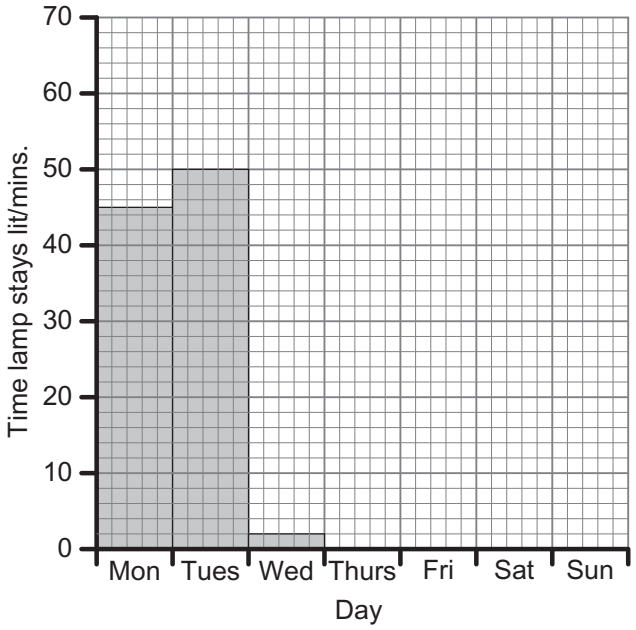
_____ [1]

**(iii)** Suggest why the bulb only stayed lit for 2 minutes on Wednesday.

_____

_____ [1]

**(b)** Complete the bar graph of the results below.




[2]

**(c)** Wind is classified as a renewable energy source.

**(i)** Name another renewable energy source.

_____ [1]

**(ii)** Explain fully why developing renewable energy sources is becoming more important for the environment.

_____

_____

_____

_____

_____ [3]

| Examiner Only | |
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| Marks | Remark |
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| Examiner Only | |
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| Marks | Remark |
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**6** The picture below shows a race being started using a starting pistol.

There is a large brick wall at the side of the running track.

"Image of runners starting a race with a brick wall in the background".

Each time the pistol is fired an echo is heard a short time later.

**(a)** Suggest why the runners will see the smoke from the pistol before they hear the sound.

_____

_____ [1]

**(b)** Explain fully why the runners will hear an echo.

_____

_____

_____ [2]

**(c)** The wall is 50 m behind the starter and the echo is heard 0.3 s after the pistol is fired.

Use the equation:

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

to calculate the speed of sound in air.
Show your working out.

Answer _____ m/s [3]

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

**THIS IS THE END OF THE QUESTION PAPER**

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