CCEA GCSE SCIENCE: SINGLE AWARD (MODULAR)

SCIENCE



EXAM QUESTION PACK

MODULE 5 FOUNDATION TIER GSC51 PAPERS

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2012

Science: Single Award (Modular)

Electricity, Waves and Communication Module 5

Foundation Tier

[GSC51]

GSC51

WEDNESDAY 14 NOVEMBER 2012, AFTERNOON

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	

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Examiner Only	
Marks	Remark

1 **(a)** Below are three electrical properties and their units.

(i) Use lines to match each property with the correct unit.

Property	Unit
Voltage	Ohm
Resistance	Volt
Current	Ampere

[2]

(ii) Which of the above properties causes a heating effect when electricity flows?

_____ [1]

(iii) Name **two** appliances that use the heating effect of electricity.

Choose from:

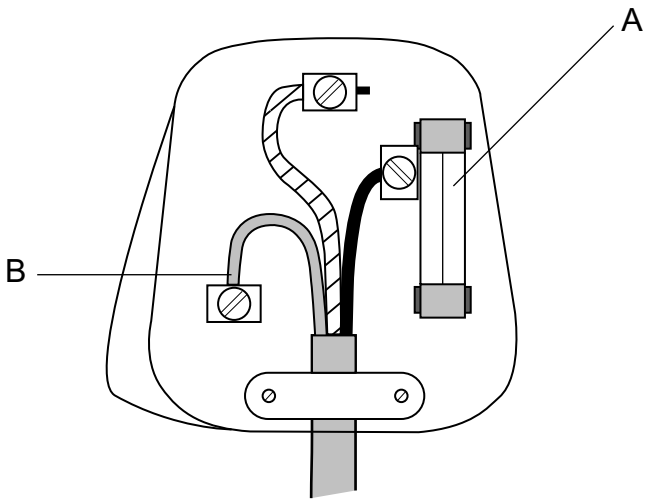
fridge **toaster** **radio** **kettle** **drill**

_____

_____ [2]

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(b) The diagram below shows a three-pin plug.



(i) Name the part labelled A. _____ [1]

(ii) Name the wire labelled B. _____ [1]

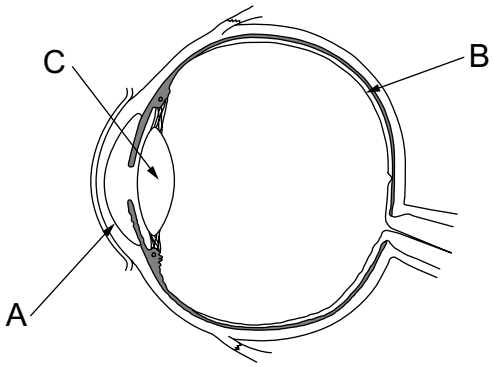
(iii) What colour is the earth wire?

_____ and _____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

2 The diagram below shows the human eye.



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(a) Name the parts labelled A and B on the diagram.

Choose from:

iris **retina** **pupil** **cornea**

A _____

B _____ [2]

(b) **(i)** Name the type of lens shown as part C.

Circle the correct answer.

contact **convex** **concave** [1]

(ii) Describe fully what this type of lens does to parallel rays of light entering the eye.

_____

_____ [2]

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(c) Short sight is a common eyesight problem.

(i) State fully the cause of short sight.

_____

_____

_____ [2]

(ii) Suggest how short sight would affect a person's vision.

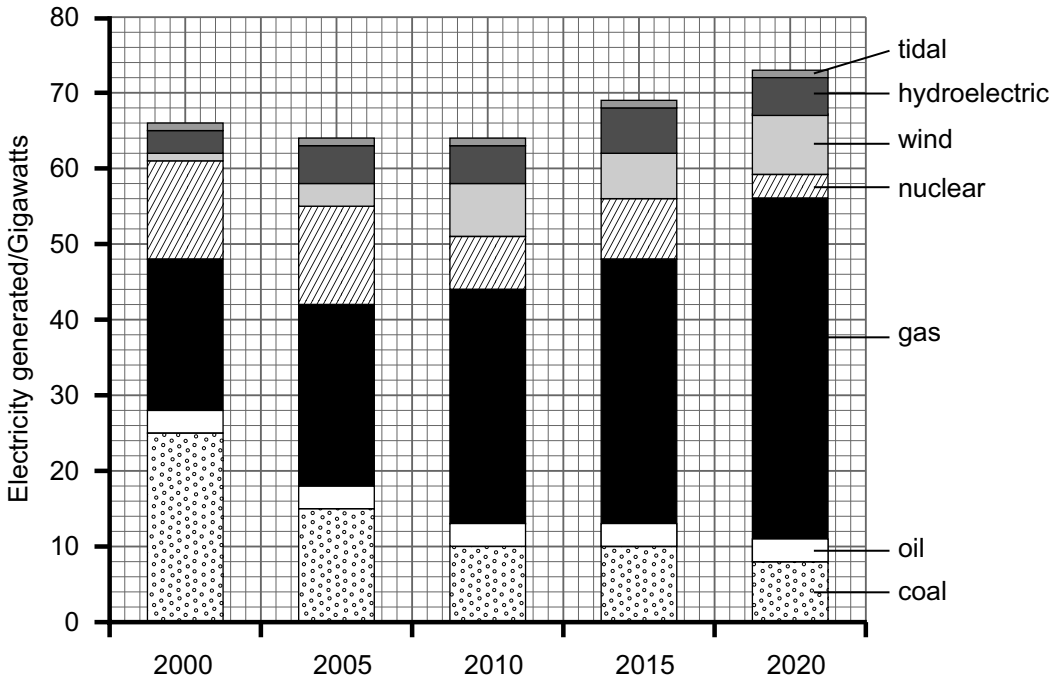
_____

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

3 The graph below shows the energy sources used to generate electricity in the UK in the years 2000, 2005 and 2010. It also shows predictions for 2015 and 2020.



(a) (i) Name **one** energy source that was used more in 2010 than in 2000.

_____ [1]

(ii) Name **one** energy source that was used less in 2010 than in 2000.

_____ [1]

(b) (i) What is meant by the term 'renewable'?

Circle the correct answer.

will run out : **can be used again** : **will not run out** [1]

(ii) Name **one** renewable source shown in the graph.

_____ [1]

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(c) The graph shows that generation of electricity from tidal sources remains almost the same over the 20 years. Suggest **one** reason for this.

_____

_____ [1]

(d) Complete the following sentences.

Choose from:

burn **coast** **extract** **transport** **border**

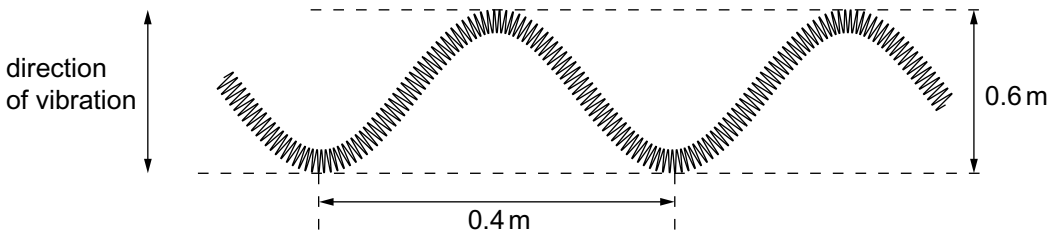
All of Northern Ireland's fossil fuel power stations are located close to the _____ . This makes it easier to _____ the fossil fuels. [2]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

4 **(a)** Andrea uses a stretched slinky spring to demonstrate a wave as shown in the diagram.



(i) What type of wave is shown above?

Choose from:

longitudinal **digital** **transverse**

_____ [1]

(ii) What is the amplitude of this wave?

Choose from:

0.6 m **0.4 m** **0.3 m** **0.8 m**

_____ m [1]

(iii) What is the wavelength of this wave?

Choose from:

0.6 m **0.4 m** **0.3 m** **0.2 m**

_____ m [1]

(b) The table below shows the electromagnetic spectrum.

Gamma rays	X-rays	Ultraviolet	Visible light	Infrared	Microwaves	Radio waves

(i) State **one** feature these waves have in common.

_____ [1]

(ii) State **one** feature that is different for each of these waves.

_____ [1]

(iii) Name **one** type of electromagnetic wave used for communication and state how it is used.

Name _____

Use _____

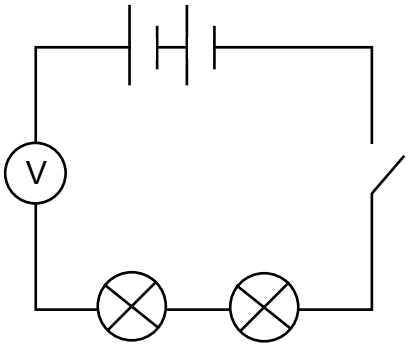
_____ [2]

Examiner Only

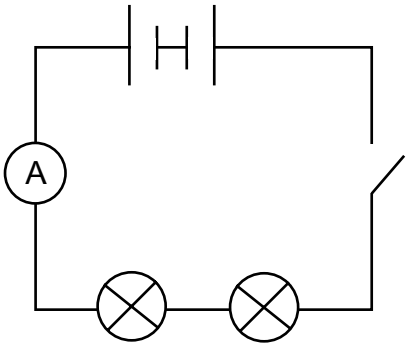
Marks	Remark

Examiner Only	
Marks	Remark

5 **(a)** Students set up two experiments to measure the current from two cells. The symbol | | represents one cell. Their circuit diagrams are shown below but each contains **one** mistake.



Circuit 1



Circuit 2

(i) Identify the mistake in each circuit.

Circuit 1 _____

_____

Circuit 2 _____

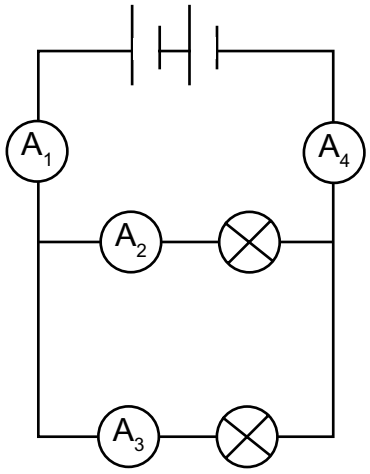
_____ [2]

(ii) What term is used to describe how the bulbs are connected in both circuits?

_____ [1]

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(b) The students then set up the circuit shown below. Both bulbs are identical.



Circuit 3

Ammeter (A1) reads 0.4 amps.

What is the reading on:

ammeter (A3)? _____amps

ammeter (A4)? _____ amps [2]

(c) Describe fully why it is safer to have car headlights (bulbs) connected together as shown in circuit 3 rather than as shown in circuits 1 and 2.

_____

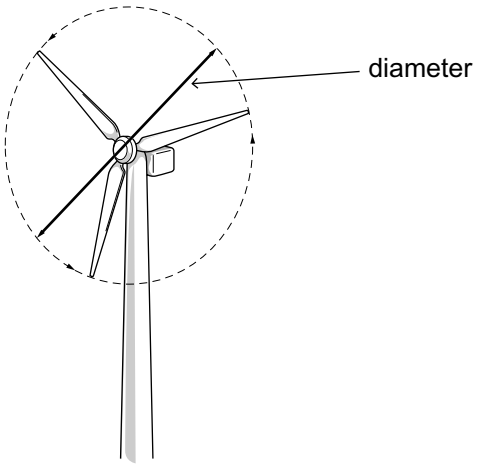
_____

_____ [2]

Examiner Only

Marks	Remark

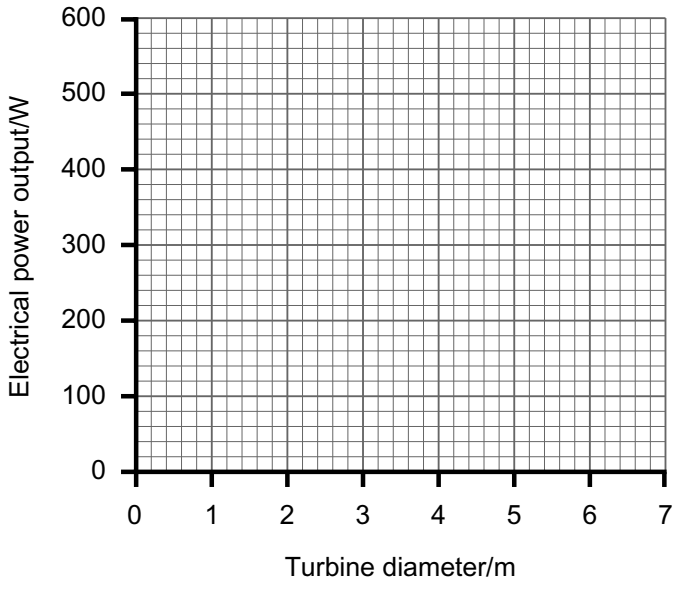
6 The diagram below shows a wind turbine used to generate electricity.



The table below shows how the electrical power output depends on the diameter of the turbine.

Turbine diameter/m	Electrical power output/W
2	60
3	130
4	240
5	370
6	540

(a) Plot a **line graph** of these results on the grid below.



[3]

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Marks	Remark

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(b) What conclusion can be drawn from these results?

_____

_____ [1]

(c) Suggest **one** other factor that will affect the amount of electricity produced.

_____ [1]

(d) Explain fully why the Government is promoting the use of wind turbines to generate electricity.

_____

_____

_____

_____ [3]

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Marks	Remark

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Rewarding Learning

General Certificate of Secondary Education
2012

Science: Single Award (Modular)

Electricity, Waves and Communication
Module 5

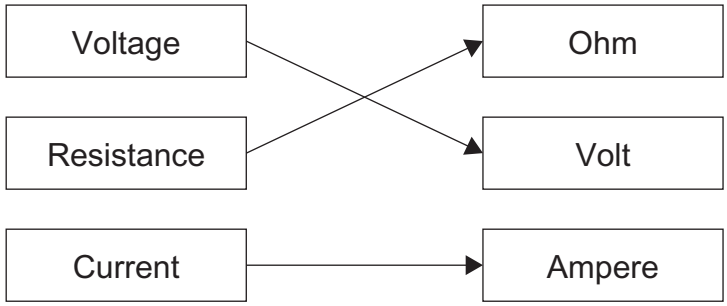
Foundation Tier

[GSC51]

WEDNESDAY 14 NOVEMBER 2012
1.30 pm–2.15 pm

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	**(i)**		
			All 3 correct = 2 marks 1/2 correct = 1 mark [2]	
		(ii)	resistance [1]	
		(iii)	toaster [1] kettle [1] [2]	
	(b)	**(i)**	A = fuse [1]	
		(ii)	B = neutral (wire) [1]	
		(iii)	green + yellow [1]	8
2	**(a)**		A = cornea [1] B = retina [1] [2]	
	(b)	**(i)**	convex [1]	
		(ii)	bends/refracts light rays [1] together/inwards [1] converges light rays/focuses light rays on retina (any 2) [2]	
	(c)	**(i)**	lens too strong [1] light rays meet/focused before retina [1] [2]	
		(ii)	close objects clear/far objects blurry [1]	8
3	**(a)**	**(i)**	gas/wind/hydroelectric [1]	
		(ii)	coal/oil/nuclear [1]	
	(b)	**(i)**	will not run out [1]	
		(ii)	wind/hydroelectric/tidal [1]	
	(c)		too expensive/stops use by boats or fish/not much electricity produced/still experimental [1]	
	(d)		coast [1] transport [1] [2]	7

					AVAILABLE MARKS
4	**(a)**	**(i)**	transverse	[1]	
		(ii)	0.3	[1]	
		(iii)	0.4	[1]	
	(b)	**(i)**	all carry energy/travel at same speed/ travel at speed of light/all transverse	[1]	
		(ii)	frequency/wavelength	[1]	
		(iii)	radio waves = tv + radio signals microwave = mobile phones/satellites visible light/infrared = optic fibres (1 for named type + 1 for correct use)	[2]	7
5	**(a)**	**(i)**	circuit 1 voltmeter replaced with ammeter	[1]	
			circuit 2 1 cell/or battery is the wrong way round	[1]	
		(ii)	series	[1]	
	(b)		A3 = 0.2A	[1]	
			A4 = 0.4A	[1]	
	(c)		parallel/circuit 3 = always got light/other cars can see you one goes out, other still lit [1] series/circuits 1+2 = if one goes out, both go out [1]	[2]	7
6	**(a)**		5 points correct = 2 marks 4/3 points correct = 1 mark correct line = 1 mark	[3]	
	(b)		bigger diameter = more power/more electricity	[1]	
	(c)		wind speed/strength/blade shape	[1]	
	(d)		less carbon dioxide/greenhouse gases/air pollution [1] less global warming/less greenhouse effect [1] saves fossil fuels [1]	[3]	8
				Total	**45**

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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

THURSDAY 24 MAY 2012, MORNING

TIME

45 minutes.

INSTRUCTIONS TO CANDIDATES

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Write your answers in the spaces provided in this question paper.
Answer **all six** questions.

INFORMATION FOR CANDIDATES

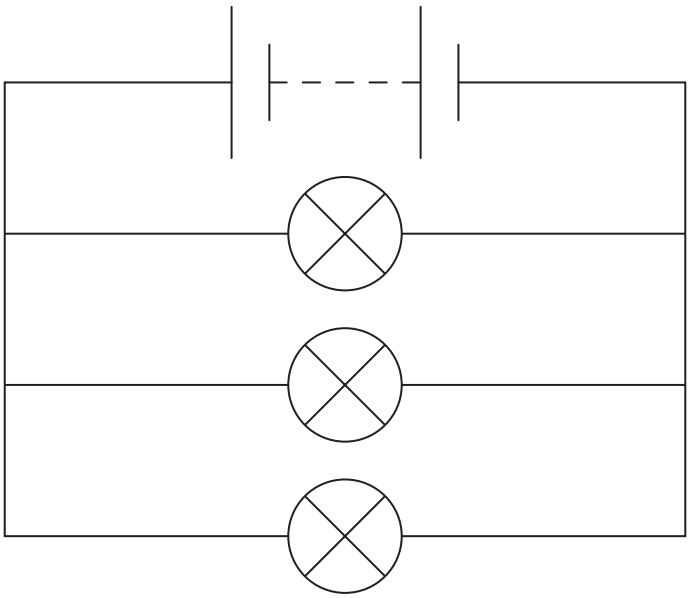
The total mark for this paper is 45.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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

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Examiner Only	
Marks	Remark

1 The diagram below shows some bulbs connected in parallel.



(a) Give two advantages of connecting bulbs in parallel rather than in series.

