Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2010–2011

Science: Single Award (Modular)

Electricity, Waves and Communication
Module 5

Higher Tier

[GSC52]

GSC52

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.

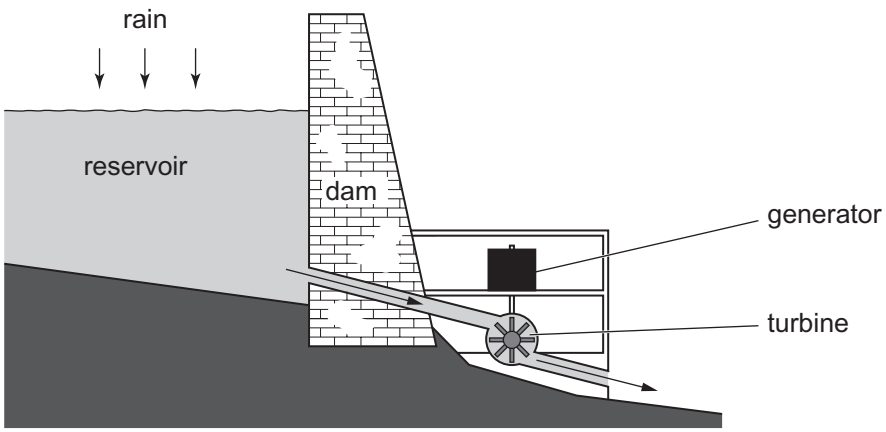
INFORMATION FOR CANDIDATES

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	

Examiner Only	
Marks	Remark

1 The diagram below shows a hydroelectric power station.



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(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]

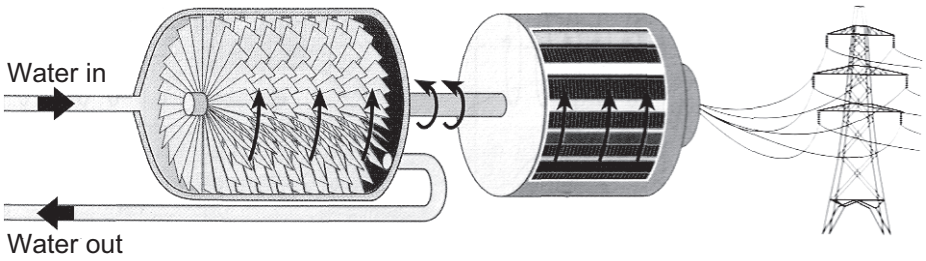
(b) Describe and explain **one** environmental disadvantage of using hydroelectric power stations.

_____

_____

_____ [2]

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



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Explain fully how the turbine and generator produce electricity.

