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	

Examiner Only	
Marks	Remark

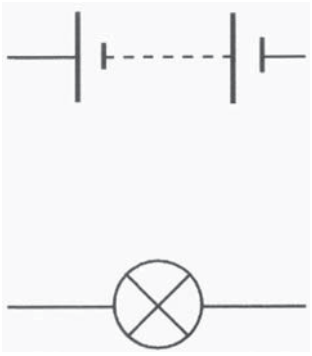
1 **(a)** Given below are the names of some electrical components and descriptions of what they do.

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]

(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

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]

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

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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.

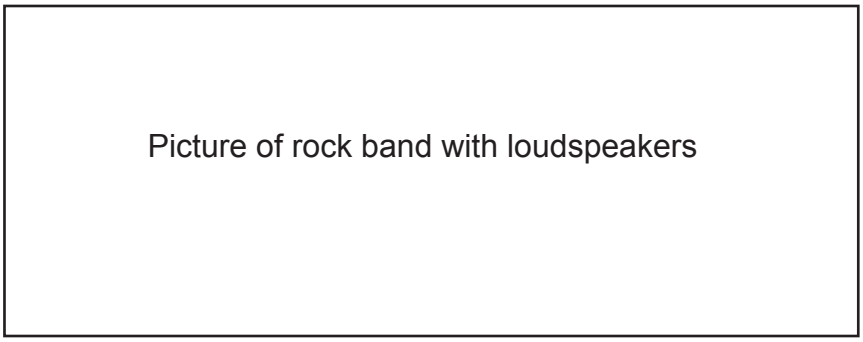
_____ [1]

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

_____ [1]

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.

Examiner Only	
Marks	Remark

(i) What do we call reflected sounds?

_____ [1]

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

_____

_____

_____ [2]

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.

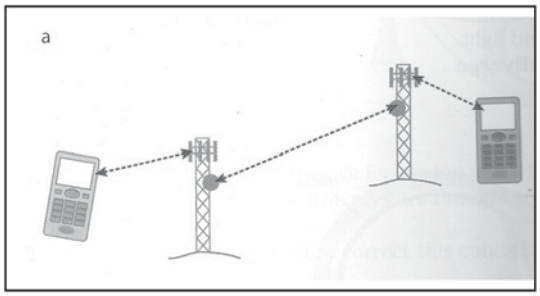
_____ [1]

(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.



(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]

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

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Marks	Remark

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

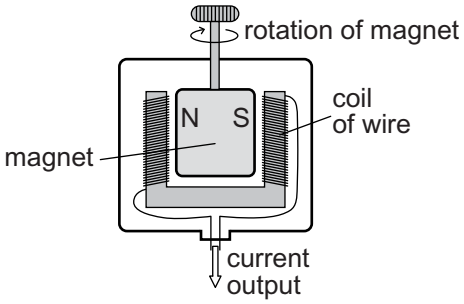
_____ [1]

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

_____ [1]

Examiner Only	
Marks	Remark
0	

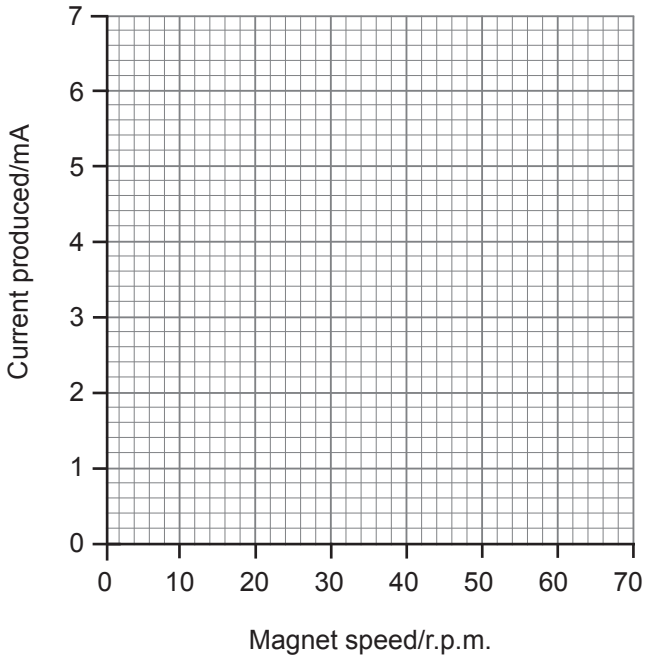
5 An investigation was carried out using a bicycle dynamo to find how the amount of current produced depends on the speed of rotation of a magnet.



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]

(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.

_____

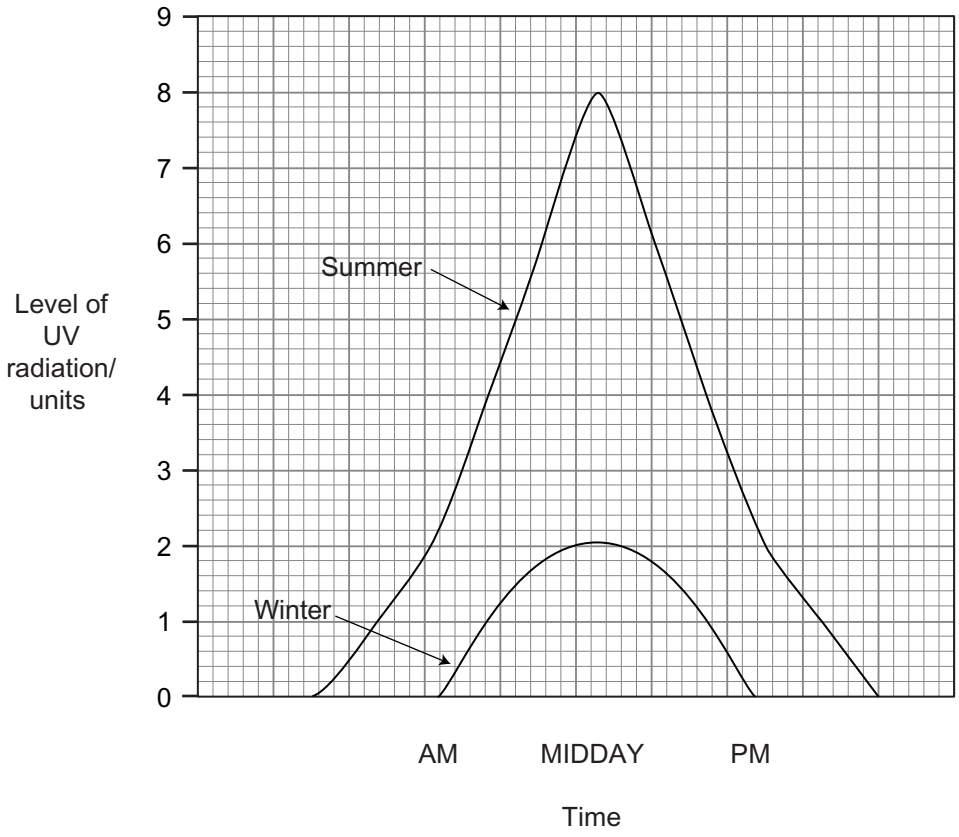
_____

_____ [2]

Examiner Only	
Marks	Remark

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]

THIS IS THE END OF THE QUESTION PAPER