1. _____ [1]

2. _____ [1]

(b) **(i)** The battery supplies a voltage of 6 V in the circuit above. How much voltage will each bulb receive?

Choose from:

3 V **6 V** **2 V**

Answer _____ [1]

(ii) What would happen to the brightness of the bulbs if more batteries were added to the circuit?

_____ [1]

(iii) Suggest two other changes that would occur in the circuit if more batteries were added.

1. _____ [1]

2. _____ [1]

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Examiner Only	
Marks	Remark

(c) **(i)** Name the type of meter that should be used to measure the current flowing in the circuit.

_____ [1]

(ii) Name the unit of electric current.

Choose from:

volt **watt** **amp** **joule**

Answer _____ [1]

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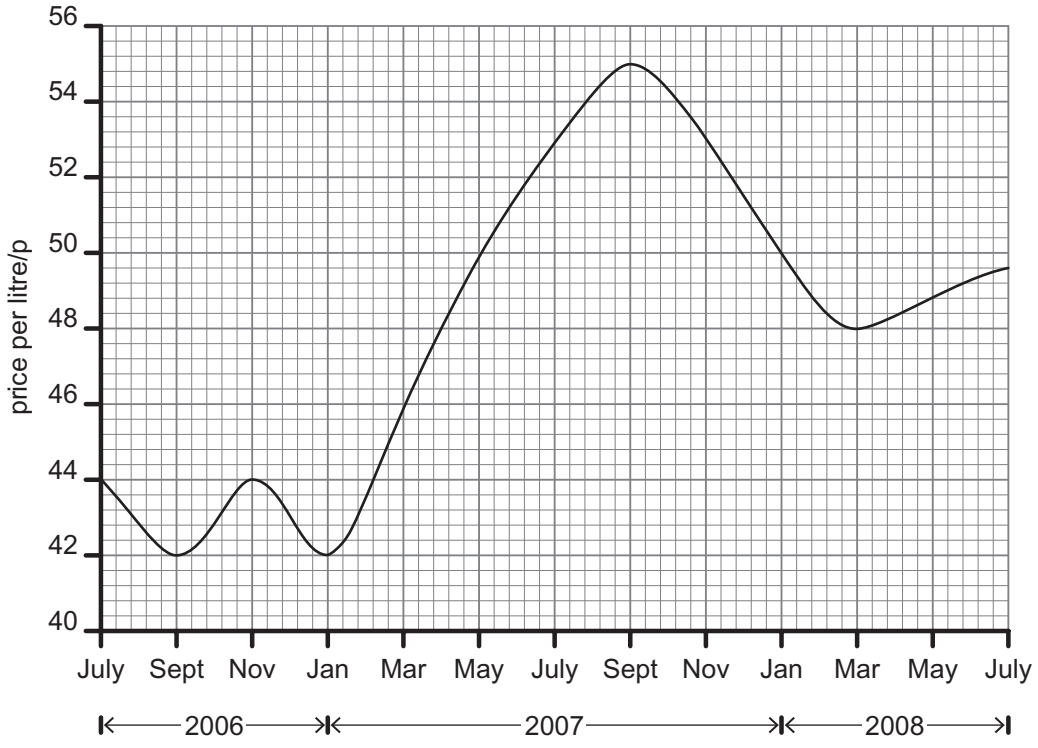
Examiner Only	
Marks	Remark

2 **(a)** Use lines to match each energy source with the correct description below.

energy source	description
coal	A renewable source used directly to turn turbines
wind	A fuel that is burned in power stations
light	A source that releases energy through radioactive decay
nuclear	A source used by solar cells to produce electricity

[3]

(b) Kilroot power station in Northern Ireland can use oil or gas depending on the cost. The graph below shows the price of gas per litre from July 2006 to July 2008.



(i) How much did 1 litre of gas cost in November 2006?

Answer _____ p [1]

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(ii) During which period of time did gas cost more than 50 p per litre?

from _____ to _____ [1]

(iii) Oil and gas are both described as non-renewable energy sources. What is meant by the term "non-renewable"?

_____ [1]

(iv) Explain fully an environmental disadvantage to using oil or gas in power stations.

_____

_____

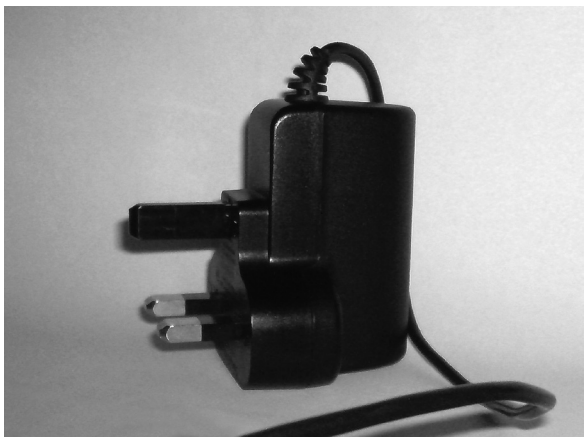
_____ [2]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

3 The picture below shows a mobile phone charger.



(a) (i) When the charger is being used it supplies a voltage of 6 V and current of 3 A to the phone.

Use the equation:

power = **voltage** × **current**

to calculate the power supplied to the phone.

(Show your working out.)

Answer _____ [2]

(ii) Name the unit of power.

Choose from:

joule **ohm** **watt**

Answer _____ [1]

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Examiner Only	
Marks	Remark

(b) Mobile phones use microwaves to transmit signals.

(i) Name a possible health risk associated with the use of microwaves in mobile phones.

_____ [1]

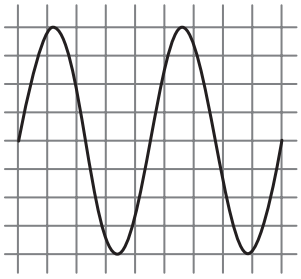
(ii) Suggest **one** way to reduce this health risk.

_____ [1]

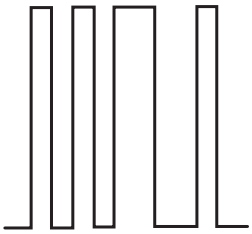
(c) Mobile phones can use both digital and analogue signals.

(i) Which diagram (**A**, **B** or **C**) below shows a digital signal?

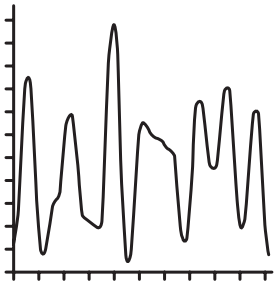
A



B



C



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Answer _____ [1]

(ii) Give **one** reason why digital signals are better than analogue signals.

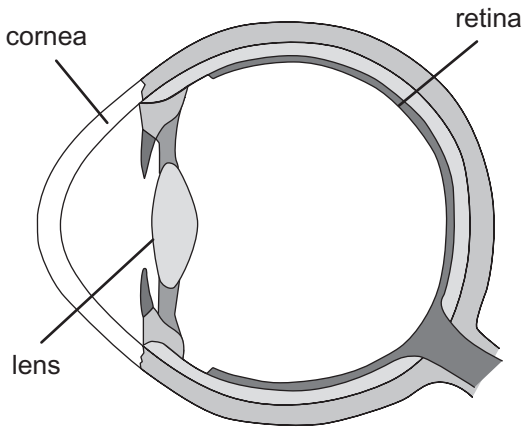
_____

_____ [1]

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Examiner Only	
Marks	Remark

4 The diagram below shows the human eye.



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(a) Use the diagram and your knowledge to answer the following questions.

(i) Name the part of the eye where the image is formed.

_____ [1]

(ii) Name the part of the eye that refracts light most.

_____ [1]

(iii) What does the term "refract" mean?

_____ [1]

(b) The type of lens found in the eye is a convex lens. Name the other type of lens and describe what it does to parallel rays of light.

Name _____

Description _____

_____ [2]

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(c) Tommy walks into the opticians and explains:

"when I hold a book close the words appear clear but when I hold it at arms length the words appear blurry"

(i) What common eyesight problem is Tommy suffering from?

_____ [1]

(ii) Suggest what is wrong with the lens in Tommy's eye that might cause this problem.

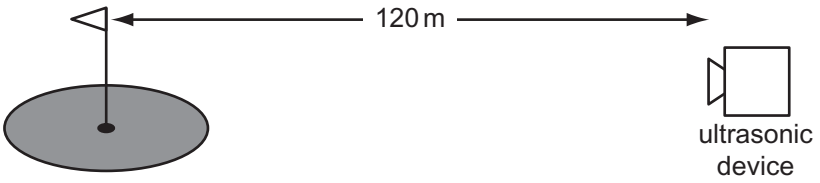
_____ [1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

5 The diagram below shows how a golfer can use an ultrasonic (ultrasound) device to measure the distance to the flag.



(a) The device shows a distance of 120 m and the return time for the signal was 0.8 s.

Use the equation:

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

to calculate the speed of sound in air.

(Show your working out.)

Answer _____ m/s [3]

(b) (i) Explain fully what is meant by the term "ultrasound".

_____

_____

_____ [2]

(ii) Apart from measuring distance give another use of ultrasound.

_____ [1]

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(c) Ultrasound is a longitudinal wave and light is an example of the other type of wave.

(i) Name this other **type** of wave.

_____ [1]

(ii) State **one** feature both light and sound waves have in common.

_____ [1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

6 The table below shows the cost per unit of generating electricity from some energy sources available in the UK.

Energy source	Building cost/p	Fuel cost/p	Running cost/p	Decommissioning cost/p	Total cost/p
Coal	1.1	1.5	0.3	0.1	3.0
Gas	0.4	2.5	0.5	0.1	3.5
Nuclear	1.5	0.5	0.5	2.5	5.0
Wind	4.2	none	0.9	0.2	5.3
Tidal	4.9	none	1.7	0.2	

(a) Calculate the total cost per unit of using **tidal** energy.

Answer _____ p [1]

(b) Use the information in the table to state two differences between the costs of using renewable sources compared to using non-renewable sources for electricity generation.

1. _____

_____

2. _____

_____ [2]

Nuclear power has the most expensive decommissioning cost.

(c) Describe fully what happens during decommissioning and suggest **one** reason why it is so expensive.

_____

_____

_____

_____

_____ [3]

(d) Apart from cost give **one** disadvantage of using tidal energy.

_____

_____ [1]

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Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Electricity, Waves and Communication

Module 5

Foundation Tier

[GSC51]

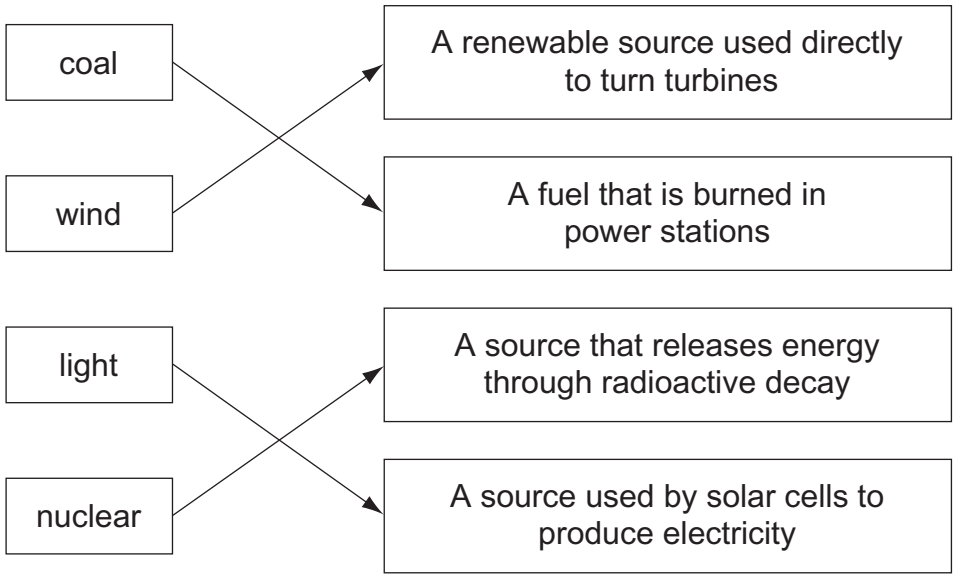
THURSDAY 24 MAY 2012
9.15 am–10.00 am

MARK SCHEME

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		AVAILABLE MARKS
1	**(a)** bulbs are brighter/one out, rest stay lit/bigger current flowing/easier to replace blown bulb/more bulbs could be lit/all have battery voltage (any 2 = 1 mark each) [2]	
	(b) **(i)** 6 V [1]	
	(ii) brighter/increase [1]	
	(iii) bigger current/bigger voltage/hotter bulbs/more power more energy (any 2 = 1 mark each) could blow *NOT* more electricity will fuse/blow up [2]	
	(c) **(i)** ammeter [1]	
	(ii) amp [1]	8

2 **(a)**



All lines correct = 3 marks
2/3 correct = 2 marks 1 correct = 1 mark [3]

(b) **(i)** 44 p [1]

(ii) from May 07 to Jan 08 [1]

(iii) will run out/cannot be replaced *NOT* can't be used again [1]

(iv) carbon dioxide/greenhouse gases/air pollution/sulphur dioxide causes global warming/greenhouse effect/acid rain
NOT wrong symbol [2] 8

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					AVAILABLE MARKS
3	**(a)**	**(i)**	6 × 3 [1] 18 [2]	[2]	
		(ii)	watt	[1]	
	(b)	**(i)**	cancer/tumour	[1]	
		(ii)	hold phone further away/loudspeaker/phone not under pillow hands free kit/text instead of calling/ reduce length of calls *NOT* use phone less	[1]	
	(c)	**(i)**	B	[1]	
		(ii)	(read) processed by computers/less interference/clearer/better quality *NOT* better signals/more accurate/more reliable/more information	[1]	7
4	**(a)**	**(i)**	retina	[1]	
		(ii)	cornea	[1]	
		(iii)	bend/change direction	[1]	
	(b)		concave diverges/spread rays out	[2]	
	(c)	**(i)**	short sight	[1]	
		(ii)	too thick/too converging/too strong	[1]	7
5	**(a)**		120/0.8 [1] 240/0.8 or 120/0.4 [2] 300 [3]	[3]	
	(b)	**(i)**	(sound with a) frequency [1] too high for humans to hear/above 20 kHz [1]	[2]	
		(ii)	scanning/fish finding/cleaning delicate equipment/lithotripsy/ map seabed/dog training/mosquito	[1]	
	(c)	**(i)**	transverse	[1]	
		(ii)	(caused by) vibrations/carry energy	[1]	8

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		AVAILABLE MARKS
6	**(a)** 6.8 p [1]	
	(b) renewables cost more to build/have cheaper fuel costs cost more to run/total cost is more (any 2 = 1 mark each) [2]	
	(c) power station is shut down/waste removed site restored to former state (any 2 = 1 mark each) expensive to get rid of waste waste is radioactive for a long time/concrete over/no radiation leaks [3]	
	(d) ruins habitats/eyesore = ugly/inhibits shipping lanes/not many suitable areas [1]	7
	Total	**45**

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	

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Examiner Only	
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 _____.

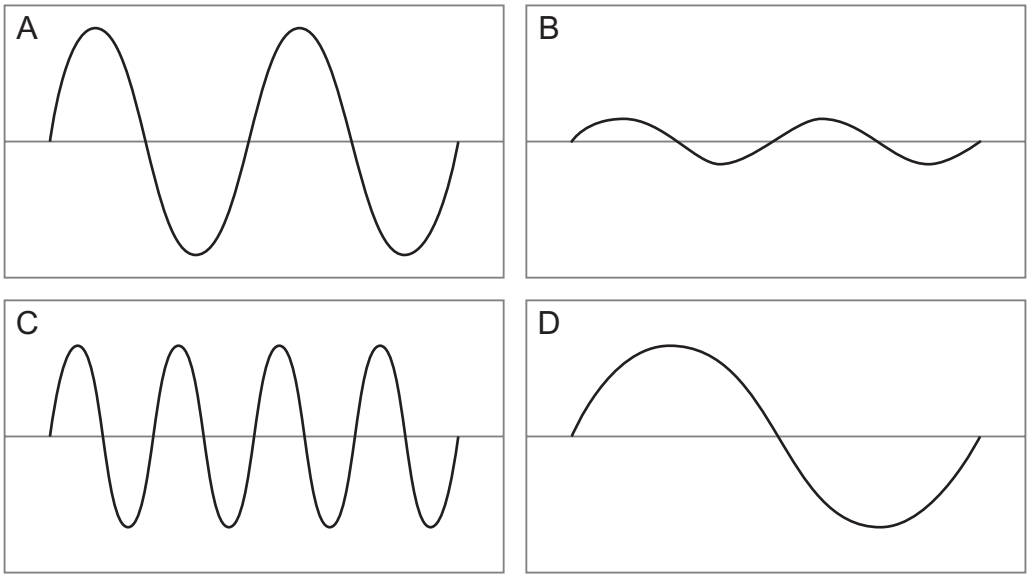
Waves carry _____ from one place to another.

There are two types of waves, transverse and

_____. [3]

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(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?

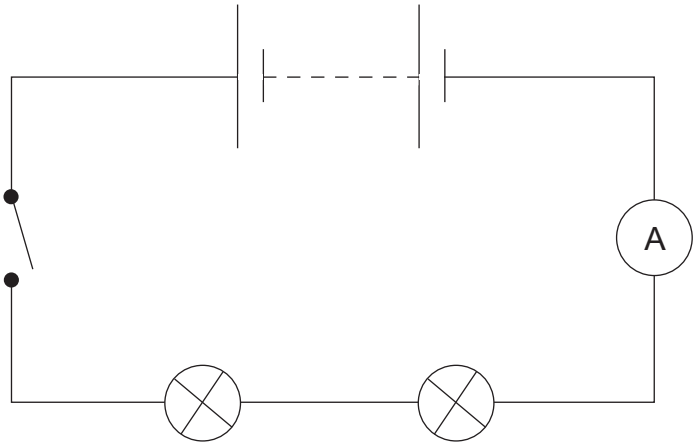
Answer _____ and _____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

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]

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

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

1. _____ [1]

2. _____ [1]

(ii) Name the unit of resistance.

Choose from:

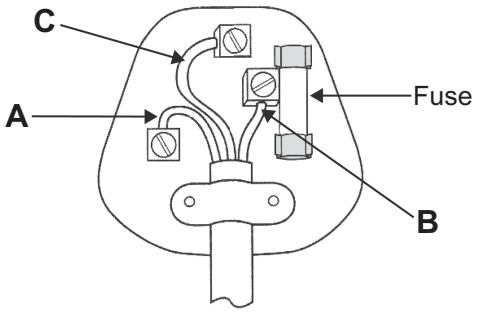
amp **ohm** **watt**

Answer _____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

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?