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

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

© George Doyle/Stockbyte/Thinkstock

© istockphoto/Thinkstock

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

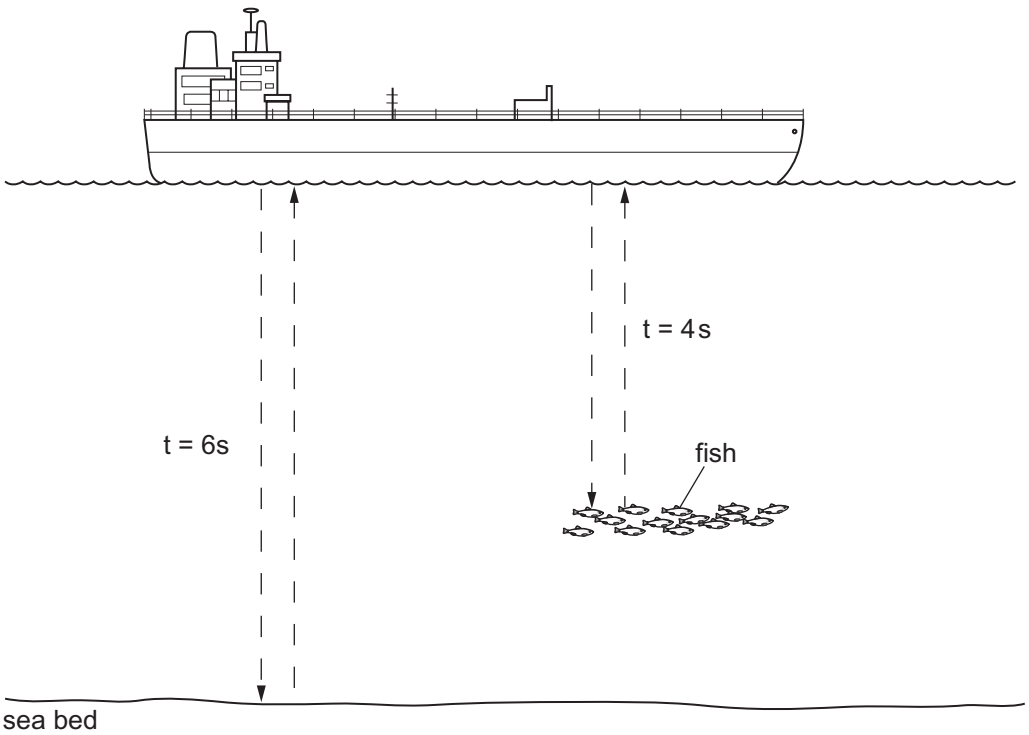
_____

_____

_____

_____ [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

Examiner Only	
Marks	Remark

3 A microfilter adapter allows both a computer and a telephone to be connected into one phone line currently made of copper.

These copper phone lines are now being replaced with fibre optic cables.

(a) Describe and explain **one** advantage of using fibre optic cables.

_____

_____

_____ [2]

(b) Information can be sent using either digital or analogue signals.

(i) Describe each type of signal.

_____

_____

_____

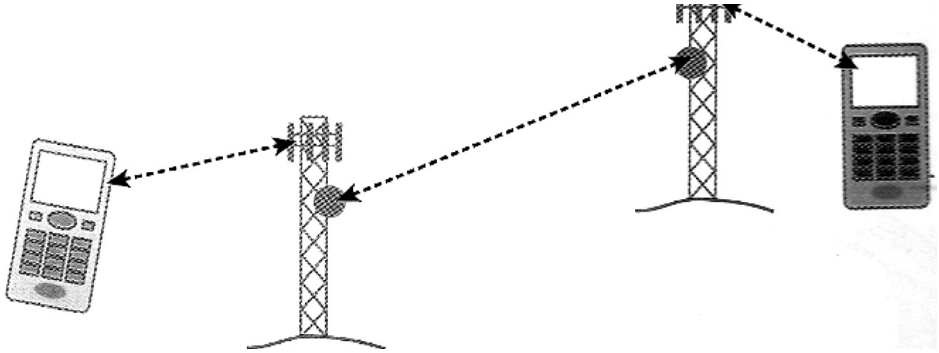
_____ [2]

(ii) Give **one** advantage of using digital signals.

_____

_____ [1]

(c) The diagram below shows how information can be sent between two mobile phones.



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(i) Name the type of electromagnetic wave that travels between the mast and phone.

_____ [1]

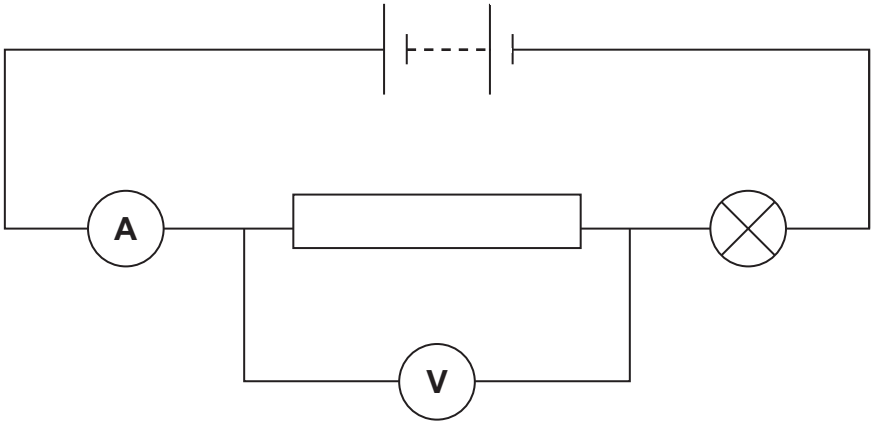
(ii) What name is given to the area around a mast?