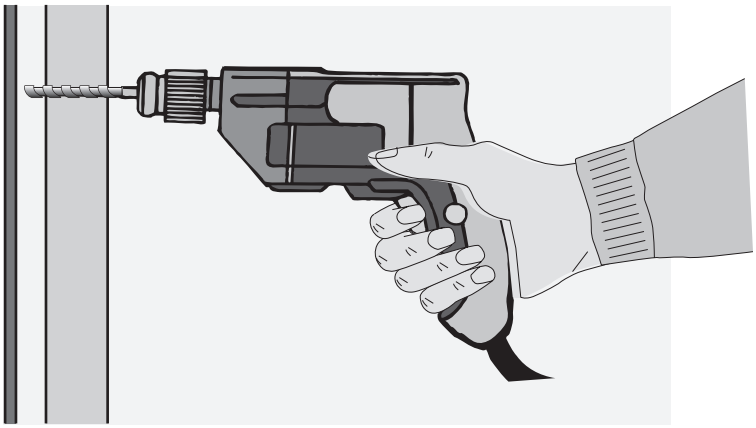
Choose from:

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

Answer _____ [1]

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



© GCSE Single Award Science for CCEA by T Laverty, J Napier & R White, page 199, published by Hodder Murray, 2006. ISBN 978 0340926000. 'Reproduced by permission of Hodder Education'.

Complete the following sentences.

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

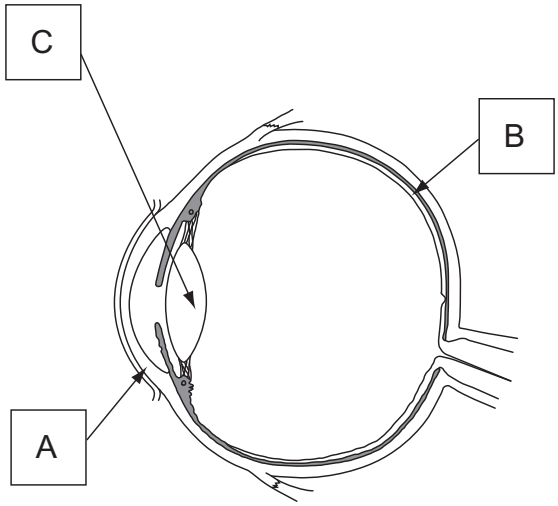
_____ wire. [1]

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

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

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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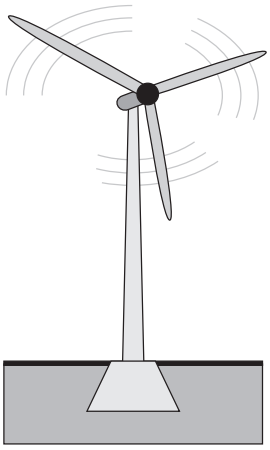
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(Questions continue overleaf)

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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).

_____

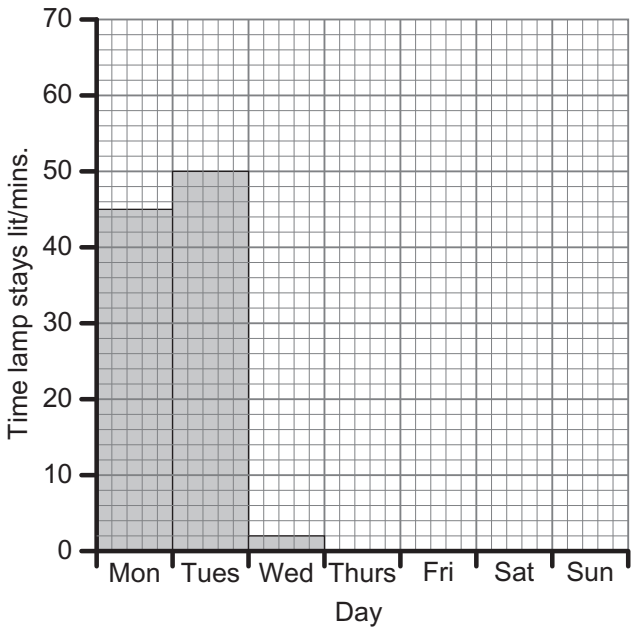
_____ [1]

(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

Marks	Remark

Examiner Only	
Marks	Remark

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]

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(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]

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Marks	Remark

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Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Electricity, Waves and Communication
Module 5

Foundation Tier

[GSC51]

WEDNESDAY 29 FEBRUARY 2012
9.30 am–10.15 am

MARK SCHEME

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				AVAILABLE MARKS
1	**(a)**	The wavelength is the length of one complete vibration The amplitude is the maximum height of a wave	[1] [1]	
	(b)	vibrations/energy/longitudinal = 1 mark each	[3]	
	(c)	**(i)** B	[1]	
		(ii) D	[1]	
		(iii) A and B	[1]	8
2	**(a)**	**(i)** correct symbol = 1 mark parallel with one bulb = 1 mark	[2]	
		(ii) bulbs will light no gaps in circuit/circuit is complete electric/energy/current will flow/ ammeter reading will rise (*any* 2 = 1 mark each)	[2]	
		(iii) series	[1]	
		(iv) 3 V	[1]	
	(b)	**(i)** kettle/hairdryer/grill/toaster/iron/straighteners (*any* 2 = 1 mark each)	[2]	
		(ii) ohm	[1]	9
3	**(a)**	**(i)** A = neutral [1] B = live [1]	[2]	
		(ii) yellow and green	[1]	
	(b)	**(i)** 2500/250 [1] 10 amps [2]	[2]	
		(ii) 13 A/c.m.	[1]	
	(c)	**(i)** earth wire	[1]	
		(ii) plastic/rubber	[1]	8
4	**(a)**	**(i)** A = cornea [1] B = retina [1]	[2]	
		(ii) convex/converging	[1]	
	(b)	long sight/short sight/astigmatism (*any* 2 = 1 mark each)	[2]	5

					AVAILABLE MARKS
5	**(a)**	**(i)**	timing how long the bulb stays lit or implied	[1]	
		(ii)	all the electricity is used up or implied	[1]	
		(iii)	not windy	[1]	
	(b)		all bars correct height = 2 marks 3/2 bars correct height = 1 mark	[2]	
	(c)	**(i)**	solar/hydroelectric/wave/geothermal/tidal	[1]	
		(ii)	fossil fuels non-renewable/will run out [1] less carbon dioxide/less air pollution/less acid rain less greenhouse gases [1] less greenhouse effect/less global warming [1]	[3]	9
6	**(a)**		light travels faster than sound	[1]	
	(b)		sound bounces off/reflects [1] hard surfaces/brick wall [1]	[2]	
	(c)		50/0.3 [1] 50/0.15 or 100/0.3 [2] 333 [3]	[3]	6
				Total	**45**

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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]

MONDAY 14 NOVEMBER 2011
1.30 pm–2.15 pm

GSC51

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	

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Examiner Only	
Marks	Remark

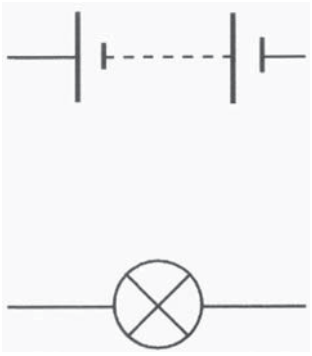
1 **(a)** Given below are the names of some electrical components and descriptions of what they do.

Using lines, match each component with its correct description.

Component	Description
Ammeter	Measures voltage
Voltmeter	Measures current
Battery	Changes electricity to light
Bulb	Changes chemical energy to electricity

[3]

(b) Some pupils wanted to find the resistance of a bulb. Part of their circuit is shown below.



(i) Complete the circuit by adding, in the correct places, the symbols for an ammeter and a voltmeter. [3]

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(ii) When the experiment was carried out it was found that the voltmeter reading was 5 V and the ammeter reading was 2 A.

Use the equation:

$$\textbf{resistance} = \frac{\textbf{voltage}}{\textbf{current}}$$

to calculate the resistance of the bulb.

Resistance = _____ [2]

(iii) Name the unit of resistance.

Choose from:

amp **ohm** **volt** **joule**

_____ [1]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

2 Energy sources can be classified as renewable or non-renewable.

(a) (i) What is meant by the term 'renewable'?

Choose from:

will run out : can be used again : will not run out

_____ [1]

(ii) Place the following energy sources in the correct column of the table.

coal hydroelectric solar

wind nuclear oil

Renewable	Non-renewable

[3]

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(b) Choose statements from the list to answer parts **(i)**, **(ii)** and **(iii)** below.

Examiner Only	
Marks	Remark

Does not produce greenhouse gases

River valleys are flooded

Produces nuclear waste

Noisy and ugly

Only works during the day

(i) Give an **advantage** of wind power.

_____ [1]

(ii) Give a **disadvantage** of nuclear power.

_____ [1]

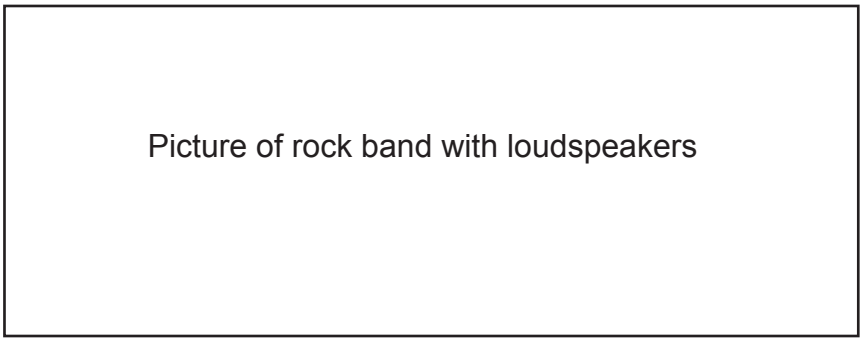
(iii) Give a **disadvantage** of solar power.

_____ [1]

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Examiner Only	
Marks	Remark

3 The picture below shows a concert with sound waves being produced by loudspeakers.



(a) **(i)** How do loudspeakers produce sound waves?

Choose from:

blow **vibrate** **flash** **spin**

_____ [1]

(ii) Which feature of a sound wave increases as the volume of the music gets louder?

Circle the correct answer.

wavelength **amplitude** **frequency** [1]

(iii) Apart from loudness, name one other factor that may af fect our hearing.

_____ [1]

(b) Humans can hear from 20 Hz to 20 kHz. What is the name given to sounds that are too high for human hearing?

_____ [1]

(c) Reflected sounds can cause problems in the concert hall.

(i) What do we call reflected sounds?

_____ [1]

(ii) Explain fully what is done to minimise reflected sounds.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

4 **(a)** The following information was sent to mobile phone users asking them to take part in a medical study.

> COSMOS is an international study on mobile phone use and possible long term effects on health. In the UK the research will be carried out by a university that will follow the health of 100,000 mobile phone users for 20 to 30 years.

(i) Suggest a long term effect on health caused by mobile phone use that the researchers might be interested in.

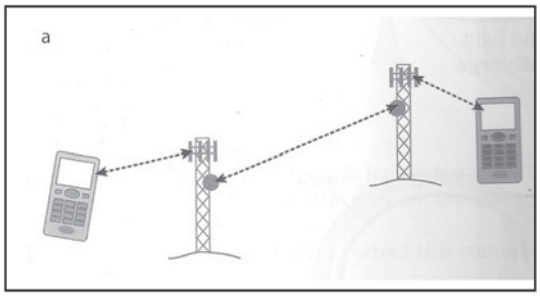
_____ [1]

(ii) State two features about the study that will give reliable results.

1. _____ [1]

2. _____ [1]

(b) Mobile phones work by sending signals to and from phone masts which boost the signal before passing it on.



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(i) Name the type of electromagnetic wave that carries these signals.

_____ [1]

(ii) What is the name given to the area around a phone mast?

_____ [1]

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(c) Telephone messages can be sent along copper wires or optical fibres.

(i) Name **one** type of electromagnetic wave that can travel through optical fibres.

_____ [1]

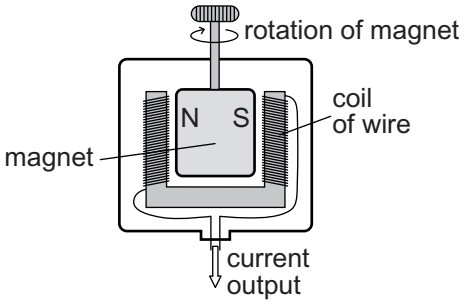
(ii) Suggest what flows through copper wire when used as a phone connection.

_____ [1]

Examiner Only	
Marks	Remark

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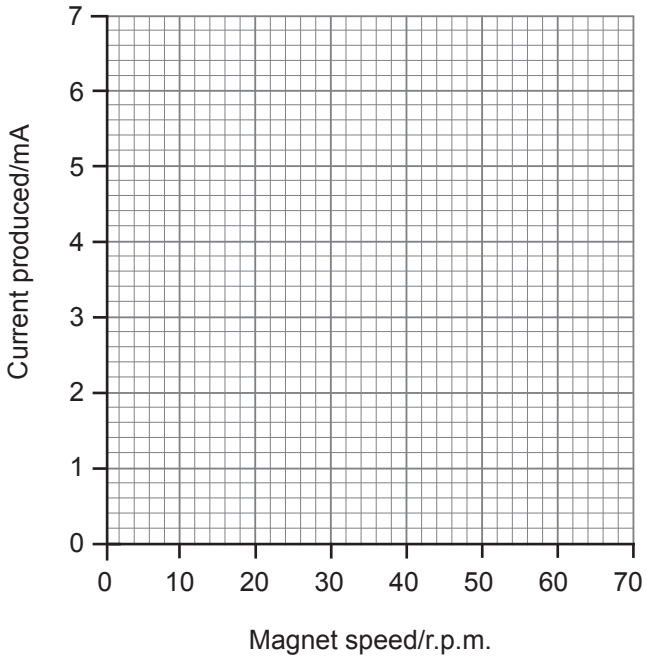
5 An investigation was carried out using a bicycle dynamo to find how the amount of current produced depends on the speed of rotation of a magnet.



The investigation results are given below.

Magnet speed/r.p.m.	Current produced/mA
	0
20	2.2
30	3.4
40	4.4
50	5
60	5
70	5

(a) Plot the points and draw a line graph on the grid below .



[3]

Examiner Only	
Marks	Remark
0	

(b) (i) State fully the conclusion that can be drawn from these results.

_____

_____ [2]

(ii) Suggest the effect on the amount of current produced if:

- a weaker magnet is used.

_____ [1]

- more coils of wire are used.

_____ [1]

(c) Forty years ago bicycles were fitted with dynamo powered lights similar to the one used in this investigation.

Suggest and explain why battery powered lights replaced dynamo powered lights.

_____

_____

_____ [2]

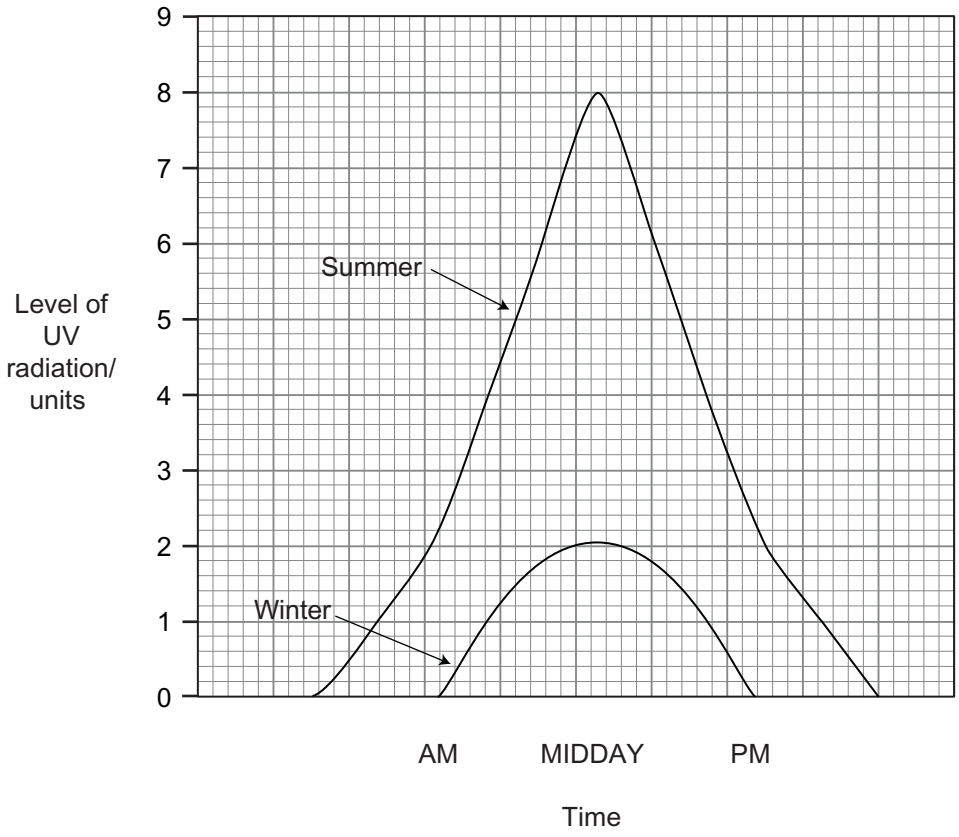
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Marks	Remark

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Examiner Only	
Marks	Remark

6 The graph below shows how the level of ultraviolet (UV) radiation changed during typical summer and winter days.
Skin needs protection above 3 units of UV.



(a) Use the information to suggest why sunscreen (sun protection) sales are greater in summer.

_____

_____ [1]

Examiner Only	
Marks	Remark

(b) UV radiation is just one part of the electromagnetic spectrum and all electromagnetic waves are transverse waves.

(i) Describe fully the movement of the particles in a transverse wave.

_____

_____

_____ [2]

(ii) Apart from being transverse waves state **two** features that all electromagnetic waves have in common.

_____

_____

_____ [2]

(iii) Apart from transverse waves name another type of wave.

_____ [1]

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Rewarding Learning

General Certificate of Secondary Education
2011–2012

Science: Single Award (Modular)

Electricity, Waves and Communication

Module 5

Foundation Tier

[GSC51]

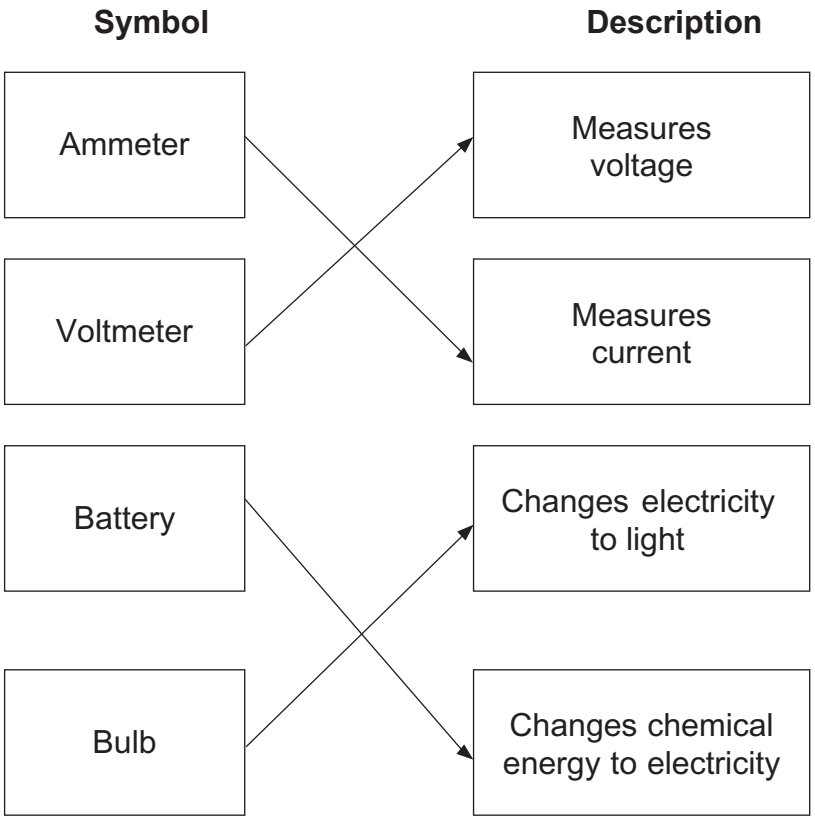
MONDAY 14 NOVEMBER 2011
1.30 pm–2.15 pm

MARK SCHEME

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AVAILABLE MARKS

1 (a)



All correct = [3]
3/2 correct = [2] 1 correct = [1] [3]

(b) (i) correct symbols [1] ammeter in series [1]
voltmeter in parallel [1]
deduct 1; for reversed symbols/incomplete circuit

(ii) 5/2 = [1] 2.5 = [2] [2]

(iii) ohm or symbol [1] 9

2 (a) (i) will not run out [1]

(ii)

Renewable	Non-renewable
hydroelectric	Coal
solar	Nuclear
wind	Oil

$\frac{1}{2}$ mark each round down [3]

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					AVAILABLE MARKS
	(b)	**(i)**	Does not produce greenhouse gases	[1]	
		(ii)	Produces nuclear waste	[1]	
		(iii)	Only works during the day	[1]	7
3	**(a)**	**(i)**	vibrate	[1]	
		(ii)	amplitude	[1]	
		(iii)	age	[1]	
	(b)		ultrasound	[1]	
	(c)	**(i)**	echo	[1]	
		(ii)	soft materials = [1] or named absorb/take in sound [1]		7
4	**(a)**	**(i)**	cancer/tumour/damage brain cells	[1]	
		(ii)	100,000 users/lots of users [1] 20 to 30 years/long period of time [1]		
	(b)	**(i)**	microwaves	[1]	
		(ii)	cell	[1]	
	(c)	**(i)**	infra red/visible light	[1]	
		(ii)	electricity/current/electrons	[1]	7
5	**(a)**		all points correct [2] 6/5 points correct [1] correct line [1]	[3]	
	(b)	**(i)**	**increasing magnet speed** gives more current [1] up to a maximum current [1]		
		(ii)	1. less current 2. more current	[1] [1]	
	(c)		produce light even when stopped/go fast for bright light (up hill) slow dim light safer/or implied	[1] [1]	9

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		AVAILABLE MARKS
6	**(a)** In summer UV level is above 3 or implied [1]	
	(b) **(i)** particles **vibrate** at right angles/particles move up and down [1] to the direction of wave travel [1]	
	(ii) Any **two** from: all carry energy/can travel through a vacuum/same speed in vacuum/speed of light [2]	
	(iii) longitudinal [1]	6
	Total	**45**

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Electricity, Waves and Communication

Module 5

Foundation Tier

[GSC51]

GSC51

FRIDAY 20 MAY 2011, MORNING

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	

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Examiner Only	
Marks	Remark

1 The picture below shows a dentist's surgery.



© *iStockphoto / Thinkstock*

(a) (i) Name the type of wave the dentist sees reflected by a mirror when looking at teeth.

Choose from:

infra-red **visible light** **gamma rays**

_____ [1]

(ii) Complete the following sentence.

Choose from:

ultraviolet **microwaves** **X-rays**

Dentists can take pictures of jaw bones using _____ . [1]

(iii) Name the spectrum of waves that includes all those named in parts **(i)** and **(ii)** above.

Choose from:

electromagnetic **electric** **magnetic**

_____ [1]

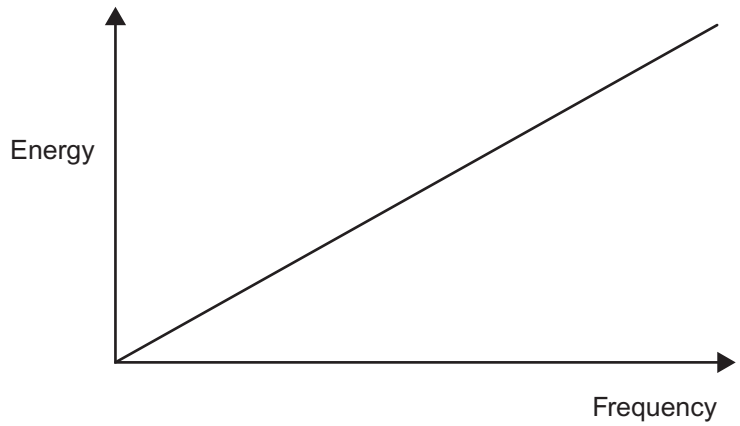
Examiner Only	
Marks	Remark

(b) The dentist can use ultrasound to clean teeth.
Which **two** of the following statements are true?

1. Ultrasound is sound too high for humans to hear
2. Ultrasound has a frequency below 20 000 Hz
3. Ultrasound scanning is more dangerous than X-rays
4. Ultrasound is sound that humans can hear
5. Ultrasound has a frequency above 20 kHz

_____ and _____ [2]

(c) The graph below shows the relationship between the energy and frequency of waves.



(i) Which statement below describes the relationship between frequency and energy?

Circle the correct answer.

The lower the frequency of a wave, the more energy it has.

The higher the frequency of a wave, the more energy it has.

The higher the frequency of a wave, the less energy it has. [1]

(ii) What are the units of frequency?

Choose from:

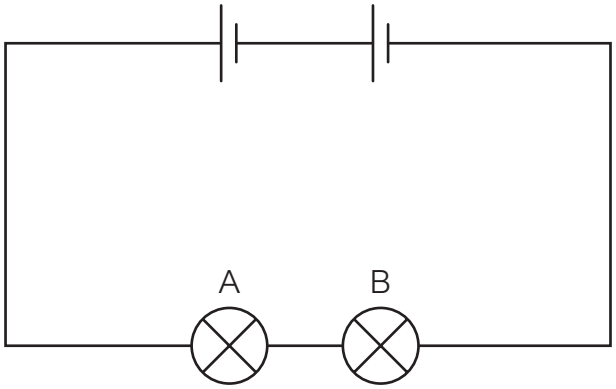
metres **hertz** **metres per second**

_____ [1]

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Examiner Only	
Marks	Remark

2 **(a)** The circuit diagram below shows two identical bulbs (A and B) connected in series.



(i) Using the correct symbol show how a voltmeter is added to the circuit to measure the voltage across bulb A. [2]

(ii) Describe what will happen to the bulbs if extra batteries are added to the circuit and give a reason.

_____

_____ [2]

(iii) If one of the bulbs (A or B) goes out, describe and explain what happens to the other bulb.

_____

_____ [2]

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(b) The batteries supply 6 V and the current flowing is found to be 2 A.

Use the equation:

$$\textbf{resistance} = \frac{\textbf{voltage}}{\textbf{current}}$$

to calculate resistance.

resistance = _____ Ω [2]

(c) Resistance wire is used in fuses. What happens when too much current flows through a fuse?

_____ [1]

(d) Apart from the fuse, name two other safety features of a 3-pin plug.

1. _____ [1]

2. _____ [1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

3 **(a)** The picture below shows a mobile phone charger.



© iStockphoto / Thinkstock

(i) When the charger is being used it supplies a voltage of 5 V and a current of 2 A to the phone.

Use the equation:

power = voltage × current

to calculate the power supplied to the phone.

power = _____ [2]

(ii) What is the unit of power?

Choose from:

joule **ohm** **watt**

_____ [1]

(b) Mobile phones use microwaves to transmit signals.

(i) Name a possible health risk associated with the use of microwaves in mobile phones.

_____ [1]

(ii) Suggest two ways to reduce this health risk.

1. _____ [1]

2. _____ [1]

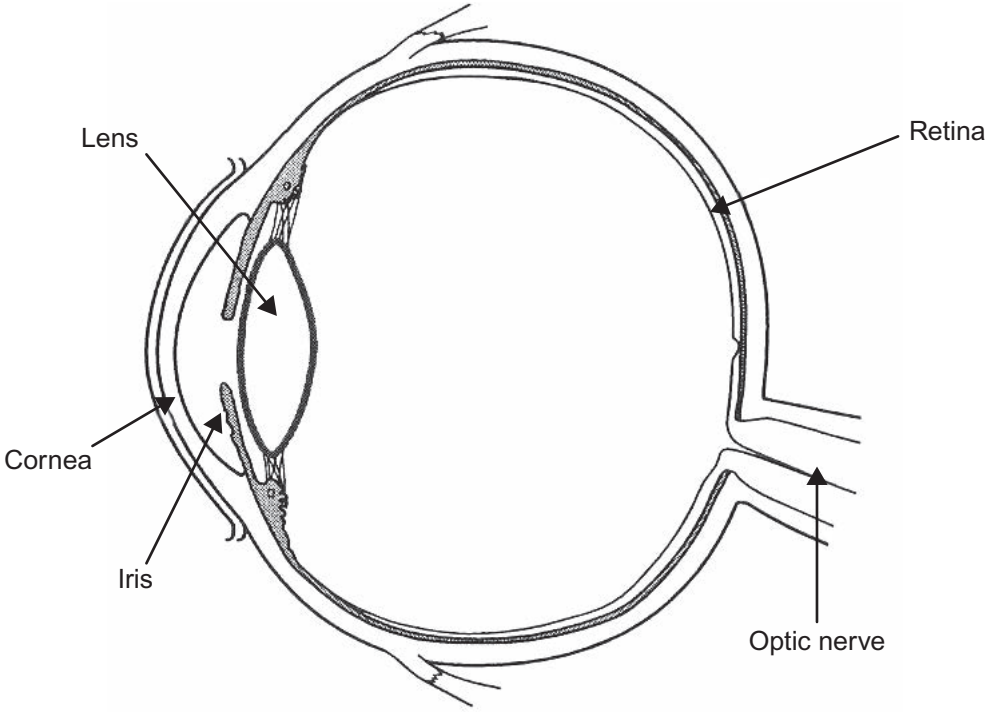
(c) Mobile phones can use digital and analogue signals. Give **one** advantage of using digital signals.

_____

_____ [1]

Examiner Only	
Marks	Remark

4 The diagram below shows parts of the eye.



(a) (i) Name the type of lens found in the eye.

_____ [1]

(ii) Explain fully the function of the eye lens.

_____

_____ [2]

(b) (i) Name the common eyesight problem caused by the lens being too strong.

_____ [1]

(ii) Suggest how this problem could affect a person's vision.

_____

_____ [1]

Examiner Only

Marks	Remark

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(Questions continue overleaf)

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Examiner Only	
Marks	Remark

5 The picture below shows a wave produced on a slinky spring.



(a) (i) Name the type of wave shown.

_____ [1]

(ii) Waves are caused by vibrations. In what direction do the vibrations occur as this wave travels from left to right?

Choose from:

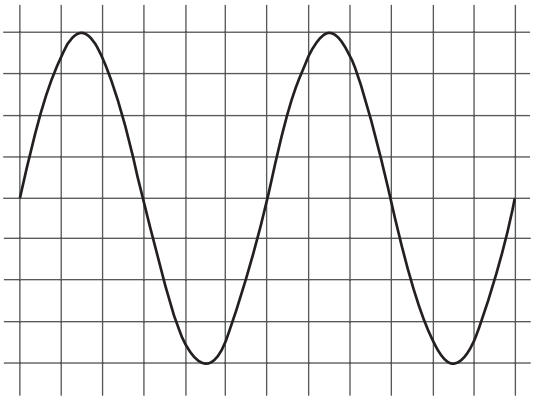
The vibrations are in the same direction as the wave

The vibrations are at right angles to the direction of the wave

The vibrations are in the opposite direction to the wave

_____ [1]

(b) The diagram below represents a sound wave.



1 square = 1 cm

(i) What is the amplitude of the wave shown above?

_____ [1]

(ii) What is the wavelength of the wave shown above?

_____ [1]

Examiner Only	
Marks	Remark

(c) The picture below shows two pupils experimenting to find the speed of sound in air.



(i) Describe a method that pupils could use.

_____

_____

_____

_____

_____ [3]

(ii) How can the pupils ensure that their results are:

accurate? _____

_____ [1]

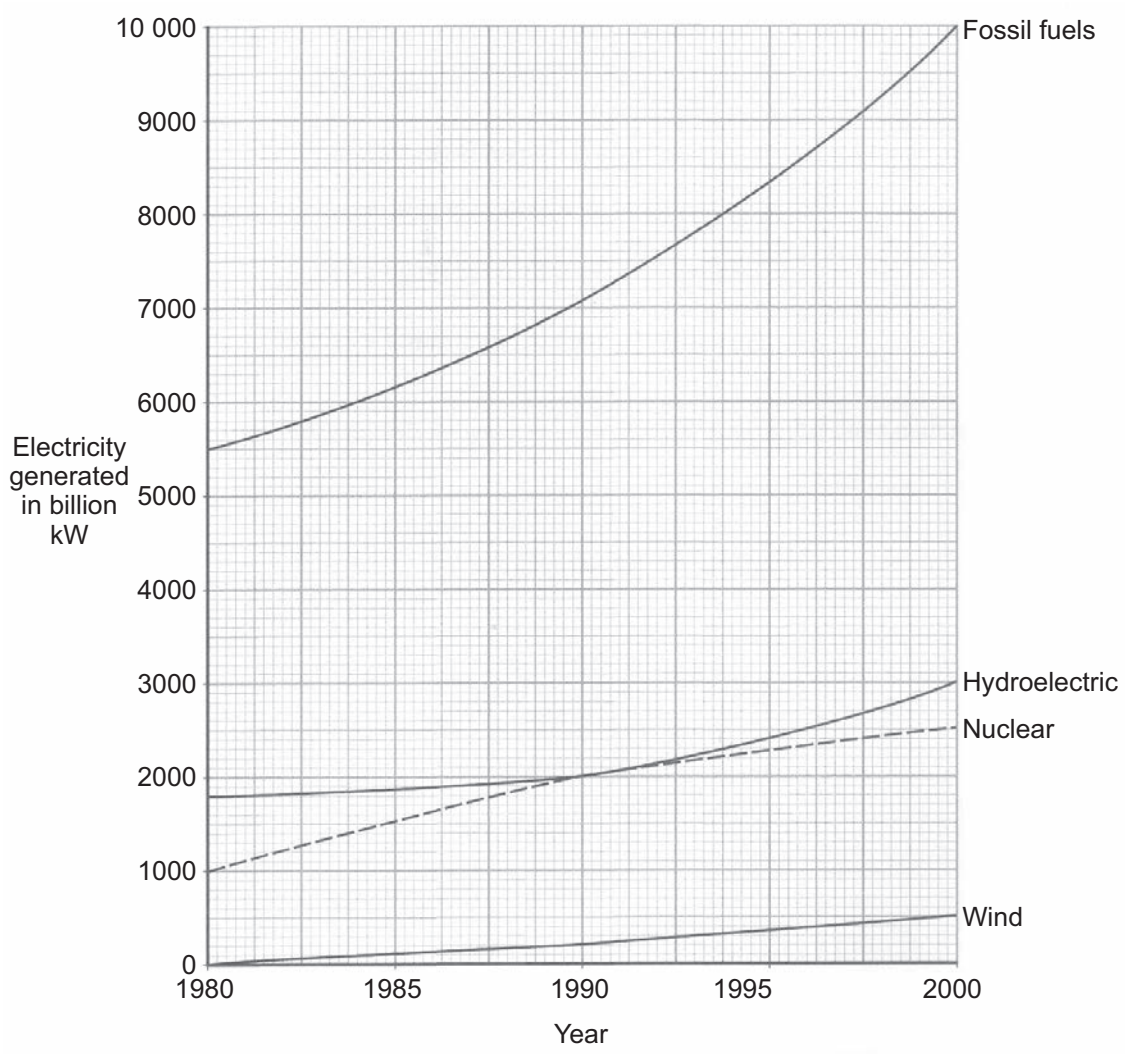
reliable? _____

_____ [1]

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Examiner Only	
Marks	Remark

6 The graph below shows how much electricity was generated worldwide from four different energy sources between 1980 and 2000.



(a) Calculate the increase in generation from fossil fuels during this 20 year period.

_____ billion kW [1]

(b) Suggest **two** reasons why the increase in the use of renewables has not been as dramatic as with fossil fuels. (Your answer must state which renewable source you are referring to.)

_____

_____

_____ [2]

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(c) In the year 2030 the amount of electricity generated from nuclear power is expected to be 5 times what it was in 2000.

(i) Calculate how much electricity could be generated from nuclear power in 2030.

_____ billion kW [1]

(ii) Explain fully why using nuclear power instead of fossil fuels is better for the environment.