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

4 The circuit below was set up to investigate how the resistance of a wire depends on the length.



Pupils placed a variety of lengths of wire in the circuit. Their results are recorded in the table.

Length/m	Voltage/V	Current/A	Resistance/ ohms
0.5	4	2.0	2.0
1.0	4	0.9	4.5
1.5	4	0.6	6.5
2.0	4	0.4	9.0
2.5	4		11.5

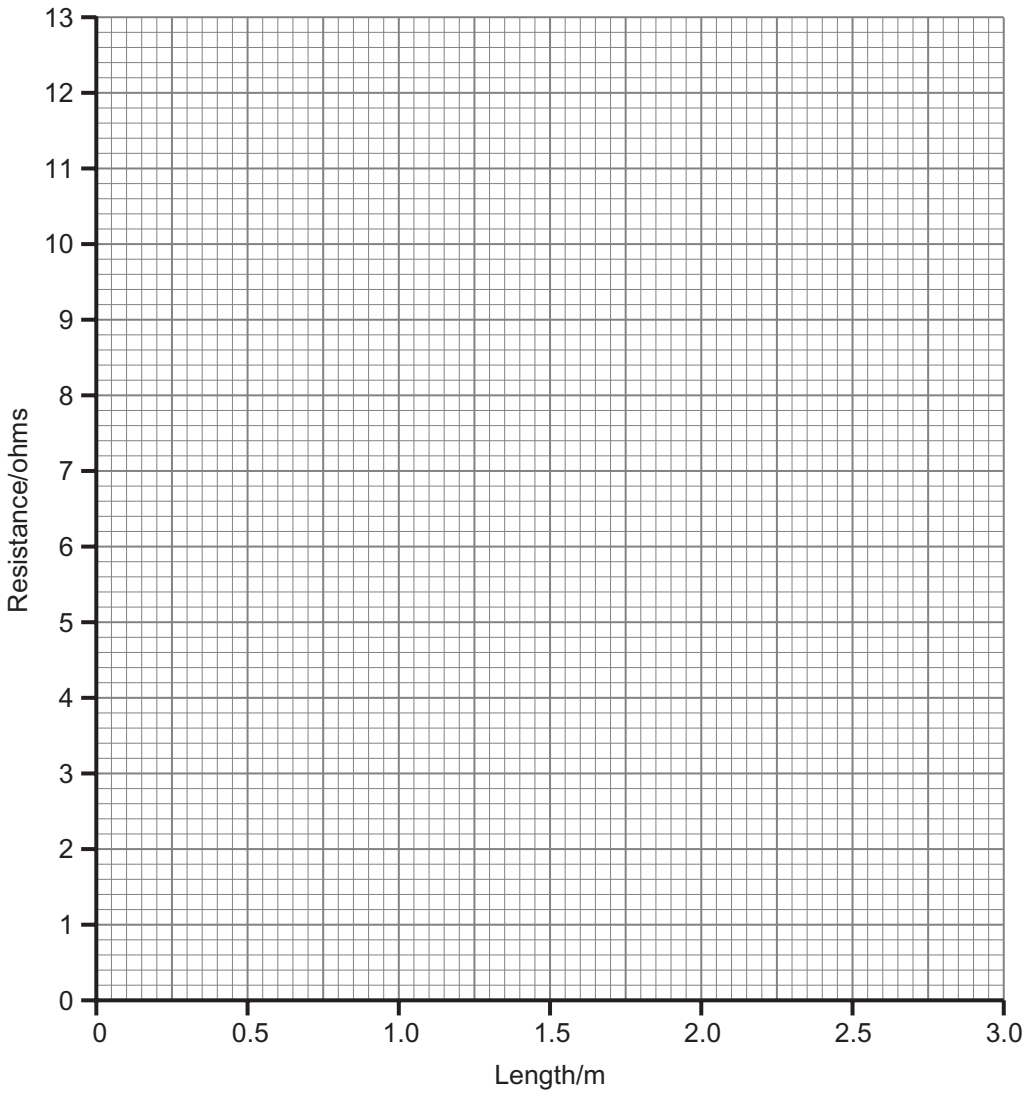
(a) Use the following equation:

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

to calculate the current flowing through the 2.5 m length.
Show your working out.

_____ A [2]

(b) Draw a line graph for resistance against length on the grid below.



[3]

(c) Apart from voltage, give two other factors that must be kept the same during this investigation to make the test fair.

1. _____

2. _____ [2]

(d) State the trend shown by the results of this investigation.

_____

_____ [1]

(e) How could the pupils have achieved more reliable results?

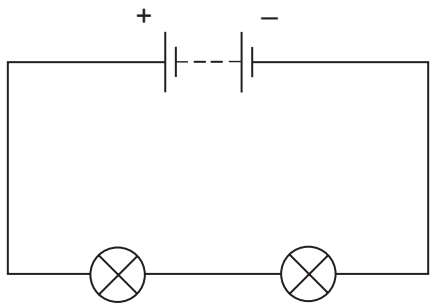
_____

_____ [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

5 The diagram below shows two identical bulbs connected in series.



(a) (i) Draw an arrow on the diagram to show the direction of conventional current flow. [1]

(ii) Use your knowledge of atomic structure to describe and explain the difference between conventional and actual current flow.

_____

_____

_____

_____ [3]

(b) Use the meter readings below to calculate the cost of electricity used by a household.

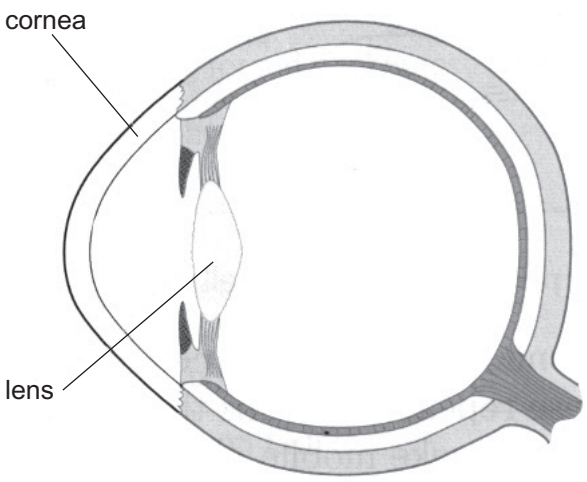
Electricity costs 15p per unit.

4 0 9 4 8	3 9 6 6 6
present reading	previous reading

Cost = _____ [2]

Examiner Only	
Marks	Remark

6 **(a)** The diagram below shows the human eye.



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

_____ [1]

(ii) Describe fully what will happen to parallel rays of light as they pass through this type of lens.

_____

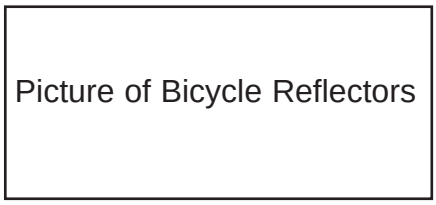
_____

_____ [2]

(iii) A common eyesight problem is caused when the lens is too weak. Name this eyesight problem.

_____ [1]

(b) The picture below shows bicycle reflectors.



Explain fully, in terms of total internal reflection, how these bicycle reflectors work.

_____

_____

_____

_____ [3]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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