_____

_____

_____ [2]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Electricity, Waves and Communication

Module 5

Foundation Tier

[GSC51]

FRIDAY 20 MAY 2011, MORNING

MARK SCHEME

STEMUP.CO.UK

					AVAILABLE MARKS
1	**(a)**	**(i)**	visible light	[1]	
		(ii)	x-rays	[1]	
		(iii)	electromagnetic	[1]	
	(b)		1 + 5 ([1] each)	[2]	
	(c)	**(i)**	The higher the frequency of a wave, the more energy it has.	[1]	
		(ii)	hertz	[1]	7
2	**(a)**	**(i)**	correct symbol = [1] in parallel across A = [1]	[2]	
		(ii)	brighter/hotter = [1] + more $\begin{matrix}\text{electricity/current}\\ \text{volts/voltage}\\ \text{power/energy}\end{matrix}$ = [1]	[2]	
		(iii)	other bulb goes out = [1] gap in circuit/current doesn't flow = [1]	[2]	
	(b)		$\frac{6}{2}$ = [1] 3 = [2]	[2]	
	(c)		wire melts/breaks/blows/burns out/current cut off	[1]	
	(d)		cable grip/plastic insulated cover/earth pin *longer* **not** plastic cover on wire (x) any 2	[2]	11
3	**(a)**	**(i)**	5 × 2 = [1] 10 = [2]	[2]	
		(ii)	watt	[1]	
	(b)	**(i)**	cancer/tumour	[1]	
		(ii)	speaker phone/text/hands free/hold further away [1] shorter time for call [1] use less often (x)	[2]	
	(c)		less interference/processed by computer clearer/(signal)	[1]	7
4	**(a)**	**(i)**	convex/converging	[1]	
		(ii)	to converge/bend/refract light = [1] to form a focus clear image on the retina = [1]	[2]	
	(b)	**(i)**	short sight	[1]	
		(ii)	far objects are blurry; near objects are clearer	[1]	5

					AVAILABLE MARKS
5	**(a)**	**(i)**	transverse	[1]	
		(ii)	The vibrations are at right angles to the direction of the wave.	[1]	
	(b)	**(i)**	4 cm	[1]	
		(ii)	6 cm	[1]	
	(c)	**(i)**	see – hear appropriate timing large distance formula } any three	[3]	
		(ii)	accurate: ensure time started when blocks banged; stopwatch/ same person increased distances = [1] reliable: repeat/average = [1]	[2]	9
6	**(a)**		4500	[1]	
	(b)		wind; less amount of land; electricity produced; intermittent/unreliable hydroelectric – lack of sites/cost/flooding	[2]	
	(c)	**(i)**	12 500	[1]	
		(ii)	no/less greenhouse gases/carbon dioxide/air pollution/ [1] no/less global warming/	[2]	6
			or less sulphur dioxide/carbon dioxide [1] less acid rain [1]		
			Total		**45**

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Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Electricity, Waves and Communication Module 5

Foundation Tier

[GSC51]

GSC51

THURSDAY 24 FEBRUARY 2011, MORNING

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

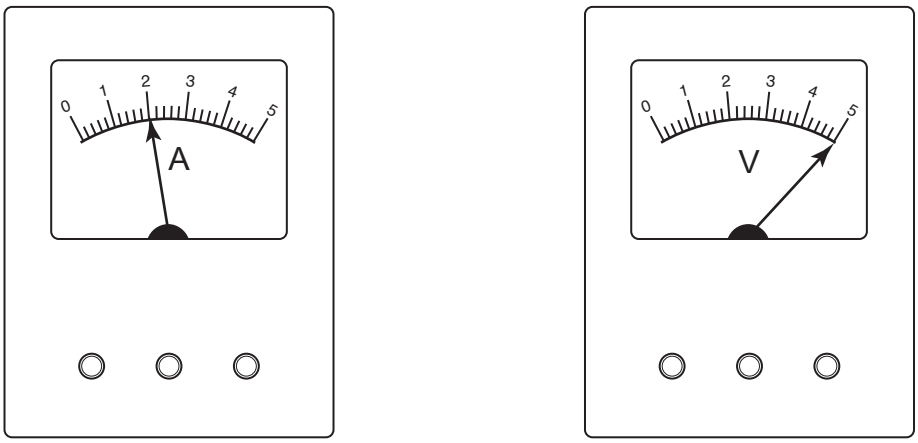
The total mark for this paper is 45.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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

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Examiner Only	
Marks	Remark

1 The diagrams below show two different electrical meters (A and B).



A **B**

(a) For each meter (**A** and **B**) state the type of meter and the reading shown on it.

(i) Meter A

Type _____ [1]

Reading _____ A [1]

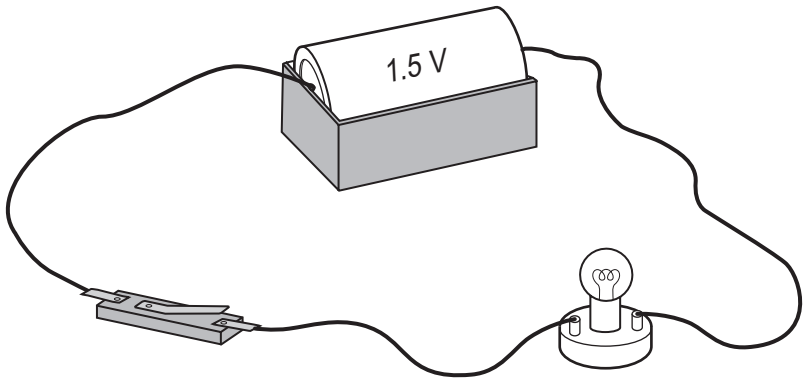
(ii) Meter B

Type _____ [1]

Reading _____ V [1]

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(b) Shown below is a simple electric circuit.



(i) Complete the following sentence.

Choose from:

parallel **series** **short**

The circuit shown above is a _____ circuit. [1]

(ii) Using the correct symbols draw the diagram for this electrical circuit.

[3]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

2 **(a)** Below are features of waves and their descriptions. Using lines, match each feature with the correct description.

Feature	Description
Amplitude	Length of one complete wave
Wavelength	The height of a wave
Frequency	A reflected sound wave
	Number of vibrations per second

[3]

(b) Complete the following sentences.

Choose from:

audible **ultrasound** **noise** **frequency**

Humans can hear sounds with a _____ between

20 Hz and 20 kHz. This is called the _____ range.

Unwanted sound or sound that is too loud is called _____ .

[3]

(c) Give two factors which can affect our hearing.

1. _____

2. _____ [2]

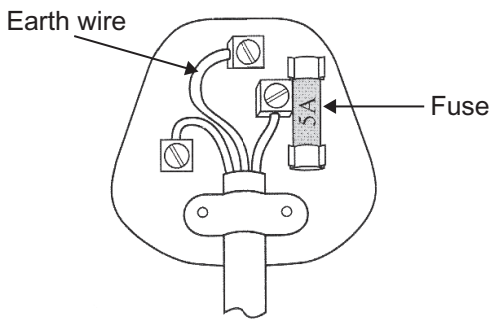
(d) Suggest **one** way we can protect ourselves against hearing damage.

_____ [1]

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3 The diagram below shows a plug used on an electrical appliance.

Examiner Only	
Marks	Remark



(a) Why has an earth wire been connected?

Choose from:

gives more power : for double insulation : for safety

_____ [1]

(b) Which of the following statements about fuses is **not** true?

A fuse breaks the circuit when there is a fault.
A fuse should be connected to the earth wire.
A fuse melts if the current becomes too high.

_____ [1]

(c) The plug has a 5 A fuse but the appliance uses a maximum of 6 A in normal use. Complete the following sentence.

Choose from:

too high : correct : too small

The value of the fuse is _____ [1]

(d) Complete the table to give the missing name and colour of the wires inside the plug.

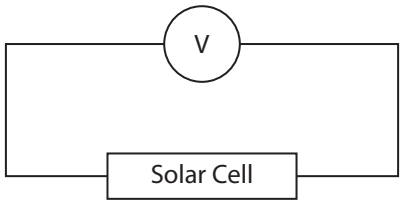
Name	Colour
Earth	Green + Yellow
Neutral	
	Brown

[2]

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Examiner Only	
Marks	Remark

4 **(a)** To investigate the electricity produced by a solar cell pupils set up the following circuit.

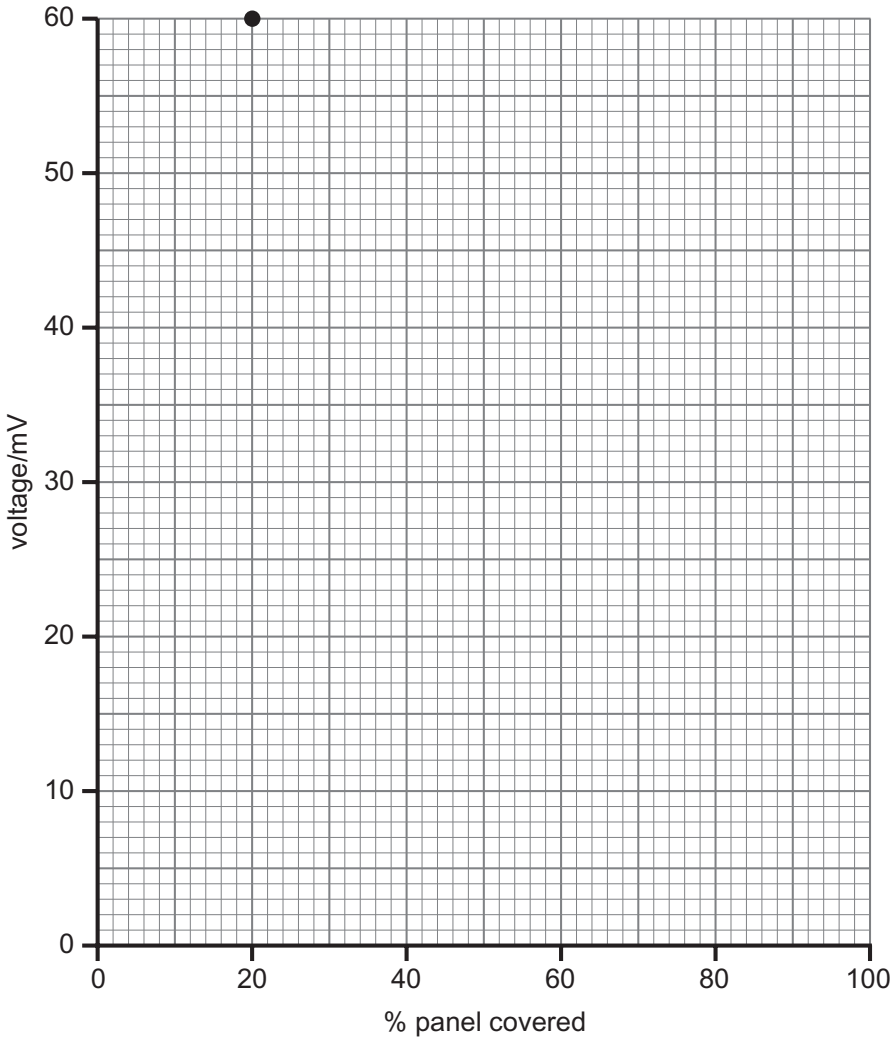


The circuit was taken outside and different percentages of the solar cell were covered in black paper.

The voltage was then recorded. The results are given below.

% panel covered	voltage/mV
20	60
40	45
60	30
80	15
100	0

(i) Complete the graph for these results on the grid below.



[2]

(ii) State a conclusion from this investigation.

_____

_____ [1]

(iii) When this experiment was carried out the next day by the same people using the same equipment a different set of results were found.
Explain fully what might have caused the results to be different.

_____

_____

_____ [2]

(b) Visible light is one part of the electromagnetic spectrum.

(i) Name another wave type from the electromagnetic spectrum.

_____ [1]

(ii) State **one** feature all electromagnetic waves have in common.

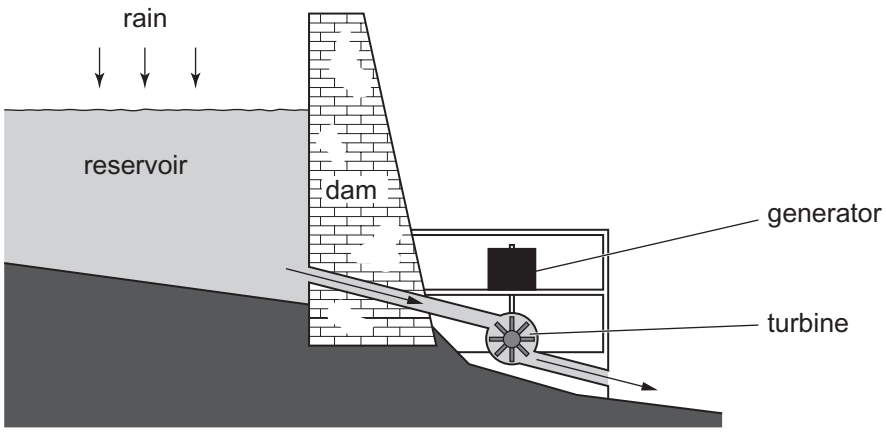
_____ [1]

Examiner Only	
Marks	Remark

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Examiner Only	
Marks	Remark

5 The diagram below shows a hydroelectric power station.



© CCEA GCSE Single Award Science Foundation Tier by A McFarland, C Murphy & J Napier, page 107, published by Hodder Education, 2009. ISBN 9780340974728. "Reproduced by permission of Hodder Education".

(a) (i) Hydroelectric power is a renewable energy source.

Use the diagram and your knowledge to explain fully why hydroelectric power is a renewable energy source.

_____

_____

_____ [2]

(ii) Suggest **one** reason why hydroelectric power stations are usually built in mountainous areas.

_____ [1]

(iii) Name **two** other renewable energy sources.

_____ and _____ [1]

(b) Describe and explain **one** environmental disadvantage of using hydroelectric power stations.

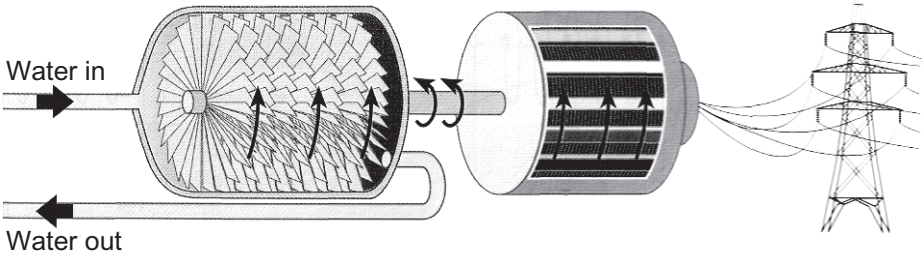
_____

_____

_____ [2]

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(c) The diagram below shows the operation of a turbine and generator.



© GCSE Single Award Science for CCEA by T Laverty, J Napier & R White, page 204, published by Hodder Education, 2006, ISBN 9780340926000. "Reproduced by permission of Hodder Education".

Explain fully how the turbine and generator produce electricity.

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

6 **(a)** The pictures below show a bathroom and a bedroom.



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© istockphoto/Thinkstock

Suggest why your voice will sound more powerful in the bathroom rather than the bedroom.

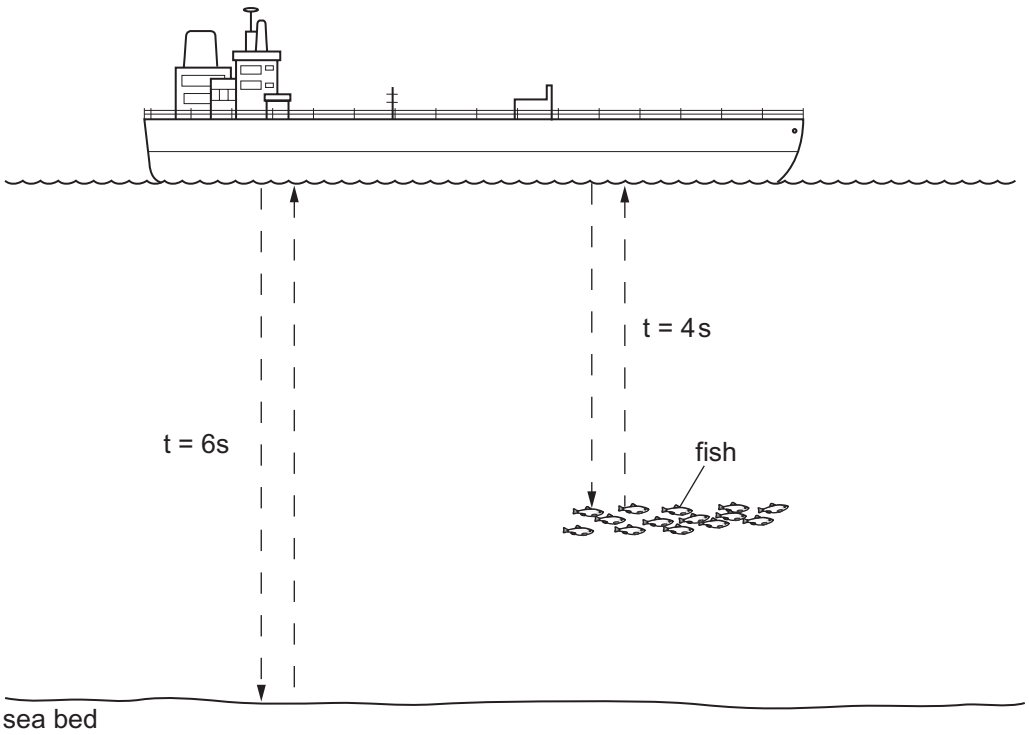
_____

_____

_____

_____ [3]

(b) Ultrasound can be used for both depth measurement and locating fish as shown in the diagram below.



The times shown on the diagram are the **return times** for the ultrasound and the speed of sound in water is 1500 m/s.

Use the equation:

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

to calculate the height of the fish above the sea bed.

Answer _____ m [4]

Examiner Only	
Marks	Remark

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Electricity, Waves and Communication
Module 5

Foundation Tier

[GSC51]

THURSDAY 24 FEBRUARY 2011, MORNING

MARK SCHEME

STEMUP.CO.UK

					AVAILABLE MARKS
1	**(a)**	**(i)**	ammeter **not** units/ampmeter	[1]	
			2A	[1]	
		(ii)	voltmeter	[1]	
			5 V	[1]	
	(b)	**(i)**	series	[1]	
		(ii)	correct symbols for battery/bulb/switch = [2] for all three **complete** circuit = [1] 2 symbols = [1]	[3]	8
2	**(a)**		[1] for each correct line	[3]	
	(b)		frequency/audible/noise ([1] each)	[3]	
	(c)		age/loud noise/job (any **two** = [1] each)	[2]	
	(d)		earplugs/earmuffs/no loud sounds/ear defenders	[1]	9
3	**(a)**		for safety	[1]	
	(b)		a fuse should be connected to the earth wire	[1]	
	(c)		too small	[1]	
	(d)			[2]	

Name	Colour
	blue
live	

5

					AVAILABLE MARKS
4	**(a)**	**(i)**	4 points correct = [2], 3/2 points = [1]	[2]	
		(ii)	increase % covered causes a decrease in voltage/electricity (**or** vice versa)	[1]	
		(iii)	different amounts of sunlight = [1] time of day/weather/clouds/rain = [1]	[2]	
	(b)	**(i)**	radio/X-rays/microwaves/UV/infra-red (I.R.)/gamma	[1]	
		(ii)	travel at same speed/speed of light/carry energy/ transverse waves/travel in vacuum (any **one**)	[1]	7
5	**(a)**	**(i)**	will not run out/refilled by rain/always be rain	[2]	
		(ii)	more rain in mountains; faster/better fall for water; v-shaped valley	[1]	
		(iii)	wind/waves/solar/sun/biomass (any **two**)	[1]	
	(b)		flooding/damages habitats	[2]	
	(c)		water in turns the blades of turbine [1] a magnet [1] a coil of wire [1] (any **three** = [1] each)	[3]	9
6	**(a)**		implied hard surfaces in bathroom/implied soft in bedroom = [1] reflectors absorbers = [1] echoes = [1]	[3]	
	(b)		6 – 4 = 2 s [1] 1500 = d/2 / d = 1500 × 2 [2] Divide time or speed by 2 [1] 1500 × 4 } 1 1500 × 6 } d = 1500 m = [4]	[4]	7
				Total	**45**

STEMUP.CO.UK

Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Electricity, Waves and Communication

Module 5

Foundation Tier

[GSC51]

GSC51

THURSDAY 11 NOVEMBER 2010, AFTERNOON

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

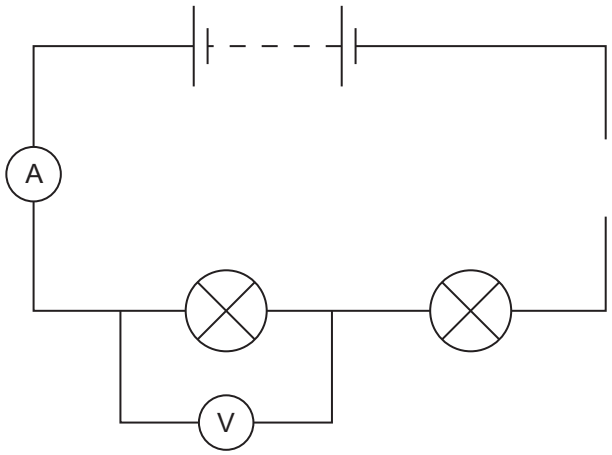
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For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
Total Marks	

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Examiner Only	
Marks	Remark

1 **(a)** Shown below is an electrical circuit with a fault.



(i) Complete the following sentences.

Choose from:

ammeter **parallel** **volts**

amps **series** **voltmeter**

The symbol —(V)— represents a _____

and is connected in _____ in the circuit above.

It measures voltage in units called _____.

In this circuit the bulbs are connected in _____. [4]

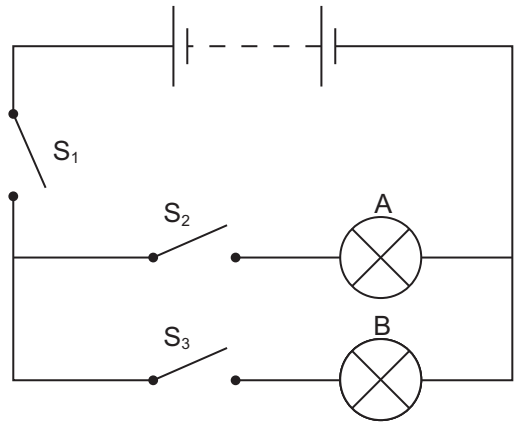
(ii) Explain why the bulbs would not light in the circuit shown above.

_____

_____ [2]

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(b) The circuit below contains two identical bulbs (A and B).



(i) Which switches (S_1, S_2 or S_3) should be closed so that **only** bulb B will be lit?

_____ and _____ [1]

(ii) If switch S_1 is closed and S_2 and S_3 are open, which bulb(s), if any, will be lit?

Choose from:

Bulb A : Bulb B : Both Bulbs A and B : None

_____ [1]

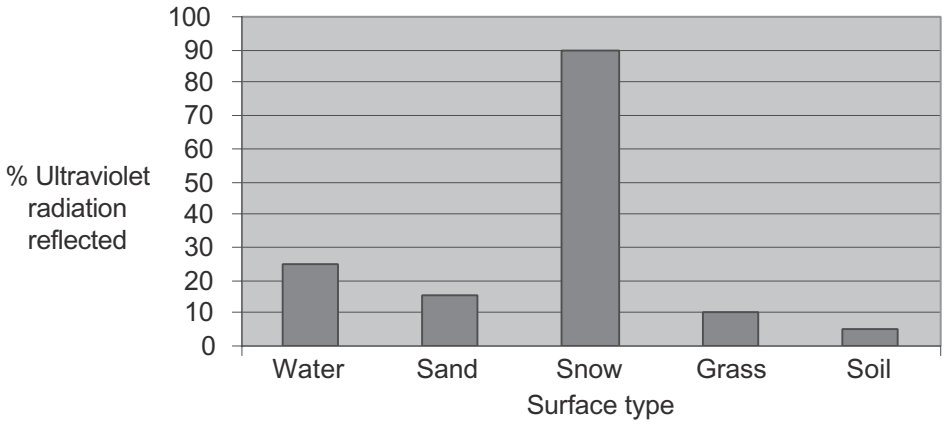
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

2 **(a)** The percentage of ultraviolet radiation **reflected** by different surfaces is shown in the bar chart below.



(i) Which sportsperson will be exposed to the most reflected ultraviolet radiation?

Circle the correct answer.

golfer **skier** **swimmer**

[1]

(ii) Name the disease caused by too much exposure to ultraviolet radiation.

_____ [1]

(iii) Suggest **one** way that sportspeople can protect themselves from ultraviolet radiation.

_____

_____ [1]

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Examiner Only	
Marks	Remark

(b) (i) Given below are types of electromagnetic radiation and some uses. Using lines link each type to **one** common use.

Type	Use
Gamma rays	Cancer treatment
	Remote controls
Visible light	
	Cooking
Microwaves	Photography

[3]

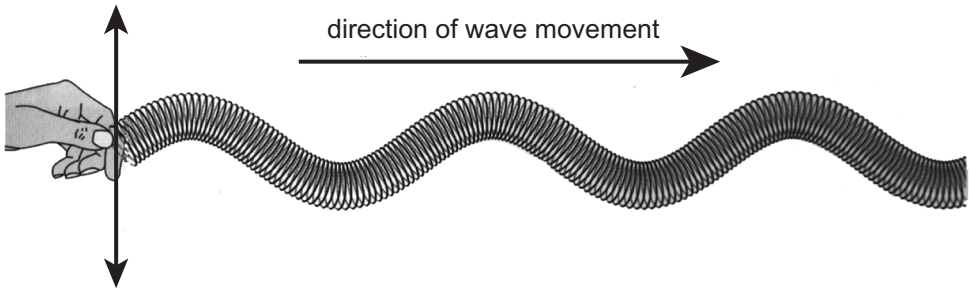
(ii) Name a type of electromagnetic radiation used in mobile phone communications.

_____ [1]

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Examiner Only	
Marks	Remark

3 **(a)** The diagram below represents a wave. It is made by moving a slinky spring up and down as shown.



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(i) What name is given to this type of wave?

_____ [1]

(ii) Complete the following sentence.

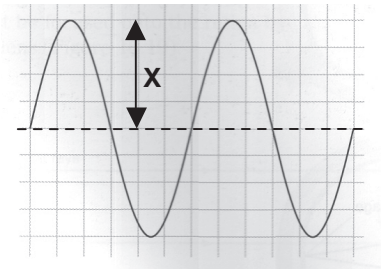
Choose from:

energy **reflections** **pictures** **vibrations**

All waves are caused by _____ and they carry

_____ from one place to another. [2]

(iii) What name is given to the height labelled **X** shown on the wave below?

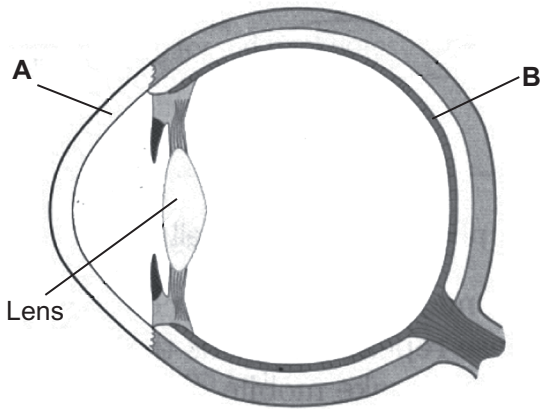


Choose from:

wavelength **amplitude** **frequency**

_____ [1]

(b) The diagram below shows the human eye.



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

Choose from:

iris **retina** **cornea** **pupil**

A _____ [1]

B _____ [1]

(ii) Name the type of lens found in the human eye.

_____ [1]

(iii) Lenses refract light. What does the term **refract** mean?

_____ [1]

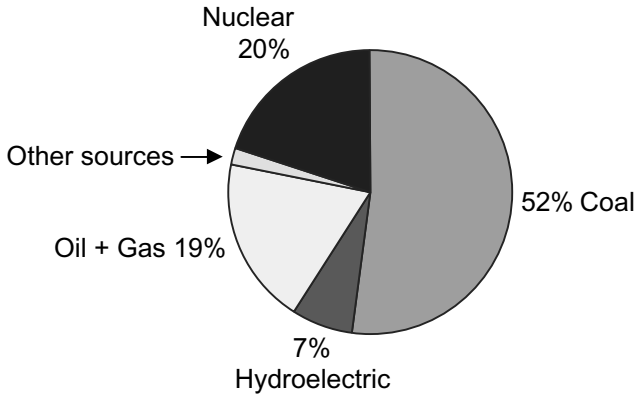
Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

4 The pie chart below shows the percentage of electricity generated from various energy sources.



(a) **(i)** Calculate the percentage of electricity produced from other sources.

Show your working out.

Answer _____% [2]

(ii) Apart from hydroelectric, name one other renewable source.

_____ [1]

(iii) Explain the meaning of the term **renewable source**.

_____ [1]

(iv) Give **one** environmental advantage to using renewable sources.

_____ [1]

(b) The cost of lighting an average house is £150 each year.
Give two ways that the cost of lighting could be reduced.

1. _____ [1]

2. _____ [1]

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Examiner Only	
Marks	Remark

5 **(a)** A charity wanted to build a water pump in a remote desert area of Africa. They had the choice of a petrol generated or solar powered pump. Explain fully why they considered the solar powered pump the better choice.

_____

_____

_____

_____

_____ [3]

(b) The water pump has a power rating of 1 kW and a voltage of 250 V. Calculate the current flowing in the lead connecting the water pump to the generator.

Use the equation:

$$\text{Current} = \frac{\text{Power}}{\text{Voltage}}$$

Answer _____ A [3]

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Examiner Only	
Marks	Remark

6 In an experiment on hearing, different frequencies were played to 20 teenagers and 20 pensioners. The number who could hear each frequency was recorded.
The results are shown in the table below.

Frequency (kHz)	Number who could hear each frequency	
	Teenagers	Pensioners
12	20	20
14	20	18
16	20	15
18	20	12
20	20	0
22	0	0

(a) (i) Describe fully what the information in the table tells us about hearing in teenagers.

_____

_____

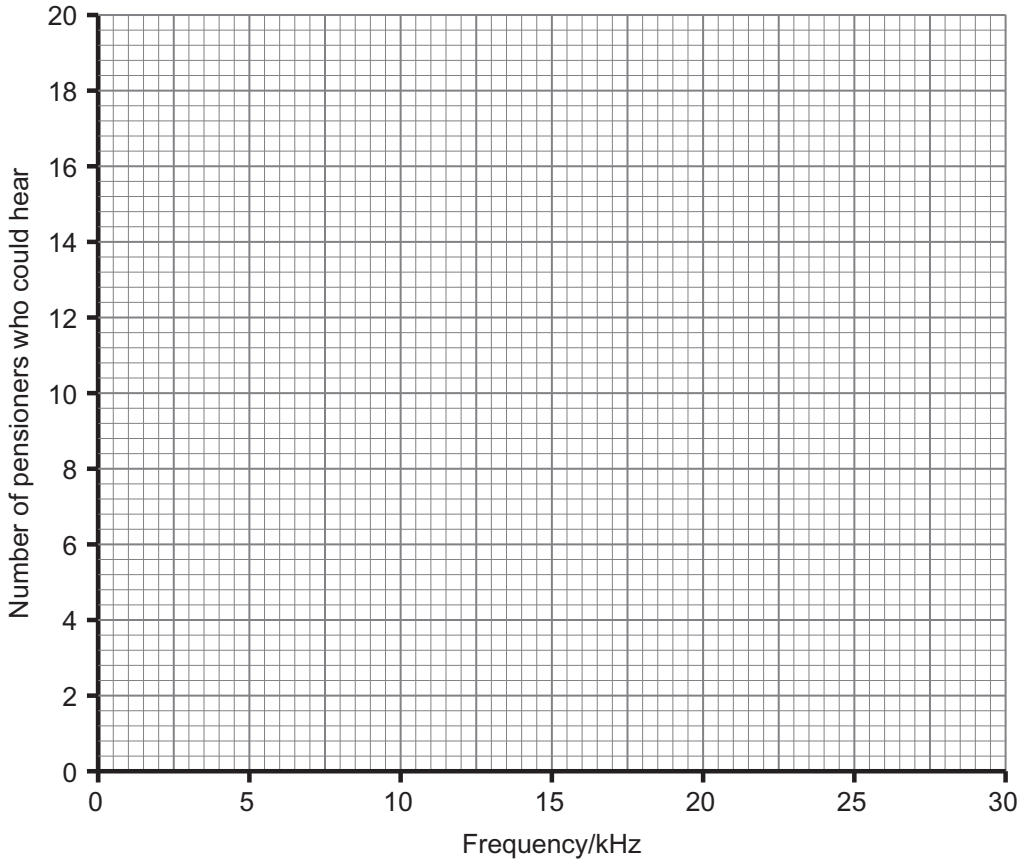
_____ [2]

(ii) What name is given to sounds above 20 kHz?

_____ [1]

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(b) Plot a line graph below for the **pensioners'** results.



[3]

(c) **(i)** Describe fully a conclusion that can be drawn about our ability to hear different frequencies as we get older.

_____

_____

_____ [2]

(ii) How could the accuracy of these results be improved?

_____ [1]

THIS IS THE END OF THE QUESTION PAPER

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Marks	Remark

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Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Electricity, Waves and Communication

Module 5

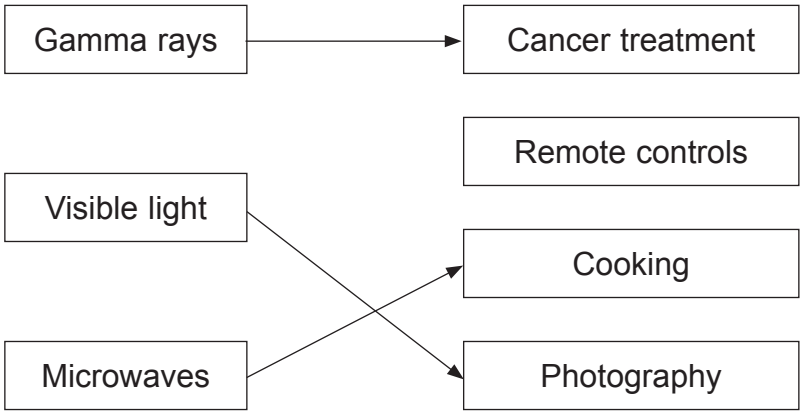
Foundation Tier

[GSC51]

THURSDAY 11 NOVEMBER 2010, AFTERNOON

MARK SCHEME

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					AVAILABLE MARKS
1	(a)	(i)	voltmeter parallel volts series [1] each	[4]	
		(ii)	gap in circuit/circuit not complete/broke [1] electricity/current doesn't flow [1]	[2]	
	(b)	(i)	S1 and S3	[1]	
		(ii)	none	[1]	8
2	(a)	(i)	skier	[1]	
		(ii)	skin cancer	[1]	
		(iii)	sun block/sun cream/extra clothing/cover up	[1]	
	(b)	(i)	 All lines correct [3] 2 correct [2] 1 correct [1]	[3]	
		(ii)	microwaves/infrared	[1]	7
3	(a)	(i)	transverse	[1]	
		(ii)	vibrations energy [1] each	[2]	
		(iii)	amplitude	[1]	
	(b)	(i)	A = cornea [1] and B = retina [1]	[2]	
		(ii)	convex/converging	[1]	
		(iii)	bend	[1]	8

					AVAILABLE MARKS
4	**(a)**	**(i)**	52 + 7 + 20 + 19 = 98 [1] 100 – 98 = 2% [2]	[2]	
		(ii)	wind/wave/biomass/geothermal/solar/tidal/sunlight	[1]	
		(iii)	will not run out/can be replaced/will always be there **not** can be used again	[1]	
		(iv)	less/no air pollution or less/no acid rain/less carbon dioxide less greenhouse effect/global warming **not** saves fossil fuels	[1]	
	(b)		energy efficient bulbs [1] lights off when no one in room/lights off during day [1]	[2]	7
5	**(a)**		no cost of buying fuel/no cost for transporting fuel solar is renewable (will not run out) less air pollution/carbon dioxide/global warming } maximum [2] less greenhouse effect	[3]	
	(b)		1 kW = 1000 W [1] $\frac{1}{250}$ [1] 1000/250 [2] 4 [3]	[3]	6
6	**(a)**	**(i)**	teenagers hear all frequencies/teenagers hear higher frequencies/as frequency increases, numbers stay the same/ teenagers can hear higher frequency sounds than pensioners [1] none can hear 22 kHz [1]	[2]	
		(ii)	ultrasound	[1]	
	(b)		6 points correct [2] 5/4 points [1] [1] for correct line	[3]	
	(c)	**(i)**	as we get older we can hear less well/unable to detect high frequency sounds/hearing decreases/hearing deteriorates [1] can't hear above 18 kHz [1]	[2]	
		(ii)	repeat/average/more people/more frequencies	[1]	9
				Total	**45**

Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2009–2010

Science: Single Award (Modular)

Electricity, Waves and Communication
Module 5
Foundation Tier

[GSC51]

GSC51

THURSDAY 20 MAY 2010, AFTERNOON

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

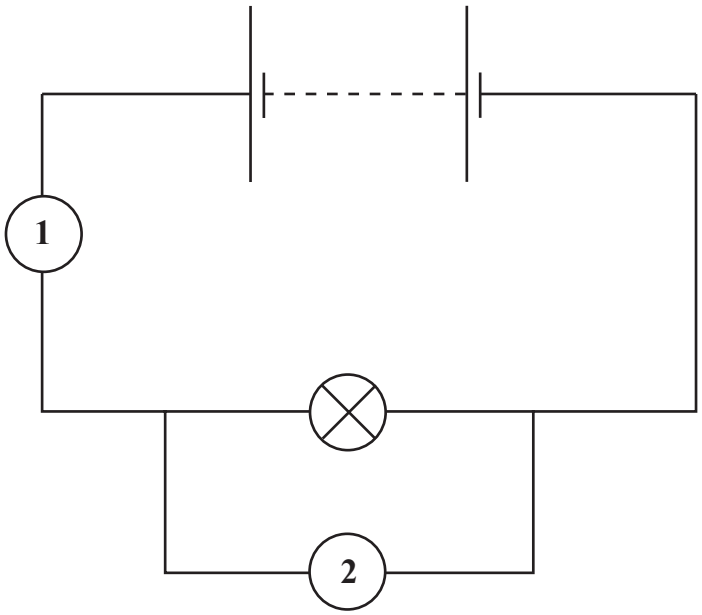
The total mark for this paper is 45.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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

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Examiner Only	
Marks	Remark

1 The circuit below was used to measure the current through and the voltage across a bulb.



(a) (i) What type of meter is meter ②?

Choose from :

voltmeter **ohmmeter** **ammeter**

_____ [1]

(ii) Complete the following sentence with **one** word that describes how meter ① is connected.

Meter ① is connected in _____ in the circuit. [1]

(iii) Give two changes you would see if more batteries were added to the circuit above.

1. _____

2. _____ [2]

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(b) If the voltage in the circuit was 6V and the current was 2A,

use the equation :

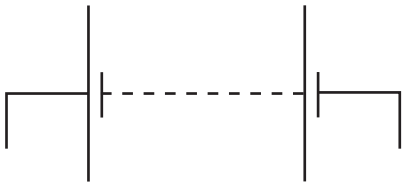
$$\textbf{resistance} = \frac{\textbf{voltage}}{\textbf{current}}$$

to calculate the resistance of the bulb.

Show your working.

Answer = _____Ω [2]

(c) Complete the circuit diagram below to show two bulbs connected in parallel.



[2]

Examiner Only

Marks	Remark

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Examiner Only	
Marks	Remark

2 **(a)** **(i)** Complete the following sentence about mobile phones.

Choose from:

city **infra-red** **microwave** **mast**

Mobile phones work by sending _____ signals to the nearest _____ which acts as a repeater station. [2]

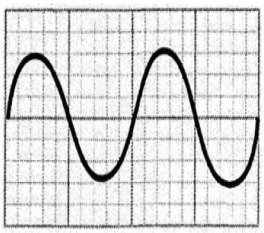
(ii) What is the area around a mast called?

_____ [1]

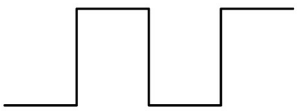
(iii) Name a disease associated with long-term use of mobile phones.

_____ [1]

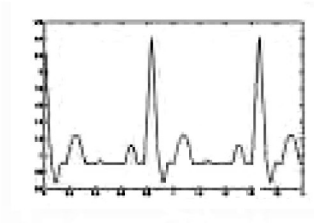
(b) **(i)** Which diagram below shows a digital signal?



A



B



C

Answer (A, B or C) _____ [1]

(ii) Digital signals are going to replace analogue signals by the year 2012. Give one **disadvantage** of analogue signals.

Circle the correct answer.

can be processed by computers

less interference

more interference

[1]

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Examiner Only	
Marks	Remark

3 **(a)** The picture below shows a three pin plug.



© *CCEA*

(i) Using lines match each pin with the colour of wire that should be connected to it.

Pin	**Colour of wire**
Earth	Blue
Neutral	Green/yellow
Live	Brown

[2]

(ii) Apart from the Earth wire, name one other safety feature of this plug.

_____ [1]

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Examiner Only	
Marks	Remark

(b) For safety reasons manufacturers are now supplying their appliances already fitted with the type of plug shown below.



© CCEA

(i) Suggest two reasons why this type of plug is safer for the user.

1. _____

_____

2. _____

_____ [2]

(ii) This plug is used to connect a laptop computer to the mains. The laptop requires 3.4 amps of current.

Which fuse should be used for the plug?

Choose from:

1A **3A** **5A** **13A**

Answer _____ [1]

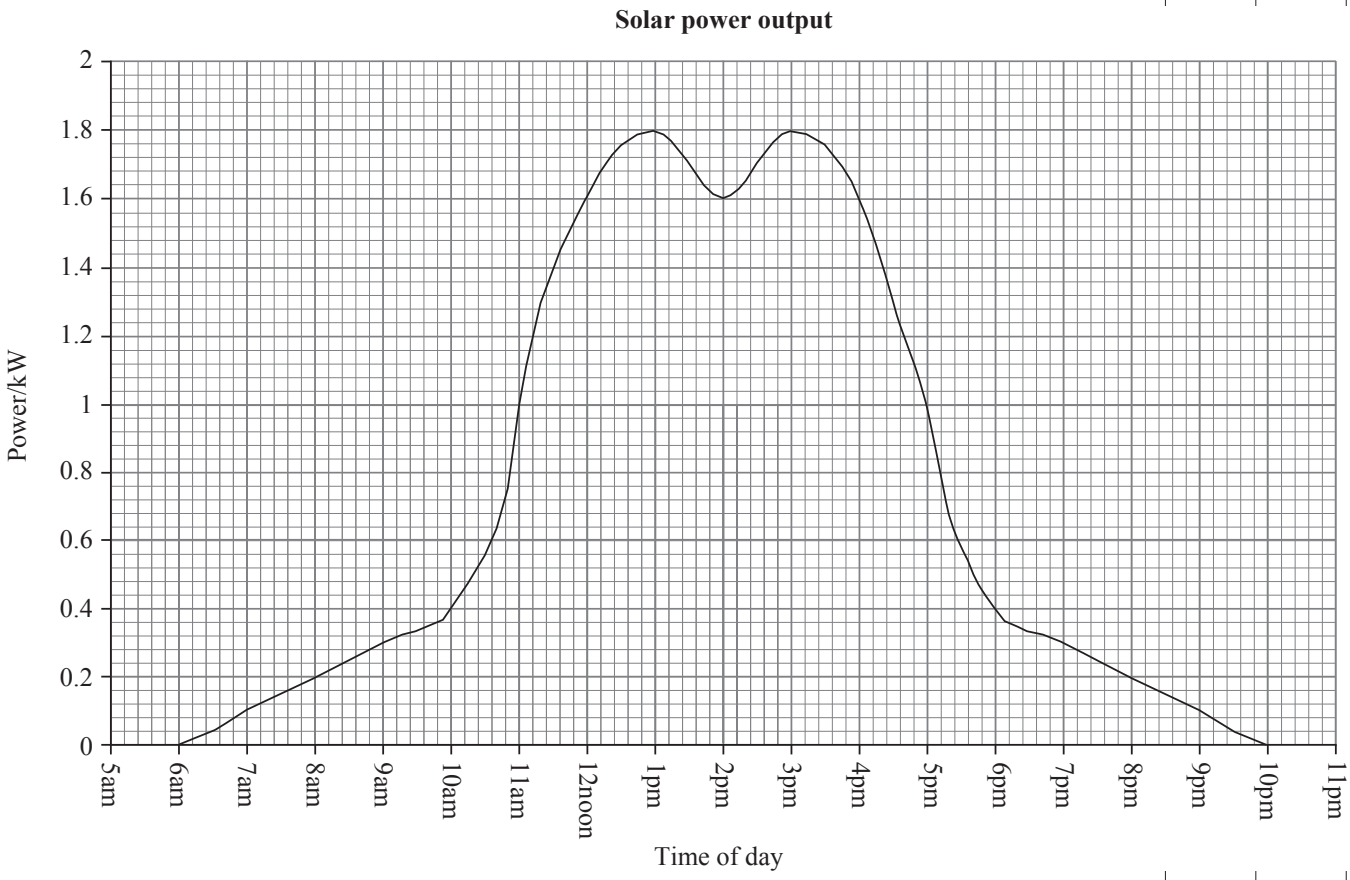
(iii) Name the wire not required inside the plug if the laptop is double insulated.

_____ [1]

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Examiner Only	
Marks	Remark

4 The graph below shows the electrical power output from a solar panel during a typical summer day.



(a) (i) Calculate the number of hours that the power output is greater than 1 kW. Show your working out.

Answer _____ hours [2]

(ii) How many watts are in 1 kW?

_____ [1]

(iii) Suggest a reason for the drop in power output during mid-afternoon.

_____ [1]

(iv) Draw a line on the graph above to show what the power output might be on a typical winter day. [2]

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(b) (i) Solar power is described as a renewable energy source.

What is meant by the term **renewable energy**?

_____ [1]

(ii) Explain fully how using renewable energy sources, such as solar power, reduces the amount of air pollution.

_____

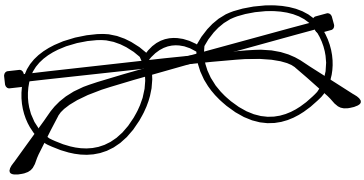
_____

_____ [2]

Examiner Only	
Marks	Remark

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5 The spectacles shown in the picture below contain convex (converging) lenses.



(a) (i) Describe fully what a convex lens does to parallel rays of light.

_____

_____

_____ [2]

(ii) Name the other type of lens.

_____ [1]

(b) The spectacles above are used to correct long sight.

Describe fully the cause of long sight and its effect on vision.

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

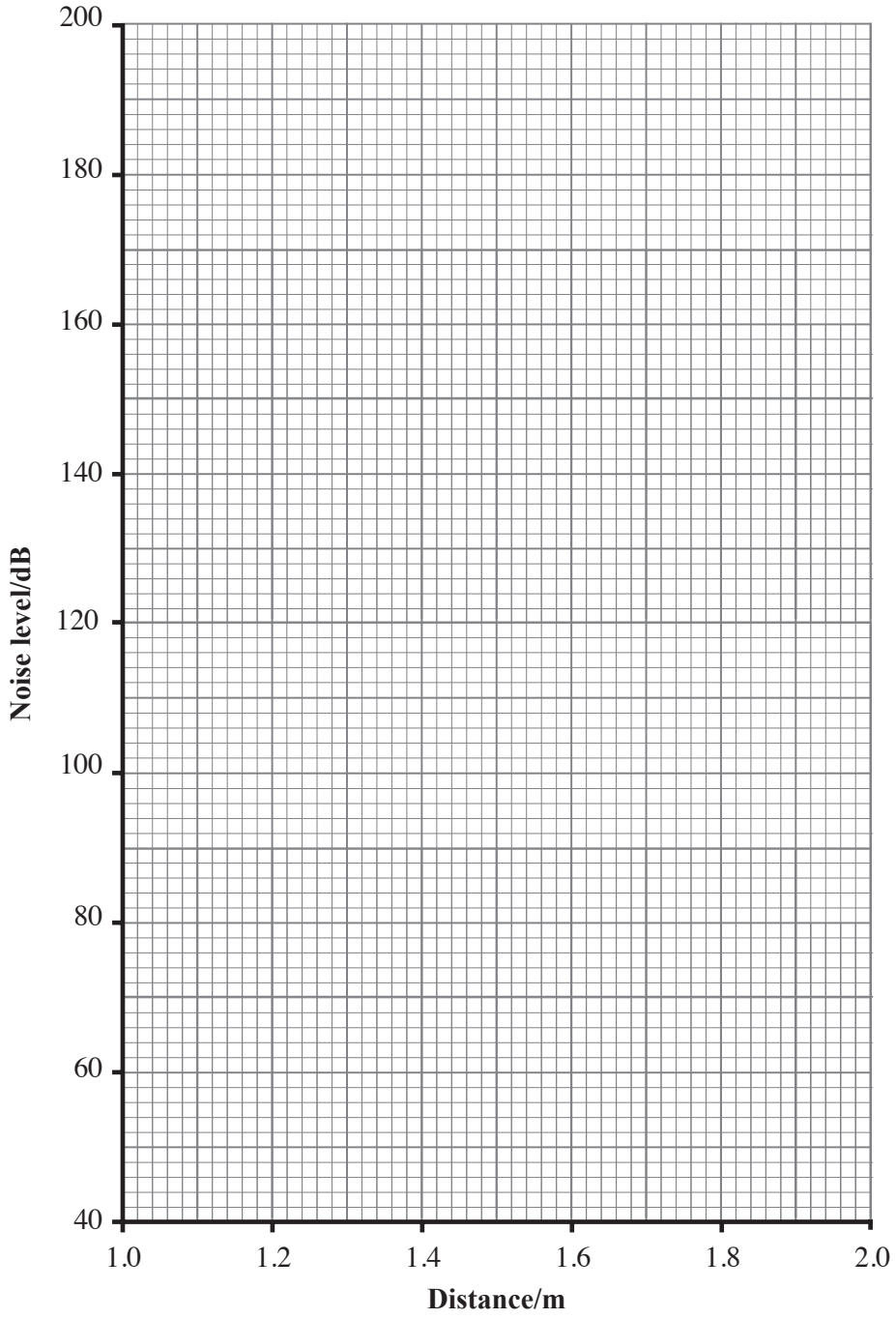
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6 The table below gives noise levels in a concert at different distances from the loudspeakers.

Distance/m	Noise level/dB
1.0	180
1.2	125
1.4	92
1.6	70
1.8	56

(a) (i) Plot these points on the grid below and draw a smooth curve.

[3]



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Marks	Remark

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(ii) State the conclusion that can be drawn from these results.

_____

_____ [1]

(iii) Use the graph to find the distance from the loudspeaker that gives a noise level of 80 dB.

Answer _____ m [1]

(iv) Sounds above 100 dB cause hearing damage. Use the graph to find the minimum distance that safety barriers should be placed at a concert.

Answer _____ m [1]

(b) The walls of modern concert halls are lined with soft material. Explain fully why this is done.

_____

_____

_____ [2]

(c) Humans can hear sounds with a frequency between 20 Hz and 20 kHz. What is the name given to sound with a frequency higher than 20 kHz?

_____ [1]

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Marks	Remark

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GCSE

Science: Single Award (Modular)

End of Module Tests

May 2010

Mark Schemes

Issued: October 2010

Rewarding Learning

General Certificate of Secondary Education
2009 – 2010

Science: Single Award (Modular)

Electricity, Waves and Communication
Module 5
Foundation Tier

[GSC51]

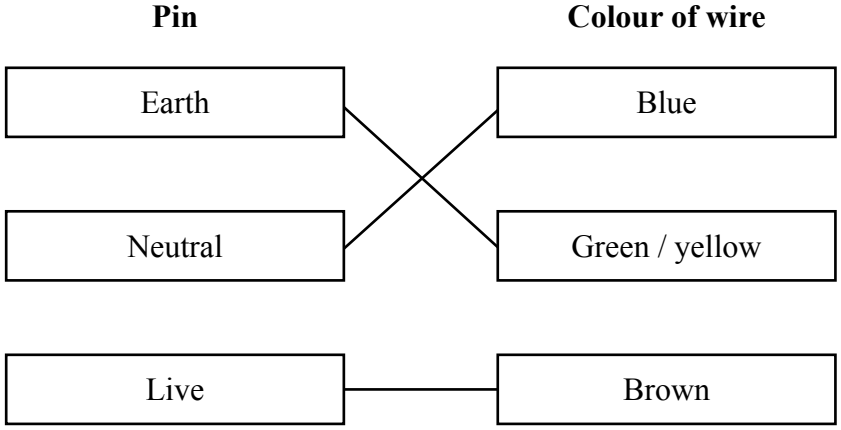
THURSDAY 20 MAY 2010, AFTERNOON

MARK SCHEME

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					AVAILABLE MARKS
1	**(a)**	**(i)**	voltmeter	[1]	
		(ii)	series	[1]	
		(iii)	increase in voltage / increase in current / stronger brighter bulb / hotter bulb / more power / more energy / blown bulb (any **two**, [1] each)	[2]	
	(b)		6 / 2 [1] 3 ohms [2]	[2]	
	(c)		bulbs in parallel [1] + complete circuit [1] bulbs in series = [0]	[2]	8
2	**(a)**	**(i)**	microwave / mast [1] each	[2]	
		(ii)	cell	[1]	
		(iii)	cancer or tumour	[1]	
	(b)	**(i)**	B	[1]	
		(ii)	more interference	[1]	6

3 **(a)** **(i)**



All lines correct = [2]
2/1 correct = [1] [2]

(ii) fuse / cable grip / insulation of live, neutral pin / longer earth pin / made of plastic / made of insulation (**not** double insulated)
(**not** plastic on wires) [1]

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					AVAILABLE MARKS
	(b)	**(i)**	Can't be wrongly wired up / wires can't be pulled out easier to replace fuse / come with correct fuse rating can't be opened / no loose wires / can't be tampered with (any **two**, [1] each) (**not** fully sealed)	[2]	
		(ii)	5A	[1]	
		(iii)	Earth wire	[1]	7
4	**(a)**	**(i)**	Between 11.00 am and 5.00 pm [1] 6 hours [2]	[2]	
		(ii)	1000	[1]	
		(iii)	cloud cover or shadow / shower (**not** changing weather)	[1]	
		(iv)	line under summer [1] starting later + finishing earlier than summer [1]	[2]	
	(b)	**(i)**	will not run out / can be replaced / always be there / can be used again / **neutral**	[1]	
		(ii)	less fossil fuels burned (or names); less carbon dioxide / less greenhouse gases / no carbon emissions (**not** incorrect symbol)	[2]	9
5	**(a)**	**(i)**	bending / refraction [1] Inwards / together [1] Focus [1]	[2]	
		(ii)	concave / diverging	[1]	
	(b)		Can't see near things clearly or Can only see far things clearly [1] lens [1] weak / thin [1] Light focused behind retina [1]	[3]	6

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					AVAILABLE MARKS
6	**(a)**	**(i)**	all 5 points [2] 4/3 [1] [1] for smooth curve No tolerance on points	[3]	
		(ii)	noise levels decrease with distance	[1]	
		(iii)	from graph 1.46 → 1.54	[1]	
		(iv)	from graph 1.32 → 1.38	[1]	
	(b)		acts as a sponge / absorb sound [1] prevents echoes / reverberation [1] or converse	[2]	
	(c)		Ultrasound / ultrasonic	[1]	9
				Total	**45**

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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2009–2010

Science: Single Award (Modular)

Electricity, Waves and Communication
Module 5

Foundation Tier

[GSC51]

GSC51

THURSDAY 25 FEBRUARY 2010, MORNING

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

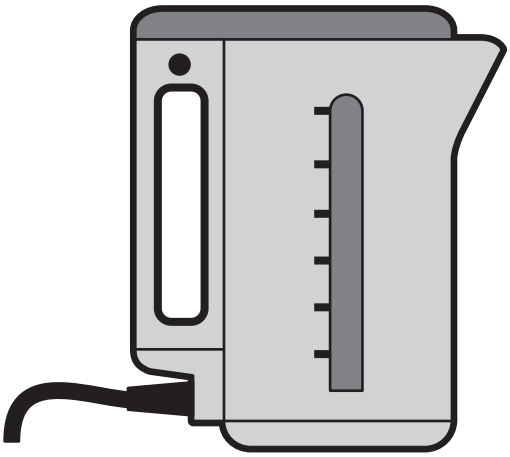
The total mark for this paper is 45.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

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

STEMUP.CO.UK

Examiner Only	
Marks	Remark

1 **(a)** The kettle shown below uses the heating effect of electricity.



(i) What causes this heating effect?

Choose from:

voltage **current** **resistance**

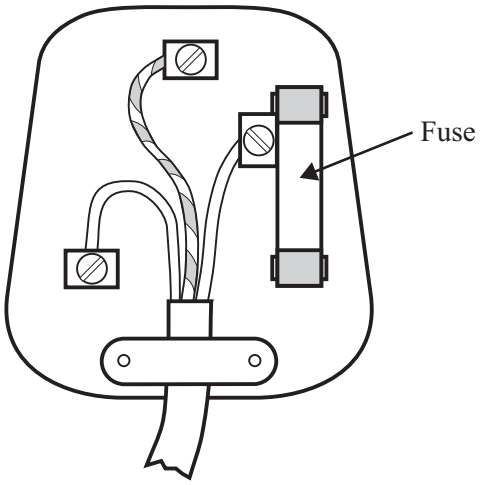
Answer _____ [1]

(ii) Name **two** other electrical appliances that use the heating effect of electricity.

_____ and _____ [2]

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(b) The plug shown below is fitted to a kettle. The kettle uses 1000 W of power and is connected to the 250 V mains.



(i) Calculate the current flowing through the plug.
Use the equation:

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

Answer _____ A [2]

(ii) What size of fuse should be fitted inside the plug above?

Choose from:

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

Answer _____ [1]

(iii) Apart from the fuse, name two other safety features found in a 3-pin plug.

1. _____

2. _____ [2]

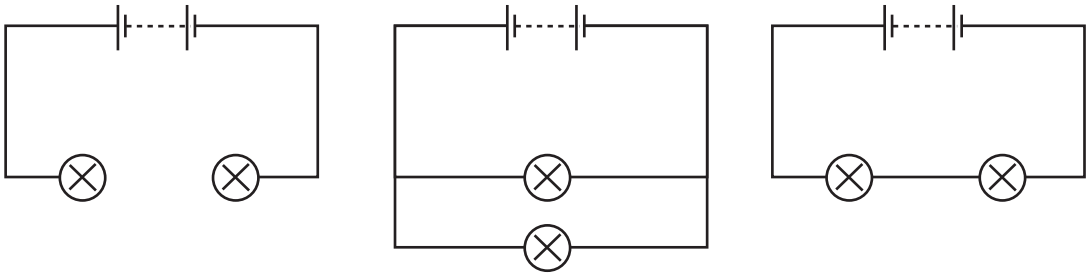
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Marks	Remark

2 Shown below are three simple circuit diagrams.



A **B** **C**

(a) Which circuit (A, B or C):

(i) will have the brightest bulbs?

Answer _____ [1]

(ii) does not allow the bulbs to light?

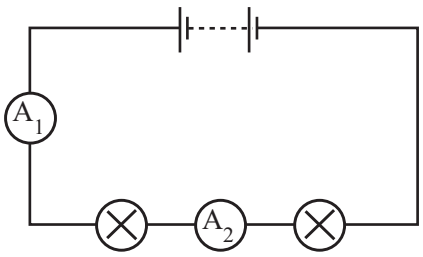
Answer _____ [1]

(b) If one bulb goes out in circuit B, what will happen to the other bulb?

_____[1]

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(c) Shown below is a series circuit.



(i) If the current flowing through A_1 is 2 A, what will be the current flowing through A_2?

A_2 = _____ A [1]

(ii) Name the meters A_1 and A_2.

Choose from:

voltmeter **ammeter** **ohmmeter**

Answer _____ [1]

(iii) What are the units of current?

Choose from:

ohms **volts** **amps**

Answer _____ [1]

(iv) What does the symbol  represent?

Answer _____ [1]

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3 **(a)** Below are five statements, but only three are correct descriptions of wave features.

The wavelength is the length of one complete vibration

The amplitude is the length of one complete vibration

The frequency is the number of vibrations per second

The wavelength is the maximum height of a wave

The amplitude is the maximum height of a wave

Which two statements are **not** correct?

1. _____

2. _____ [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.

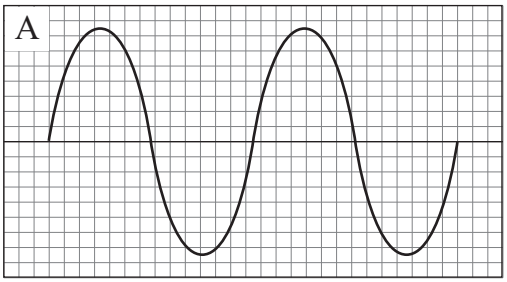
There are two types of waves, transverse and _____. [3]

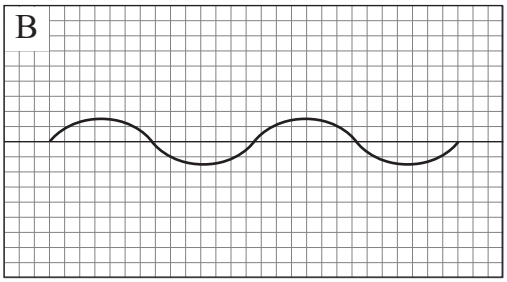
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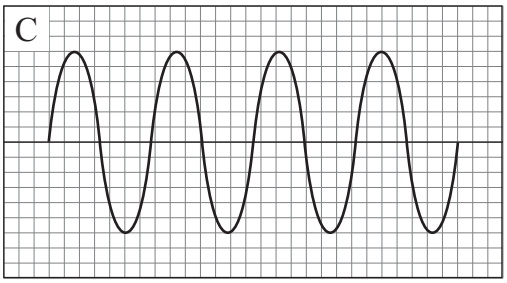
(c) The diagrams below show four waves taken over the same time.

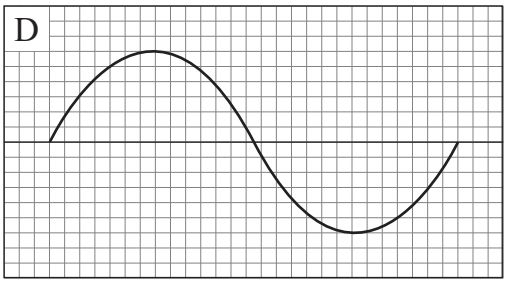
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(i) Which wave (A, B, C or D) has the largest amplitude?

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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4 The table below shows part of the electromagnetic spectrum.

gamma rays	X-rays	ultra-violet		infra-red	micro-waves	

(a) Name **one** of the missing waves from the diagram above.

_____ [1]

(b) X-rays are useful, but can be dangerous.

(i) Give **one** use of X-rays. _____

_____ [1]

(ii) Why are X-rays dangerous? _____

_____ [1]

(c) Give two features that all electromagnetic waves have in common.

1. _____ [1]

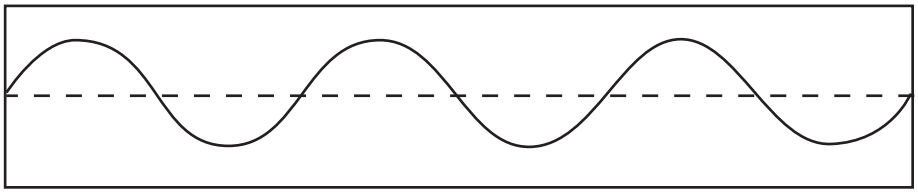
2. _____ [1]

(d) Microwaves can be used to send digital communication signals, e.g. satellite television.

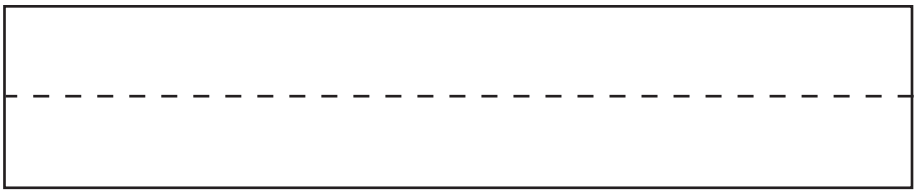
(i) Name another type of electromagnetic wave that can be used in communications.

_____ [1]

The diagram below shows how an analogue signal varies with time.



(ii) In the box below, show how a digital signal varies with time. [1]



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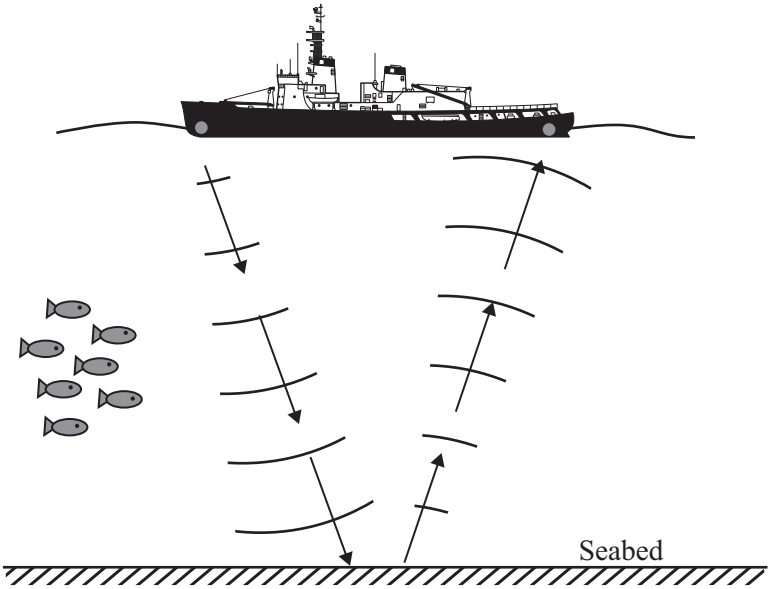
5 Humans can hear sounds of frequencies between 20 Hz and 20 kHz. This is called the human audible range.

(a) Explain fully how the audible range will change as we grow older.

_____

_____ [2]

(b) Ultrasound can be used to measure the depth of the sea and to find fish as shown in the diagram below.



Sound travels at 1500 m/s in water.

The ship sends out an ultrasound pulse and the echo returns 4 seconds later.

(i) Use the equation below to calculate the depth of the sea.

distance = speed × time

Depth = _____ m [3]

(ii) Use the information above to explain how the ship's captain will know when the shoal of fish swims under the boat.

_____

_____ [2]

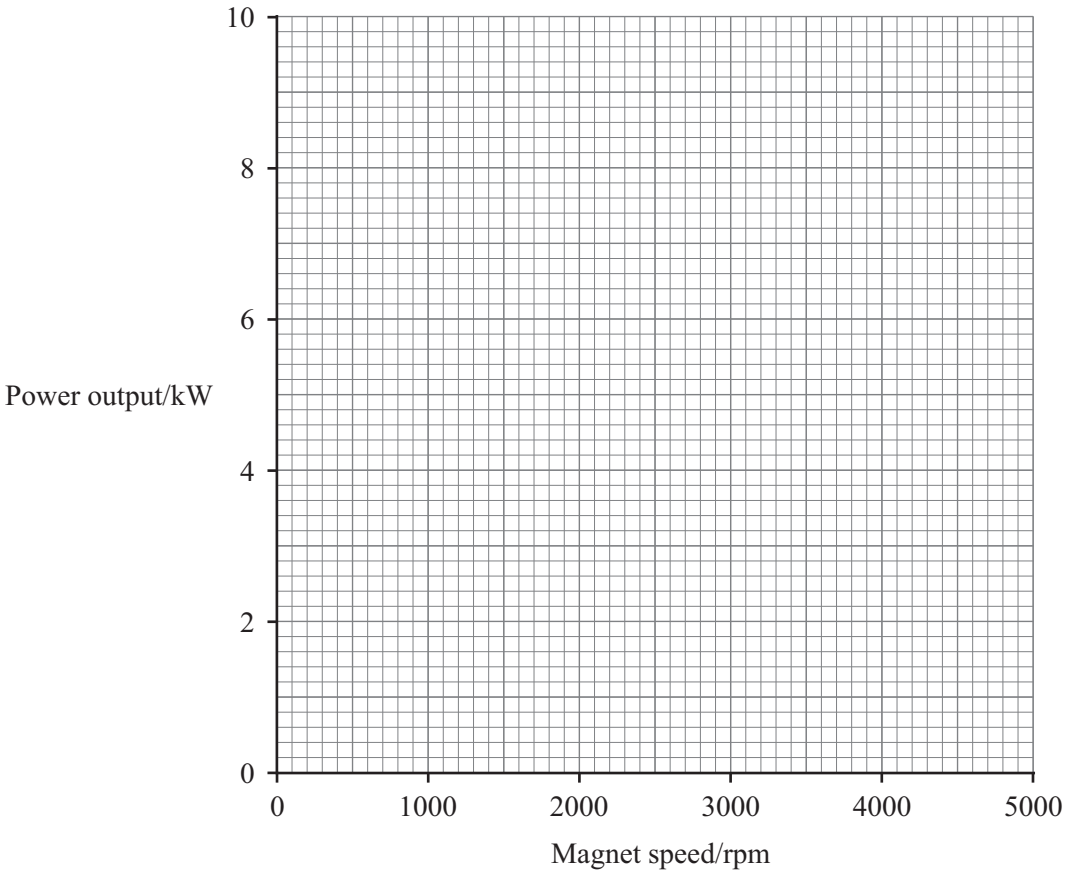
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6 The generator inside a power station produces electricity by having a magnet spin inside a coil of wire. The table below gives the power output for different magnet speeds in an investigation.

Magnet speed/rpm	Power output/kW
0	0
800	1.6
2000	4
3200	6.4
4000	7.8
4500	8
5000	8

(a) Plot a **line graph** for the figures shown in the table.



[3]

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(b) Describe fully the conclusion shown by the results of the investigation.

_____

_____

_____ [2]

(c) It is proposed that fossil fuel power stations should be replaced with nuclear power stations. Describe **two** environmental advantages of this proposal.

_____

_____

_____ [2]

(d) Fossil fuels and nuclear power are described as non-renewable energy sources. Explain the term **non-renewable**.

_____

_____ [1]

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THIS IS THE END OF THE QUESTION PAPER

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GCSE

Science: Single Award (Modular)

March 2010

Mark Schemes

Issued: May 2010

Rewarding Learning

General Certificate of Secondary Education
2009 – 2010

Science: Single Award (Modular)

Electricity, Waves and Communication

Module 5

Foundation Tier

[GSC51]

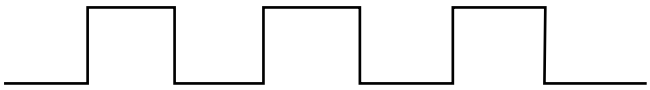
THURSDAY 25 FEBRUARY 2010, MORNING

MARK SCHEME

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					AVAILABLE MARKS
1	**(a)**	**(i)**	resistance	[1]	
		(ii)	toaster / hair drier / fire / cooker / straighteners / shower / tumble dryer **not** microwave / lamp (any 2 = 1 mark each)	[2]	
	(b)	**(i)**	1000 / 250 = 1 mark 4 = 2 marks	[2]	
		(ii)	5A c.m.	[1]	
		(iii)	cable grip / plastic (insulated) cover / earth wire / longer earth pin **not** plastic wire covering (any 2 = 1 mark each)	[2]	8
2	**(a)**	**(i)**	B	[1]	
		(ii)	A	[1]	
	(b)		stay lit / gets brighter / nothing	[1]	
	(c)	**(i)**	A2 = 2A	[1]	
		(ii)	ammeters	[1]	
		(iii)	amps	[1]	
		(iv)	battery/cell	[1]	7
3	**(a)**		The amplitude is the length of one complete vibration The wavelength is the maximum height of a wave	[1] [1]	
	(b)		vibrations / energy / longitudinal (1 mark each)	[3]	
	(c)	**(i)**	A	[1]	
		(ii)	D	[1]	
		(iii)	A + B	[1]	8

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			AVAILABLE MARKS
4	**(a)**	(visible) light / radio (waves) [1]	
	(b)	**(i)** looking at fractures/looking for cracks in pipes / bongs / teeth [1]	
		(ii) damage cells / cause cancer / harms baby or mum in pregnancy / damages tissues or organs [1]	
	(c)	**carry** energy / transverse / travel at (same) speed of light Can travel through a vacuum (any 2 = 1 mark each) [2]	
	(d)	**(i)** radio (waves) / visible (light) / infra red (any 1) [1]	
		(ii)  [1]	7
5	**(a)**	it shrinks = 1 mark / lessens / decrease **not** loudness / gets worse / lower we can't hear high pitch (frequencies) = 2 marks or implied [2]	
	(b)	**(i)** 1500 × 4 = 1 mark 1500 × 2 = 2 marks **not** 6000 3000m = 3 marks [3]	
		(ii) (sound / sonar / echo returns) = 1 mark quicker = 2 marks decrease in depth = 1 mark [2]	7
6	**(a)**	all points correct = 2 marks 6/5/4 points correct = 1 mark Correct line of best fit = 1 mark [3]	
	(b)	power output increases with speed = 1 mark **not** converse Up to a maximum = 1 mark [2]	
	(c)	less acid rain / less **air** pollution / less carbon dioxide / less sulphur dioxide **not** fossil fuels Less global warming (any 2 = 1 mark each) / less greenhouse gases [2]	
	(d)	will run out / can't be replaced / implied limited **not** can't be used again [1]	8
		Total	**45**